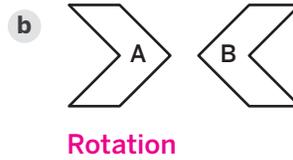
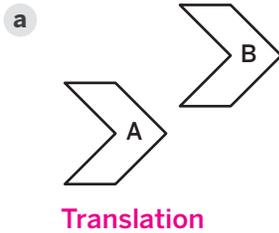


Additional Practice

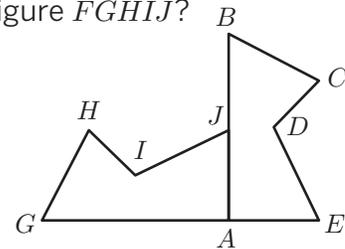
1.02

1. For each movement from Figure A to Figure B, decide whether it shows a translation or a rotation.



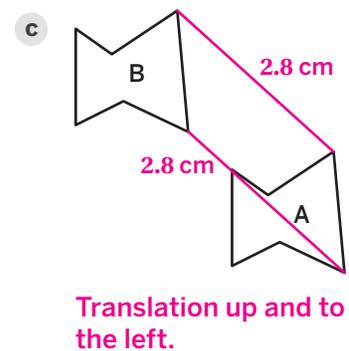
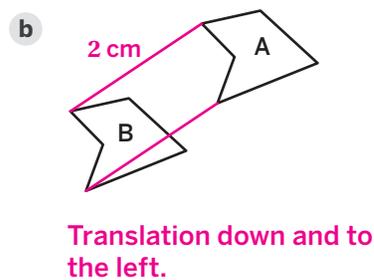
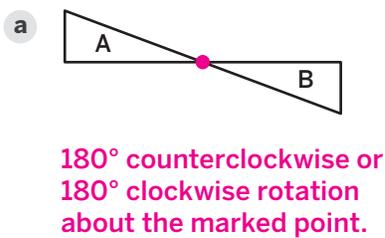
2. Which best describes the movement from Figure $ABCDE$ to Figure $FGHIJ$?

- A. 90° clockwise rotation about point A .
- B. 90° counterclockwise rotation about point A .
- C. 180° clockwise rotation about point A .
- D. 270° counterclockwise rotation about point A .

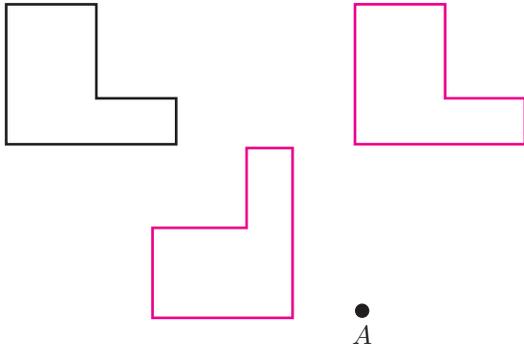


3. For each movement from Figure A to Figure B:

- Decide whether it shows a translation or rotation.

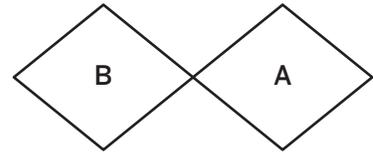


4. You will need a centimeter ruler. Translate the figure shown 4.5 cm right, and then rotate the newly translated figure 90° counterclockwise about point A .



5. Refer to Figure A and Figure B. Is the movement from Figure A to Figure B a *translation*, a *rotation*, or *both*? Explain your thinking.

Both; Sample response: You can translate Figure A to the left to map it onto Figure B. You can also rotate Figure A 180° clockwise or counterclockwise about a point to map Figure A onto Figure B.



Name: _____ Date: _____ Period: _____

Additional Practice 1.02

1. For each movement from Figure A to Figure B, decide whether it shows a translation or a rotation.

a

Translation

b

Rotation

2. Which best describes the movement from Figure $ABCDE$ to Figure $FCHIJ$?

A. 90° clockwise rotation about point A .
 B. 90° counterclockwise rotation about point A .
 C. 180° clockwise rotation about point A .
 D. 270° counterclockwise rotation about point A .

3. For each movement from Figure A to Figure B:

- Decide whether it shows a translation or rotation.

a

180° counterclockwise or 180° clockwise rotation about the marked point.

b

Translation down and to the left.

c

Translation up and to the left.

Unit 1 Lesson 2 3 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

4. You will need a centimeter ruler. Translate the figure shown 4.5 cm right, and then rotate the newly translated figure 90° counterclockwise about point A .

5. Refer to Figure A and Figure B. Is the movement from Figure A to Figure B a translation, a rotation, or both? Explain your thinking.

Both: Sample response: You can translate Figure A to the left to map it onto Figure B. You can also rotate Figure A 180° clockwise or counterclockwise about a point to map Figure A onto Figure B.

Unit 1 Lesson 2 4 Additional Practice

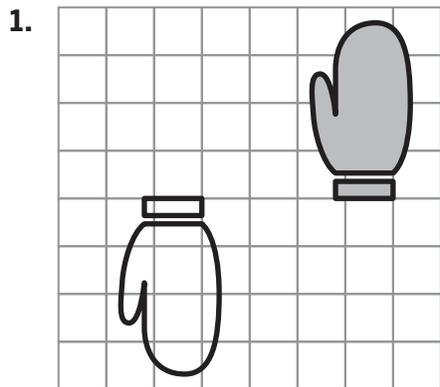
Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.1
2	1	8.G.A.1
3	2	8.G.A.1
4	2	8.G.A.1
5	3	8.G.A.1

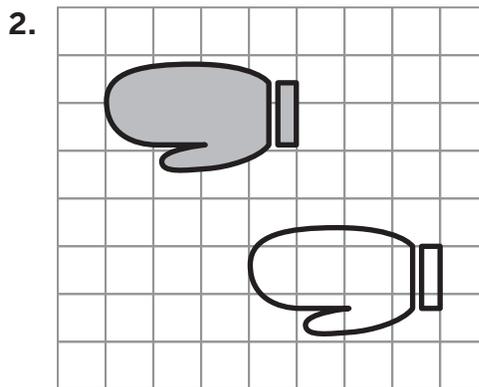
Notes:

Additional Practice **1.03**

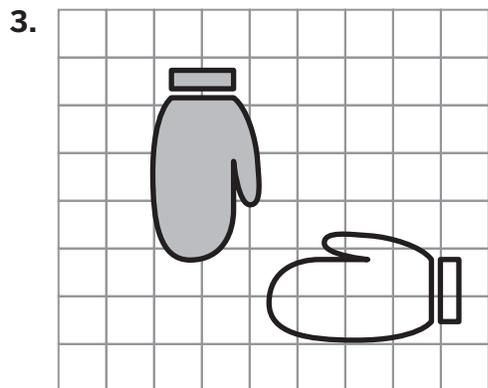
Problems 1–4: Describe a sequence of transformations that moves the shaded figure onto the unshaded figure.



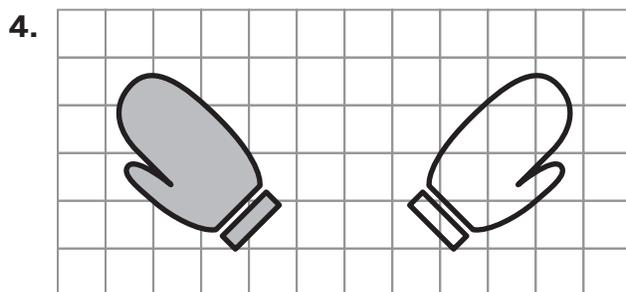
Explanations vary. Reflect over a horizontal line and translate 4 units to the left.



Explanations vary. Translate 3 units down and 4 units to the right.



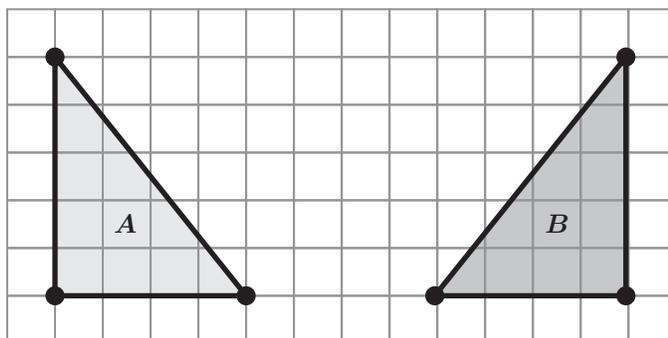
Explanations vary. Rotate 90 degrees clockwise about a point.



Explanations vary. Reflect across a horizontal line right between the two figures.

5. Refer to the figures shown. Identify the transformation that has occurred from Figure A to Figure B.

- A. Translation 4 units to the left
- B. Translation 8 units to the right
- C. Reflection across a vertical line
- D. Reflection across a horizontal line



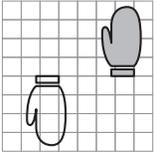
6. Select *all* the sequences of transformations that could return a figure to its original position.

- A. Rotate the figure around a point 90° clockwise and then rotate it another 90° clockwise
- B. Reflect the figure over one line and then reflect over a different line.
- C. Translate the figure 3 units down, then 5 units up, and then 2 units down.
- D. Reflect the figure over one line and then reflect over the same line.
- E. Rotate the figure 90° counterclockwise around a point and then 270° counterclockwise around the same point.
- F. Rotate a figure 180° counterclockwise, then reflect it over a vertical line.

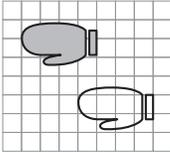
Name: _____ Date: _____ Period: _____

Additional Practice 1.03

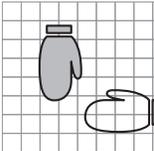
Problems 1–4: Describe a sequence of transformations that moves the shaded figure onto the unshaded figure.

1. 

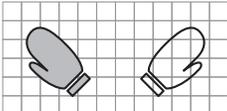
Explanations vary. Reflect over a horizontal line and translate 4 units to the left.

2. 

Explanations vary. Translate 3 units down and 4 units to the right.

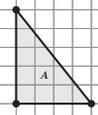
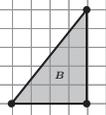
3. 

Explanations vary. Rotate 90 degrees clockwise about a point.

4. 

Explanations vary. Reflect across a horizontal line right between the two figures.

5. Refer to the figures shown. Identify the transformation that has occurred from Figure A to Figure B.

A. Translation 4 units to the left
 B. Translation 8 units to the right
 C. Reflection across a vertical line
 D. Reflection across a horizontal line

Unit 1 Lesson 3 5 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

6. Select *all* the sequences of transformations that could return a figure to its original position.

- A. Rotate the figure around a point 90° clockwise and then rotate it another 90° clockwise
- B. Reflect the figure over one line and then reflect over a different line.
- C. Translate the figure 3 units down, then 5 units up, and then 2 units down.
- D. Reflect the figure over one line and then reflect over the same line.
- E. Rotate the figure 90° counterclockwise around a point and then 270° counterclockwise around the same point.
- F. Rotate a figure 180° counterclockwise, then reflect it over a vertical line.

Unit 1 Lesson 3 6 Additional Practice

Practice Problem Analysis		
Problem	DOK	Standard(s)
1	2	8.G.A.1
2	2	8.G.A.1
3	2	8.G.A.1
4	2	8.G.A.1
5	1	8.G.A.1
6	1	8.G.A.1

Notes:

Additional Practice

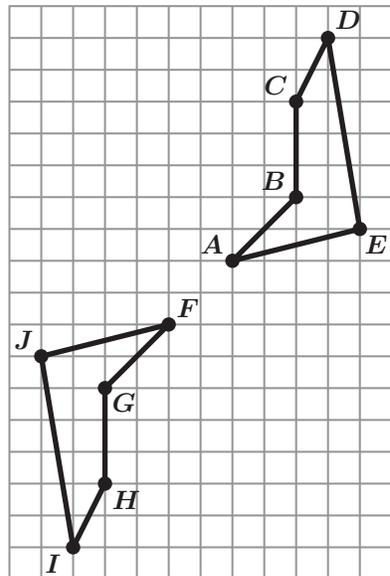
1.04

1. A sequence of transformations maps Polygon $ABCDE$ onto Polygon $FGHIJ$. Select the correct sequence.

Sequence A: Reflect Polygon $ABCDE$ over a vertical line, and then reflect the resulting image across a horizontal line.

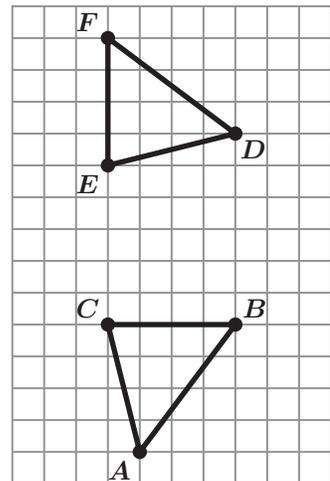
Sequence B: Translate Polygon $ABCDE$ down 9 units, and then reflect the resulting image across a vertical line.

Series A



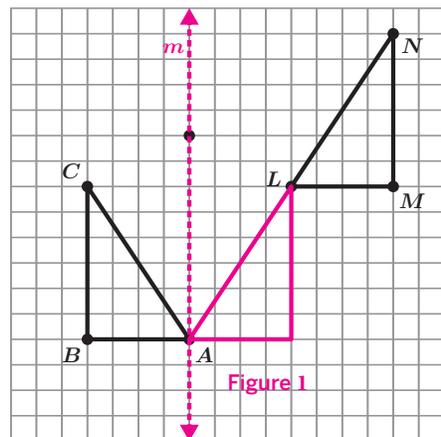
2. Select the series of transformations that maps Triangle ABC onto Triangle DFE .

- A. Rotate Triangle ABC 90° counterclockwise about point C , and then translate the resulting image up 5 units.
- B. Rotate Triangle ABC 90° counterclockwise about point A , and then translate the resulting image up 5 units.
- C. Reflect Triangle ABC across line AB , and then translate the resulting image up 5 units and 1 unit left.
- D. Translate Triangle ABC up 9 units, and then rotate the resulting image 90° counterclockwise about point A .



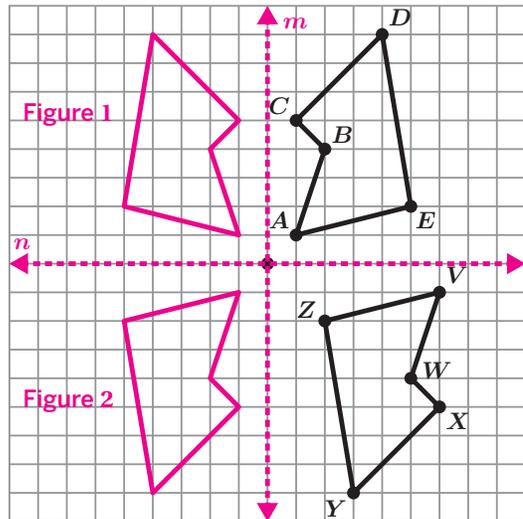
3. Describe a sequence of transformations that maps Triangle ABC onto Triangle LMN .

Sample response: Reflect Triangle ABC across line m to create Figure 1. Translate Figure 1 6 units up and 4 units right to create Triangle LMN .



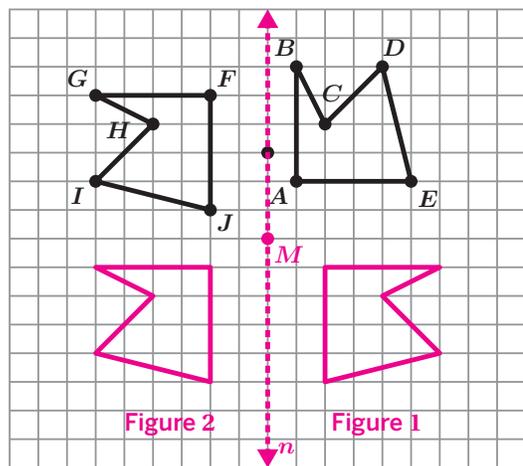
4. Describe a sequence of transformations that maps Polygon $ABCDE$ onto Polygon $VWXYZ$.

Sample response: Reflect Polygon $ABCDE$ across line m to create Figure 1. Reflect Figure 1 across line n to create Figure 2. Translate Figure 2 27 units right to create Polygon $VWXYZ$.



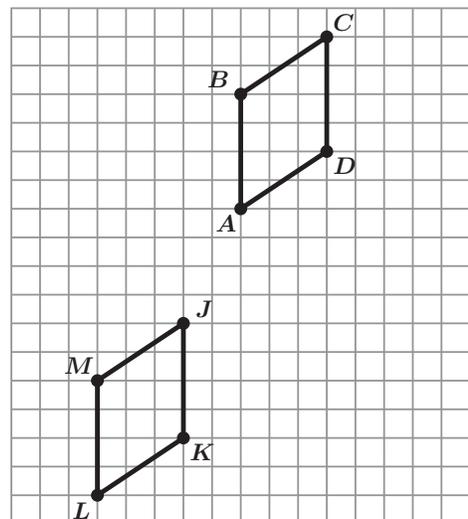
5. Describe a sequence of transformations that maps Polygon $ABCDE$ onto Polygon $FGHIJ$.

Sample response: Rotate Polygon $ABCDE$ 90° clockwise about point M to create Figure 1. Reflect Figure 1 across line n to create Figure 2. Translate Figure 2 6 units up.



6. Kiran claims that there are at least two different transformations or sequences of transformations that map Polygon $ABCD$ onto Polygon $JKLM$. Is he correct? Explain your thinking.

Kiran is correct. Sample response: There are at least two ways. One way: Rotate Polygon $ABCD$ 180° clockwise about a point halfway between point A and point J . Another way: Reflect Polygon $ABCD$ across a vertical line, and then reflect that image over a horizontal line.



Name: _____ Date: _____ Period: _____

Additional Practice

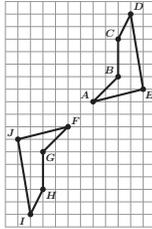
1.04

1. A sequence of transformations maps Polygon $ABCDE$ onto Polygon $FGHIJ$. Select the correct sequence.

Sequence A: Reflect Polygon $ABCDE$ over a vertical line, and then reflect the resulting image across a horizontal line.

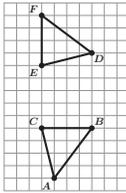
Sequence B: Translate Polygon $ABCDE$ down 9 units, and then reflect the resulting image across a vertical line.

Series A



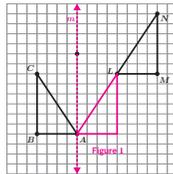
2. Select the series of transformations that maps Triangle ABC onto Triangle DEF .

- A. Rotate Triangle ABC 90° counterclockwise about point C , and then translate the resulting image up 5 units.
- B. Rotate Triangle ABC 90° counterclockwise about point A , and then translate the resulting image up 5 units.
- C. Reflect Triangle ABC across line AB , and then translate the resulting image up 5 units and 1 unit left.
- D. Translate Triangle ABC up 9 units, and then rotate the resulting image 90° counterclockwise about point A .



3. Describe a sequence of transformations that maps Triangle ABC onto Triangle LMN .

Sample response: Reflect Triangle ABC across line m to create Figure 1. Translate Figure 1 6 units up and 4 units right to create Triangle LMN .



Unit 1 Lesson 4

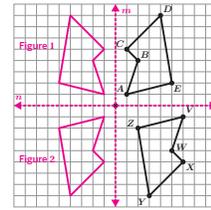
7

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

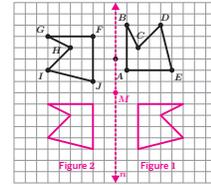
4. Describe a sequence of transformations that maps Polygon $ABCDE$ onto Polygon $VWXYZ$.

Sample response: Reflect Polygon $ABCDE$ across line m to create Figure 1. Reflect Figure 1 across line n to create Figure 2. Translate Figure 2 7 units right to create Polygon $VWXYZ$.



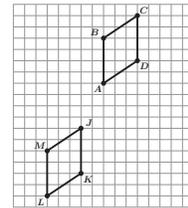
5. Describe a sequence of transformations that maps Polygon $ABCDE$ onto Polygon $FGHIJ$.

Sample response: Rotate Polygon $ABCDE$ 90° clockwise about point A to create Figure 1. Reflect Figure 1 across line n to create Figure 2. Translate Figure 2 6 units up.



6. Kiran claims that there are at least two different transformations or sequences of transformations that map Polygon $ABCD$ onto Polygon $JKLM$. Is he correct? Explain your thinking.

Kiran is correct. Sample response: There are at least two ways. One way: Rotate Polygon $ABCD$ 180° clockwise about a point halfway between point A and point J . Another way: Reflect Polygon $ABCD$ across a vertical line, and then reflect that image over a horizontal line.



Unit 1 Lesson 4

8

Additional Practice

Practice Problem Analysis

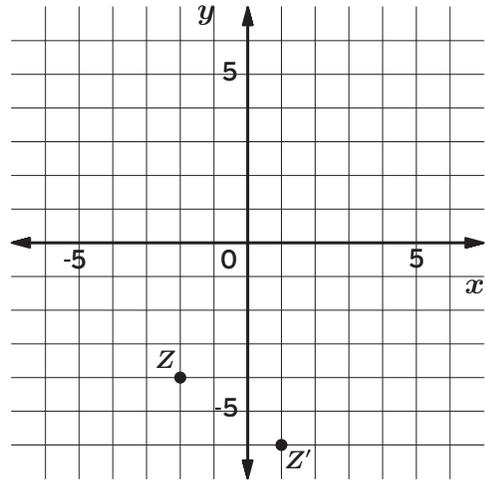
Problem	DOK	Standard(s)
1	1	8.G.A.1
2	1	8.G.A.1
3	2	8.G.A.1
4	2	8.G.A.1
5	2	8.G.A.1
6	3	8.G.A.1

Notes:

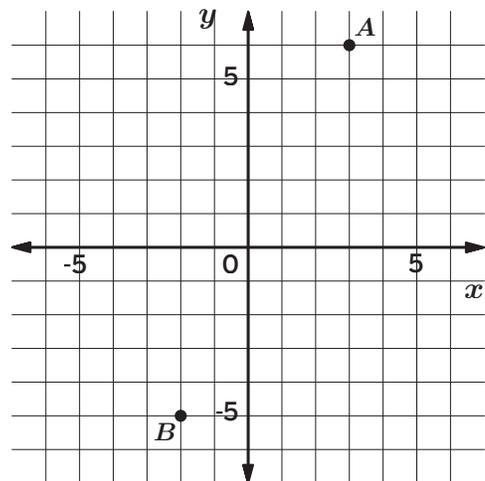
Additional Practice

1.05

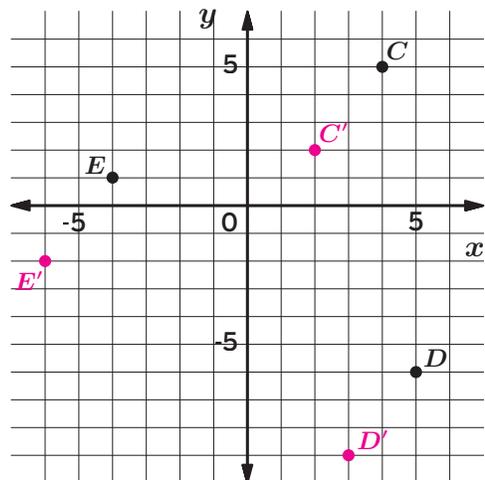
- Point $Z(-2, -4)$ is plotted on the coordinate plane. Point Z' is a translation of point Z . Which of the following describes the translation of point Z ?
 - 2 units right, 3 units up
 - 3 units right, 2 units down**
 - 3 units left, 2 units up
 - 2 units left, 3 units down



- Points $A(3, 6)$ and $B(-2, -5)$ are plotted on the coordinate plane.
 - Which are the coordinates of point A after a reflection across the x -axis? Circle the correct choice.
 $(3, -6)$ $(-3, 6)$
 $A'(3, -6)$
 - Which are the coordinates of point B after a reflection across the y -axis? Circle the correct choice.
 $(-2, 5)$ $(2, -5)$
 $B'(2, -5)$



- Points $C(4, 5)$, $D(5, -6)$, and $E(-4, 1)$ are plotted on the coordinate plane.
 - What are the coordinates of points C , D , and E after each point is translated 2 units to the left and 3 units down?
 $C'(2, 2)$; $D'(3, -9)$; $E'(-6, -2)$
 - Plot these points on the grid, and label them C' , D' , and E' .



4. Points $F(4, -4)$, $G(0, 3)$, $H(-4, 1)$, and $I(4, 0)$ are plotted on the coordinate plane.

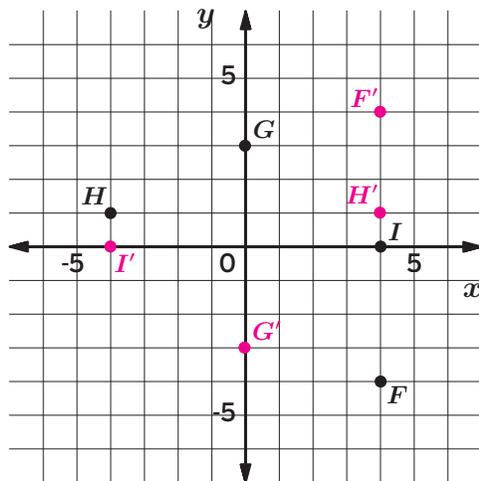
- a What are the coordinates of points F and G after a reflection across the x -axis?

$F'(4, 4)$; $G'(0, -3)$

- b What are the coordinates of points H and I after a reflection across the y -axis?

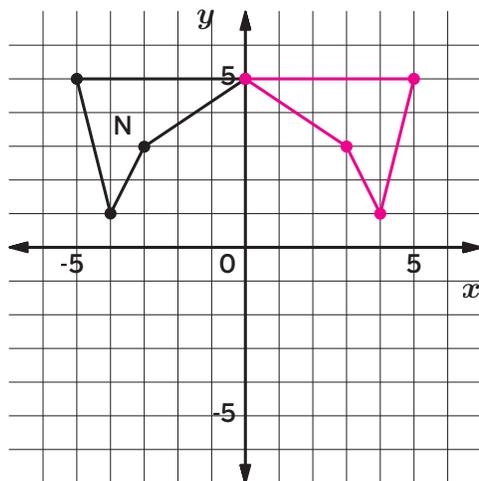
$H'(4, 1)$; $I'(-4, 0)$

- c Plot these points on the grid, and label them F' , G' , H' , and I' .



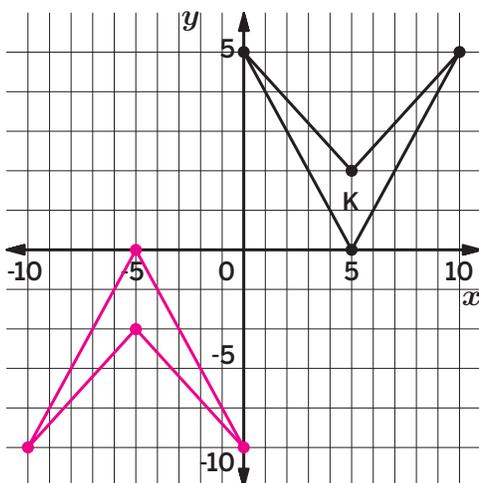
5. Polygon N is reflected across the y -axis. Predict the coordinates of the image by completing the table. Check your predictions by graphing the image.

Preimage	Image
$(0, 5)$	$(0, 5)$
$(-3, 3)$	$(3, 3)$
$(-4, 1)$	$(4, 1)$
$(-5, 5)$	$(5, 5)$



6. K is reflected across the x -axis and then reflected across the y -axis. Complete the table with the coordinates of the final image. Check your coordinates by graphing the image.

Preimage	Image
$(5, 0)$	$(-5, 0)$
$(5, 2)$	$(-5, -2)$
$(0, 5)$	$(0, -5)$
$(10, 5)$	$(-10, -5)$



Name: _____ Date: _____ Period: _____

Additional Practice 1.05

- Point $Z(-2, -4)$ is plotted on the coordinate plane. Point Z' is a translation of point Z . Which of the following describes the translation of point Z ?
 - A. 2 units right, 3 units up
 - B. 3 units right, 2 units down**
 - C. 3 units left, 2 units up
 - D. 2 units left, 3 units down
- Points $A(3, 6)$ and $B(-2, -5)$ are plotted on the coordinate plane.
 - a Which are the coordinates of point A after a reflection across the x -axis? Circle the correct choice.
 $(3, -6)$ $(-3, 6)$
 $A(3, -6)$
 - b Which are the coordinates of point B after a reflection across the y -axis? Circle the correct choice.
 $(-2, 5)$ $(2, -5)$
 $B(2, -5)$
- Points $C(4, 5)$, $D(5, -6)$, and $E(-4, 1)$ are plotted on the coordinate plane.
 - a What are the coordinates of points C , D , and E after each point is translated 2 units to the left and 3 units down?
 $C(2, 2)$; $D(3, -9)$; $E(-6, -2)$
 - b Plot these points on the grid, and label them C' , D' , and E' .

Unit 1 Lesson 5 9 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Points $F(4, -4)$, $G(0, 3)$, $H(-4, 1)$, and $I(4, 0)$ are plotted on the coordinate plane.
 - a What are the coordinates of points F' and G' after a reflection across the x -axis?
 $F'(4, 4)$; $G'(0, -3)$
 - b What are the coordinates of points H' and I' after a reflection across the y -axis?
 $H'(4, 1)$; $I'(-4, 0)$
 - c Plot these points on the grid, and label them F' , G' , H' , and I' .
- Polygon N is reflected across the y -axis. Predict the coordinates of the image by completing the table. Check your predictions by graphing the image.

Preimage	Image
$(0, 5)$	$(0, 5)$
$(-3, 3)$	$(3, 3)$
$(-4, 1)$	$(4, 1)$
$(-5, 5)$	$(5, 5)$
- K is reflected across the x -axis and then reflected across the y -axis. Complete the table with the coordinates of the final image. Check your coordinates by graphing the image.

Preimage	Image
$(5, 0)$	$(-5, 0)$
$(5, 2)$	$(-5, -2)$
$(0, 5)$	$(0, -5)$
$(10, 5)$	$(-10, -5)$

Unit 1 Lesson 5 10 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.3
2	1	8.G.A.3
3	2	8.G.A.3
4	2	8.G.A.3
5	2	8.G.A.3
6	3	8.G.A.3

Notes:

Additional Practice

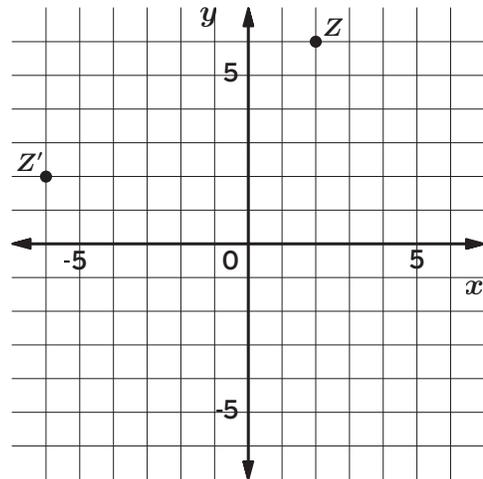
1.06

1. Point $Z(2, 6)$ is plotted on the coordinate plane. Point Z' is a rotation of point Z about the origin. Circle the degree and direction of the rotation.

Degree: 90° or 180°

Direction: clockwise or counterclockwise

90° ; Counterclockwise



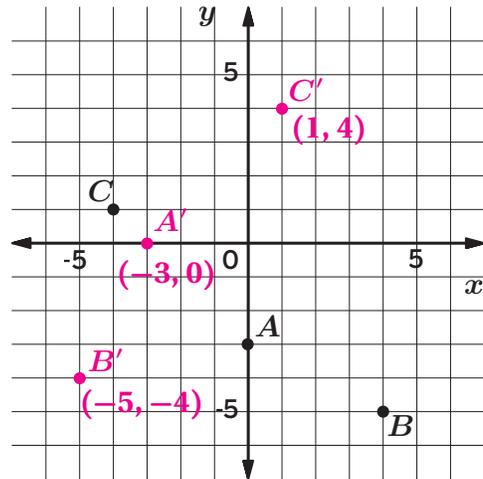
2. Point $N(0, 6)$ is rotated 180° counterclockwise about the origin, and the image is labeled N' . What are the coordinates of point N' ?

$N'(0, -6)$

3. Points $A(0, -3)$, $B(4, -5)$, and $C(-4, 1)$ are plotted on the coordinate plane.

What are the coordinates of A , B , and C after a rotation 270° counterclockwise about the origin? Plot these points on the grid, and label them A' , B' , and C' . Include the coordinates of the images in your labels.

$A'(-3, 0)$; $B'(-5, -4)$; $C'(1, 4)$



4. Point $H(6, 4)$ is rotated 90° clockwise about the origin, and the image is labeled H' . Which of the following are the coordinates of point H' ?

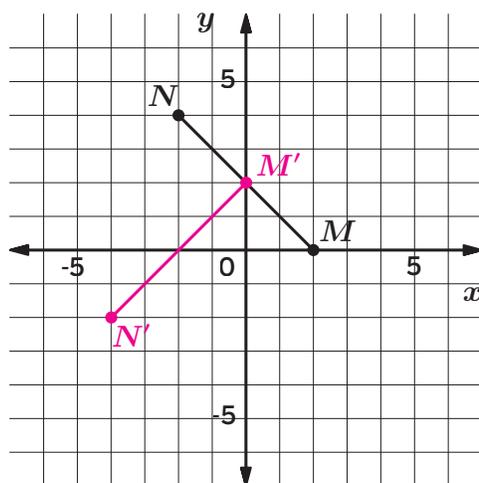
A. $(4, -6)$

B. $(-4, 6)$

C. $(6, -4)$

D. $(-6, -4)$

5. Rotate line segment MN 90° counterclockwise about the origin and label the image of the line segment $M'N'$. Record the coordinates of the image in the table.



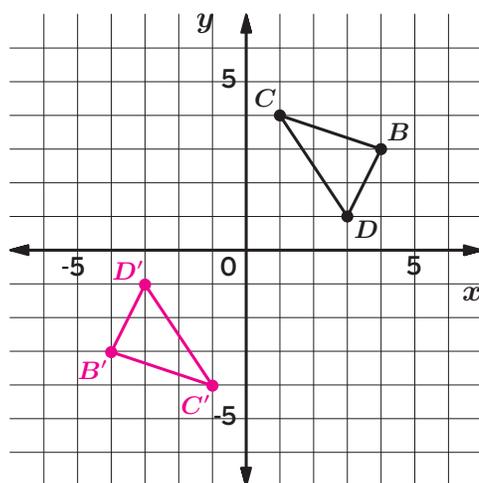
Preimage coordinates		Image coordinates	
M	$(2, 0)$	M'	$(0, 2)$
N	$(-2, 4)$	N'	$(-4, -2)$

6. Triangle JKL has been rotated about the origin to create Triangle $J'K'L'$. The following table shows the coordinates of the vertices. Indicate the degree and direction of the rotation that maps Triangle JKL onto Triangle $J'K'L'$.

Preimage coordinates		Image coordinates	
J	$(-3, 6)$	J'	$(6, 3)$
K	$(-3, 2)$	K'	$(2, 3)$
L	$(2, 2)$	L'	$(2, -2)$

90° clockwise rotation about the origin or 270° counterclockwise rotation about the origin.

7. Elena wants to rotate Triangle BCD 180° about the origin. She says that it does not matter if she rotates the triangle clockwise or counterclockwise. Is she correct? Explain your thinking.

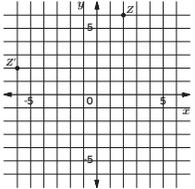


No; Sample response: The resulting image is the same no matter which direction the rotation occurred. Triangle BCD is rotated 180° clockwise and counterclockwise about the origin. The resulting images are the same.

Name: _____ Date: _____ Period: _____

Additional Practice 1.06

- Point $Z(2, 6)$ is plotted on the coordinate plane. Point Z' is a rotation of point Z about the origin. Circle the degree and direction of the rotation.
Degree: 90° or 180°
Direction: clockwise or counterclockwise
 90° ; Counterclockwise



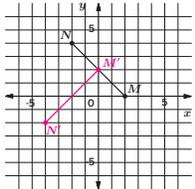
- Point $N(0, 6)$ is rotated 180° counterclockwise about the origin, and the image is labeled N' . What are the coordinates of point N' ?
 $N'(0, -6)$
- Points $A(0, -3)$, $B(4, -5)$, and $C(-4, 1)$ are plotted on the coordinate plane. What are the coordinates of A , B , and C after a rotation 270° counterclockwise about the origin? Plot these points on the grid, and label them A' , B' , and C' . Include the coordinates of the images in your labels.
 $A'(-3, 0)$; $B'(-5, -4)$; $C'(1, 4)$
- Point $H(6, 4)$ is rotated 90° clockwise about the origin, and the image is labeled H' . Which of the following are the coordinates of point H' ?
 A. $(4, -6)$ B. $(-4, 6)$
 C. $(6, -4)$ D. $(-6, -4)$

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Rotate line segment MN 90° counterclockwise about the origin and label the image of the line segment $M'N'$. Record the coordinates of the image in the table.

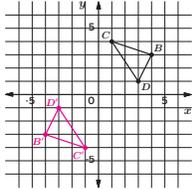
Preimage coordinates	Image coordinates
$M(2, 0)$	$M'(0, 2)$
$N(-2, 4)$	$N'(-4, -2)$



- Triangle JKL has been rotated about the origin to create Triangle $J'K'L'$. The following table shows the coordinates of the vertices. Indicate the degree and direction of the rotation that maps Triangle JKL onto Triangle $J'K'L'$.

Preimage coordinates	Image coordinates
$J(-3, 6)$	$J'(6, 3)$
$K(-3, 2)$	$K'(2, 3)$
$L(2, 2)$	$L'(2, -2)$

 90° clockwise rotation about the origin or 270° counterclockwise rotation about the origin.
- Elena wants to rotate Triangle BCD 180° about the origin. She says that it does not matter if she rotates the triangle clockwise or counterclockwise. Is she correct? Explain your thinking.
No; Sample response: The resulting image is the same no matter which direction the rotation occurred. Triangle BCD is rotated 180° clockwise and counterclockwise about the origin. The resulting images are the same.



© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.3
2	1	8.G.A.3
3	2	8.G.A.3
4	2	8.G.A.3
5	2	8.G.A.3
6	2	8.G.A.3
7	3	8.G.A.3

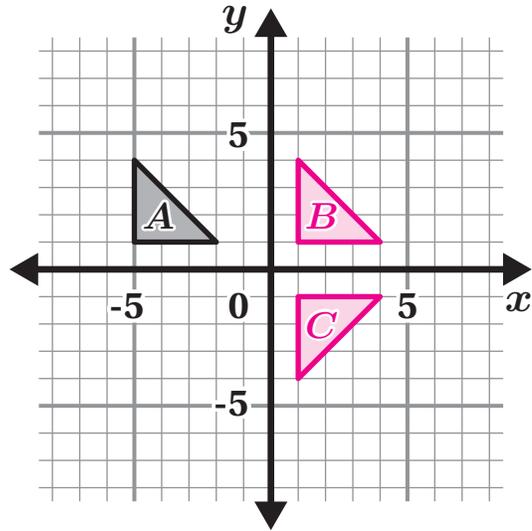
Notes:

Additional Practice

1.08

Problems 1–3: This coordinate plane shows Figure A.

1. Translate Figure A 6 units to the right. Label the image B.
2. Reflect Figure B over the x-axis. Label the image C.
3. Are Figures A and C congruent? Explain your thinking.



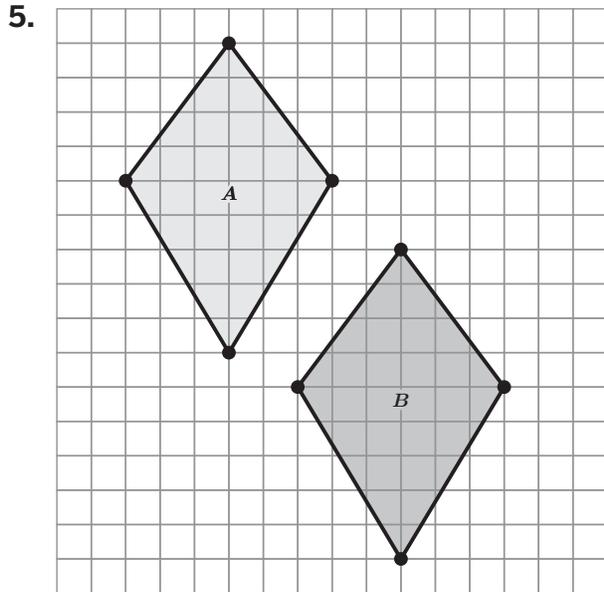
Explanations vary. A sequence of a translation and a reflection are two rigid transformations. Therefore, all corresponding angle measures and side lengths remain equal.

4. Trapezoid $JKLM$ was graphed on a coordinate plane and then rotated 270° clockwise around the origin to form Trapezoid .

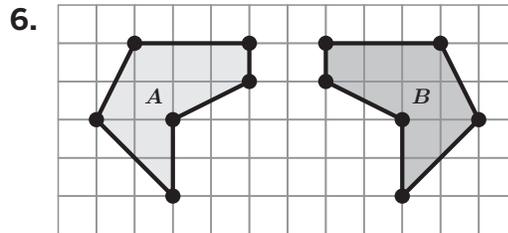
Select *all* statements that are always true.

- A. Trapezoid $J'K'L'M'$ is congruent to Trapezoid $JKLM$.
- B. The length of side $J'K'$ is not the same as the length of side JK .
- C. The measure of Angle $J'K'L'$ is the same as the measure of Angle JKL .
- D. The area of Trapezoid $J'K'L'M'$ is equal to the area of Trapezoid $JKLM$.
- E. Trapezoid $J'K'L'M'$ is facing the same direction as Trapezoid $JKLM$.

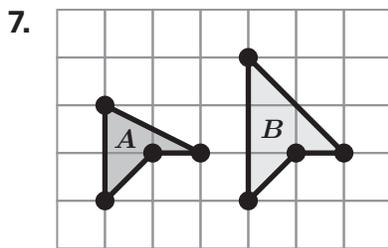
Problems 5–8: Determine whether Figure *A* is congruent to Figure *B*. Explain your thinking.



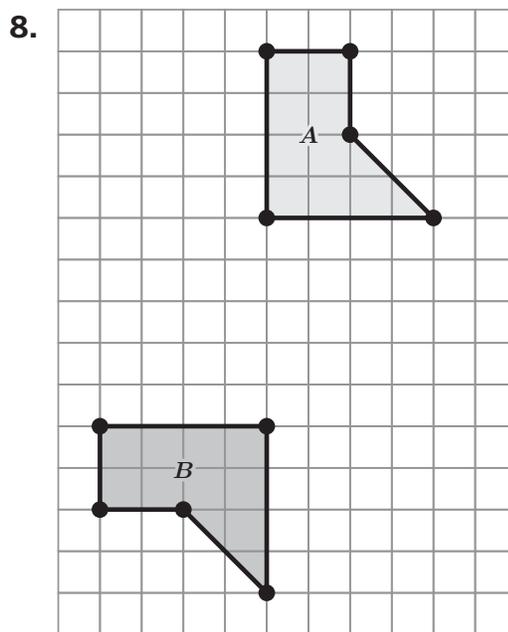
Explanations vary. Figure *A* is congruent to Figure *B* because it is a translation down and to the right, which is a rigid transformation.



Explanations vary. Figure *A* is congruent to Figure *B* because it is a reflection over a horizontal line, which is a rigid transformation.



Explanations vary. Figure *A* is not congruent to Figure *B* because the corresponding side lengths and angle measures are not equal.



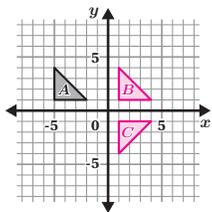
Explanations vary. Figure *A* is congruent to Figure *B* because it is a rotation around a point, which is a rigid transformation.

Name: _____ Date: _____ Period: _____

Additional Practice

1.08

Problems 1–3: This coordinate plane shows Figure A.



- Translate Figure A 6 units to the right. Label the image B.
- Reflect Figure B over the x-axis. Label the image C.
- Are Figures A and C congruent? Explain your thinking.

Explanations vary. A sequence of a translation and a reflection are two rigid transformations. Therefore, all corresponding angle measures and side lengths remain equal.

- Trapezoid $JKLM$ was graphed on a coordinate plane and then rotated 270° clockwise around the origin to form Trapezoid $J'K'L'M'$.

Select all statements that are always true.

- A. Trapezoid $J'K'L'M'$ is congruent to Trapezoid $JKLM$.
- B. The length of side $J'K'$ is not the same as the length of side JK .
- C. The measure of Angle $J'K'L'$ is the same as the measure of Angle JKL .
- D. The area of Trapezoid $J'K'L'M'$ is equal to the area of Trapezoid $JKLM$.
- E. Trapezoid $J'K'L'M'$ is facing the same direction as Trapezoid $JKLM$.

Unit 1 Lesson 8

15

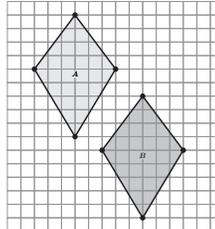
© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 5–8: Determine whether Figure A is congruent to Figure B.

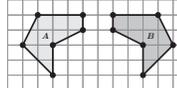
Explain your thinking.

5.



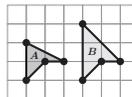
Explanations vary. Figure A is congruent to Figure B because it is a translation down and to the right, which is a rigid transformation.

6.



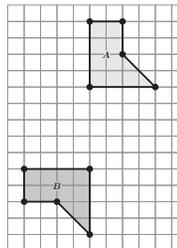
Explanations vary. Figure A is congruent to Figure B because it is a reflection over a horizontal line, which is a rigid transformation.

7.



Explanations vary. Figure A is not congruent to Figure B because the corresponding side lengths and angle measures are not equal.

8.



Explanations vary. Figure A is congruent to Figure B because it is a rotation around a point, which is a rigid transformation.

Unit 1 Lesson 8

16

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.1
2	1	8.G.A.1
3	2	8.G.A.1
4	1	8.G.A.2
5	2	8.G.A.2
6	2	8.G.A.2
7	2	8.G.A.2
8	2	8.G.A.2

Notes:

Additional Practice

1.09

1. For each statement, choose the correct term or terms to complete the statement.

- a If there is a sequence of translations, rotations, or reflections that map one polygon onto the other, then the two polygons are [congruent, not congruent].

Congruent

- b If two polygons have different side lengths, different angle measures, or different areas, then the polygons are [congruent, not congruent].

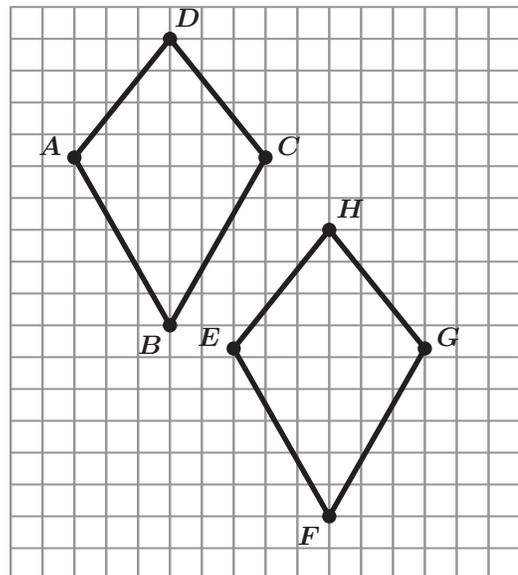
Not congruent

2. Which statement is better to explain why the polygons shown are congruent?

Statement A: Both figures have 4 sides and 4 angles.

Statement B: I can map one figure onto the other by translating Polygon $ABCD$ right 5 units and down 6 units.

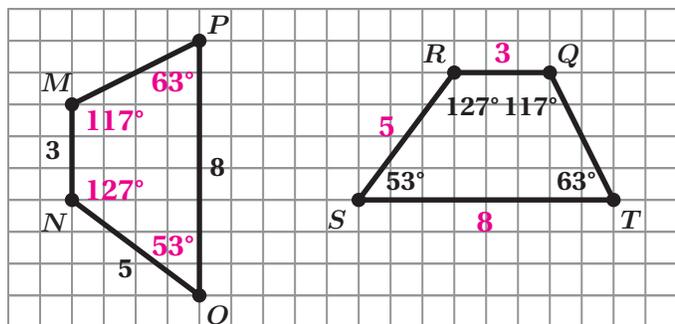
Statement B



3. Refer to Trapezoids $MNOP$ and $QRST$.

- a Show that the two trapezoids are congruent by describing a sequence of rigid transformations that can map one figure onto the other.

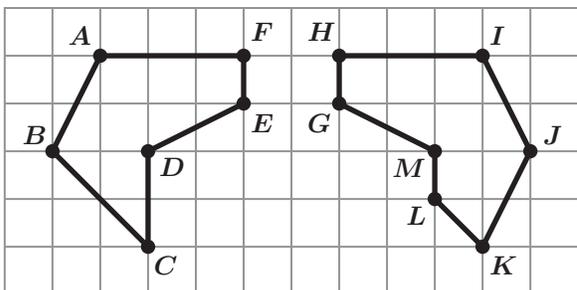
Rotate Trapezoid $MNOP$ 90° clockwise about point O . Then translate the image 5 units to the right and 3 units up.



- b Label the angle measures of Trapezoid $MNOP$ and the side lengths of Trapezoid $QRST$.

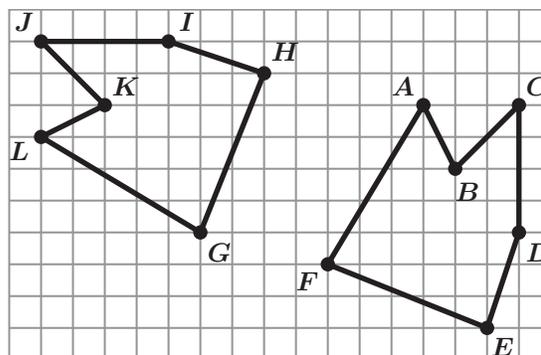
4. For each pair of figures, decide whether they are congruent. Explain your thinking.

a



No; The figures cannot be mapped onto each figure by using a sequence of rigid transformations because Polygon $ABCDEF$ has six sides and Polygon $IJKLMGH$ has seven sides.

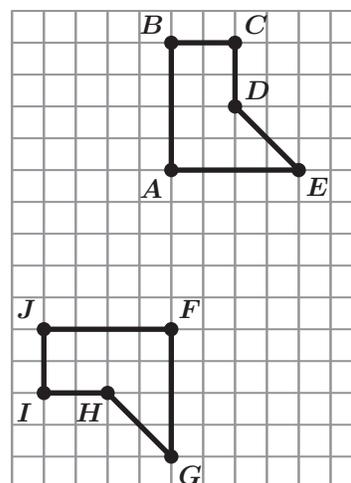
b



Yes; When Figure $ABCDEF$ is rotated 90° counterclockwise about point F and translated 1 unit up and 4 units to the left, it will map onto Figure $LKJIHG$.

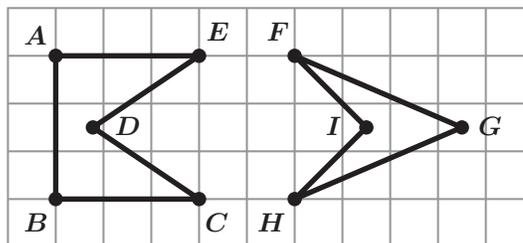
5. Describe a sequence of transformations that shows that Polygon $ABCDE$ is congruent to Polygon $FJIHG$.

Sample response: Rotate Polygon $ABCDE$ 270° counterclockwise about point A . Translate the image 5 units down. Reflect the image across segment AE .



6. Is the pair of figures congruent? Explain your thinking.

No; The figures cannot be mapped onto each figure by using a sequence of rigid transformations because Polygon $ABCDE$ has 5 sides and Polygon $FGHI$ has 4 sides.



7. Rectangle A and Rectangle B have the same side lengths. Jada says that this is enough to prove that the figures are congruent. Do you agree? Explain your thinking.

Yes, I agree. Sample response: Rectangles, by definition, have all right angles of equal measure, so it is given that the corresponding angle measures are all the same.

Name: _____ Date: _____ Period: _____

Additional Practice 1.09

1. For each statement, choose the correct term or terms to complete the statement.

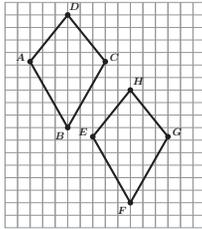
- a If there is a sequence of translations, rotations, or reflections that map one polygon onto the other, then the two polygons are [congruent, not congruent].
Congruent
- b If two polygons have different side lengths, different angle measures, or different areas, then the polygons are [congruent, not congruent].
Not congruent

2. Which statement is better to explain why the polygons shown are congruent?

Statement A: Both figures have 4 sides and 4 angles.

Statement B: I can map one figure onto the other by translating Polygon $ABCD$ right 5 units and down 6 units.

Statement B

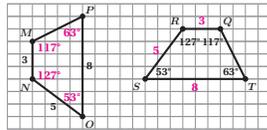


3. Refer to Trapezoids $MNOP$ and $QRST$.

- a Show that the two trapezoids are congruent by describing a sequence of rigid transformations that can map one figure onto the other.

Rotate Trapezoid $MNOP$ 90° clockwise about point O . Then translate the image 5 units to the right and 3 units up.

- b Label the angle measures of Trapezoid $MNOP$ and the side lengths of Trapezoid $QRST$.



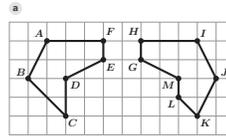
Unit 1 Lesson 9

17

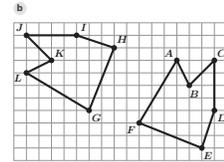
© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

4. For each pair of figures, decide whether they are congruent. Explain your thinking.



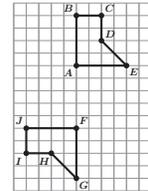
No: The figures cannot be mapped onto each figure by using a sequence of rigid transformations because Polygon $ABCDEF$ has six sides and Polygon $IJKLMGH$ has seven sides.



Yes: When Figure $ABCDEF$ is rotated 90° counterclockwise about point F and translated 1 unit up and 4 units to the left, it will map onto Figure $LKJIHG$.

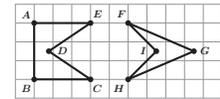
5. Describe a sequence of transformations that shows that Polygon $ABCDE$ is congruent to Polygon $FJIHG$.

Sample response: Rotate Polygon $ABCDE$ 270° degrees counterclockwise about point A . Translate the image 5 units down. Reflect the image across segment AE .



6. Is the pair of figures congruent? Explain your thinking.

No: The figures cannot be mapped onto each figure by using a sequence of rigid transformations because Polygon $ABCDE$ has 5 sides and Polygon $FGHI$ has 4 sides.



7. Rectangle A and Rectangle B have the same side lengths. Jada says that this is enough to prove that the figures are congruent. Do you agree? Explain your thinking.

Yes, I agree. Sample response: Rectangles, by definition, have all right angles of equal measure, so it is given that the corresponding angle measures are all the same.

Unit 1 Lesson 9

18

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.2
2	1	8.G.A.2
3	2	8.G.A.2
4	2	8.G.A.2
5	2	8.G.A.2
6	3	8.G.A.2
7	3	8.G.A.2

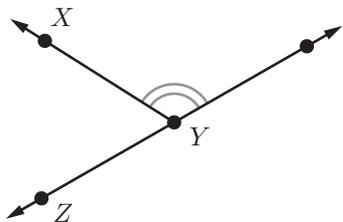
Notes:

Additional Practice

7.02

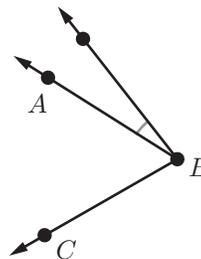
1. Consider each diagram shown. For each angle specified, determine whether its adjacent angle is *complementary* or *supplementary* to it.

a $\angle XYZ$



Supplementary

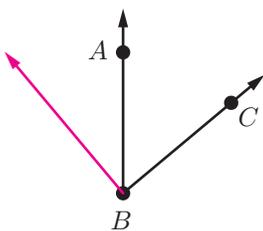
b $\angle ABC$



Complementary

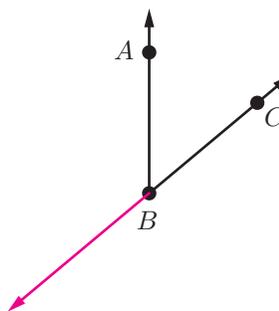
2. For each diagram, draw an angle that is:

a Complementary to $\angle ABC$.



Sample response shown.

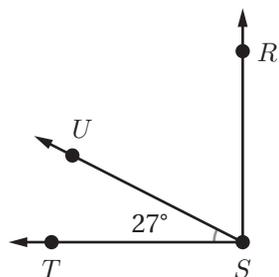
b Supplementary to $\angle ABC$.



Sample response shown.

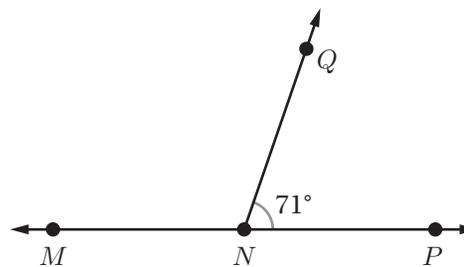
3. Determine the missing angle measure in each diagram.

a Angle RST is a right angle. Determine the measure of $\angle RSU$.



63°

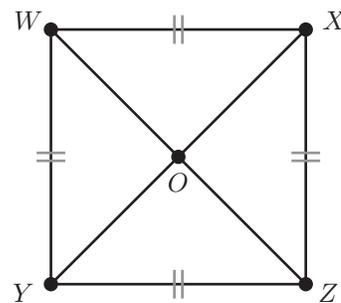
b Point N lies on line MP . Determine the measure of $\angle MNQ$.



109°

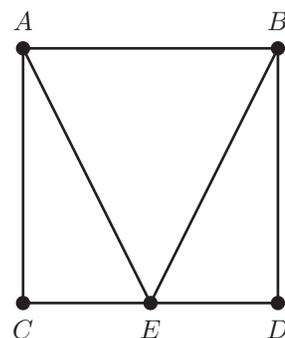
4. Refer to Square $WXZY$. Name two angles whose measures have a sum of 180° .

Sample response: $\angle WOY$ and $\angle WOX$



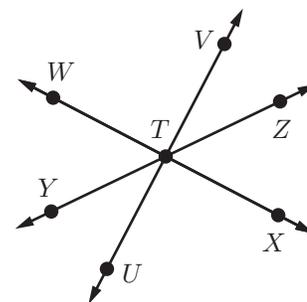
5. Refer to Square $ABDC$. Name three angles whose measures have a sum of 180° .

Sample response: $\angle AEC$, $\angle AEB$, and $\angle BED$



6. Segments WX , YZ , and UV intersect at point T . Angle VTW is a right angle. Select *all* the pairs of supplementary angles.

- A. $\angle VTZ$ and $\angle ZTX$
- B. $\angle WTV$ and $\angle VTX$
- C. $\angle WTY$ and $\angle YTV$
- D. $\angle YTU$ and $\angle YTV$
- E. $\angle ZTX$ and $\angle VTZ$



7. Angle A is supplementary to angle B . Angle C is complementary to angle B . Do you have enough information to determine which angle has the smallest measure? Explain your thinking.

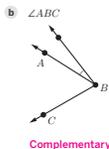
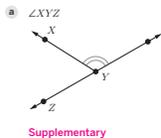
No, there is not enough information. Sample response: If angle A measures 91° , then angle B measures 89° and angle C measures 1° . But if angle A measures 170° , then angle B measures 10° and angle C measures 80° . So, either angle B or angle C could have the smallest measure.

Name: _____ Date: _____ Period: _____

Additional Practice

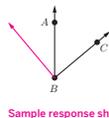
7.02

1. Consider each diagram shown. For each angle specified, determine whether its adjacent angle is *complementary* or *supplementary* to it.

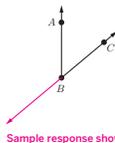


2. For each diagram, draw an angle that is:

- a Complementary to $\angle ABC$.

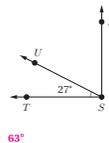


- b Supplementary to $\angle ABC$.

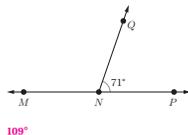


3. Determine the missing angle measure in each diagram.

- a Angle RST is a right angle. Determine the measure of $\angle RSU$.



- b Point N lies on line MP . Determine the measure of $\angle MNQ$.



Unit 7 Lesson 2

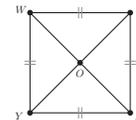
157

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

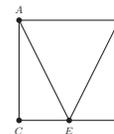
4. Refer to Square $WXYZ$. Name two angles whose measures have a sum of 180° .

Sample response: $\angle WOY$ and $\angle WOX$



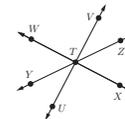
5. Refer to Square $ABDC$. Name three angles whose measures have a sum of 180° .

Sample response: $\angle AEC$, $\angle AEB$, and $\angle BED$



6. Segments WX , YZ , and UV intersect at point T . Angle VTW is a right angle. Select *all* the pairs of supplementary angles.

- A. $\angle VTZ$ and $\angle ZTX$
 B. $\angle WTV$ and $\angle VTX$
 C. $\angle WTY$ and $\angle YTU$
 D. $\angle YTU$ and $\angle YTV$
 E. $\angle ZTX$ and $\angle ZTV$



7. Angle A is supplementary to angle B . Angle C is complementary to angle B . Do you have enough information to determine which angle has the smallest measure? Explain your thinking.

No, there is not enough information. Sample response: If angle A measures 91° , then angle B measures 89° and angle C measures 1° . But if angle A measures 170° , then angle B measures 10° and angle C measures 80° . So, either angle B or angle C could have the smallest measure.

Unit 7 Lesson 2

158

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.5
2	1	7.G.B.5
3	2	7.G.B.5
4	2	7.G.B.5
5	2	7.G.B.5
6	2	7.G.B.5
7	3	7.G.B.5

Notes:

Additional Practice

7.03

In Problems 1–6, the figures may not be drawn to scale.

1. Determine whether the pairs of angles are vertical angles. State *yes* or *no*.

a $\angle AGE$ and $\angle FGB$

Yes

b $\angle AGD$ and $\angle AGE$

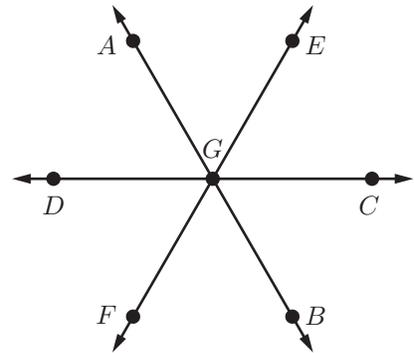
No

c $\angle EGC$ and $\angle CGB$

No

d $\angle BGC$ and $\angle AGD$

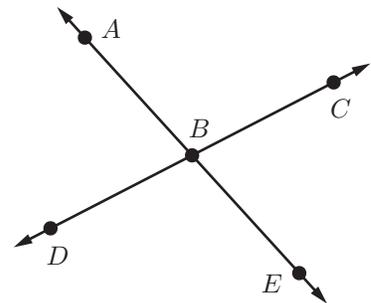
Yes



2. Lines AE and CD intersect at point B and $m\angle ABC = 105^\circ$. Determine the measures of angles ABD and DBE .

$m\angle ABD = m\angle ABD = 75^\circ$

$m\angle DBE = m\angle DBE = 105^\circ$



3. Select *all* the equations that represent a true relationship between the angles in the diagram shown.

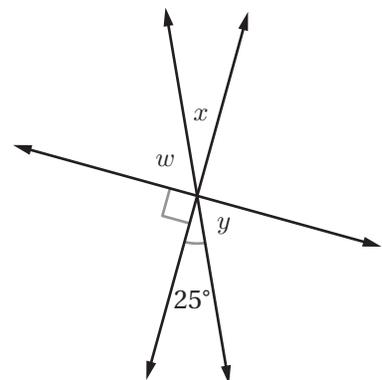
A. $x = 25$

B. $w = 90$

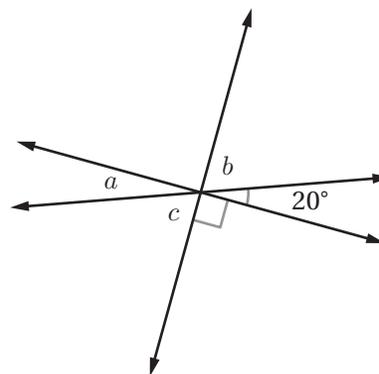
C. $y = 65$

D. $90 + w + x = 180$

E. $w + x + y = 90$

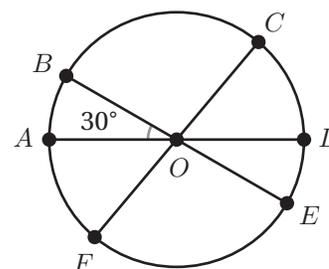


4. Determine whether the statements about the relationships between the angles in the figure are *true* or *false*.



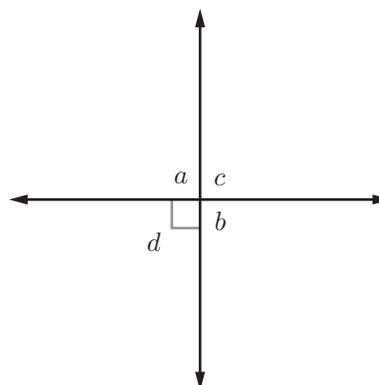
- a The value of a is 20° .
True
- b The value of a and the value of b are equal.
False
- c The sum of the values of a , c , and 90 is 180 .
True
- d The sum of the values of a and c is 90 .
True
- e The sum of the values of a , c , and 20 is 180 .
False
- f The sum of the values of b and c is 90 .
False

5. Line segments AD , BE , and CF are all diameters of the circle. The measure of angle $DOF = 130^\circ$. Determine the measure of $\angle BOC$. Explain your thinking.



$m\angle BOC = 100^\circ$; Sample response: Angle AOC is vertical to DOF , so $m\angle AOC = m\angle DOF = 130^\circ$. Angle AOC is made up of angles AOB and BOC , so $m\angle AOB + m\angle BOC = m\angle AOC$ which means $30^\circ + m\angle BOC = 130^\circ$ and $m\angle BOC = 100^\circ$

6. Mai says that angles a and b are vertical angles and complementary angles. Tyler says that angles c and d are vertical angles and supplementary angles. Who is correct? Explain your thinking.



Tyler is correct; Sample response: Angles c and d are vertical angles because they are opposite angles formed by two intersecting lines. They are also supplementary angles because each angle measures 90° and their sum is 180° . While angles a and b are vertical angles, each angle measures 90° and their sum is 180° which means they are supplementary, not complementary.

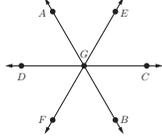
Name: _____ Date: _____ Period: _____

Additional Practice 7.03

In Problems 1–6, the figures may not be drawn to scale.

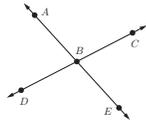
1. Determine whether the pairs of angles are vertical angles. State yes or no.

- a. $\angle AGE$ and $\angle FGB$ **Yes**
- b. $\angle AGD$ and $\angle AGE$ **No**
- c. $\angle EGC$ and $\angle CGB$ **No**
- d. $\angle BGC$ and $\angle AGD$ **Yes**



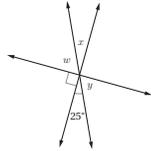
2. Lines AE and CD intersect at point B and $m\angle ABC = 105^\circ$. Determine the measures of angles ABD and DBE .

$m\angle ABD = m\angle ADB = 75^\circ$
 $m\angle DBE = m\angle DBE = 105^\circ$



3. Select all the equations that represent a true relationship between the angles in the diagram shown.

- A. $x = 25$
- B. $w = 90$
- C. $y = 65$
- D. $90 + w + x = 180$
- E. $w + x + y = 90$



Unit 7 Lesson 3

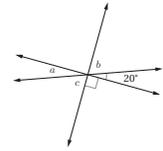
159

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

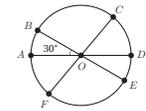
4. Determine whether the statements about the relationships between the angles in the figure are true or false.

- a. The value of a is 20° . **True**
- b. The value of a and the value of b are equal. **False**
- c. The sum of the values of a , c , and 90 is 180 . **True**
- d. The sum of the values of a and c is 90 . **True**
- e. The sum of the values of a , c , and 20 is 180 . **False**
- f. The sum of the values of b and c is 90 . **False**



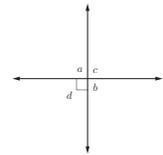
5. Line segments AD , BE , and CF are all diameters of the circle. The measure of angle $DOF = 130^\circ$. Determine the measure of $\angle BOC$. Explain your thinking.

$m\angle BOC = 100^\circ$; Sample response: Angle AOC is vertical to DOF , so $m\angle AOC = m\angle DOF = 130^\circ$. Angle AOC is made up of angles AOB and BOC , so $m\angle AOB + m\angle BOC = m\angle AOC$ which means $30^\circ + m\angle BOC = 130^\circ$ and $m\angle BOC = 100^\circ$



6. Mai says that angles a and b are vertical angles and complementary angles. Tyler says that angles c and d are vertical angles and supplementary angles. Who is correct? Explain your thinking.

Tyler is correct; Sample response: Angles c and d are vertical angles because they are opposite angles formed by two intersecting lines. They are also supplementary angles because each angle measures 90° and their sum is 180° . While angles a and b are vertical angles, each angle measures 90° and their sum is 180° which means they are supplementary, not complementary.



Unit 7 Lesson 3

160

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.B.5
2	1	7.G.B.5
3	2	7.G.B.5
4	2	7.G.B.5
5	3	7.G.B.5
6	3	7.G.B.5

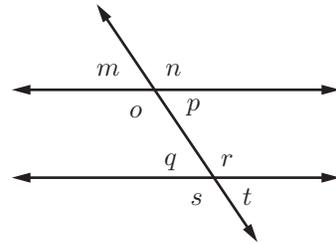
Notes:

Additional Practice

1.10

1. List *all* the pairs of vertical angles in the figure shown.

$\angle m \cong \angle p, \angle n \cong \angle o, \angle q \cong \angle t, \angle r \cong \angle s$



The figure may not be drawn to scale.

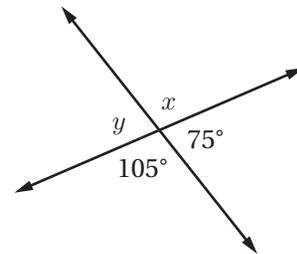
2. Use the figure to determine the missing values.

a x

105°

b y

75°



The figure may not be drawn to scale.

3. Use the figure to calculate the measure of each angle. Explain your thinking.

a $m\angle AEC$

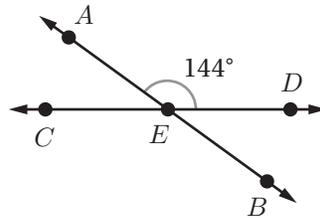
36° ; $\angle AED$ and $\angle AEC$ are supplementary angles.

b $m\angle DEB$

36° ; $\angle AED$ and $\angle DEB$ are supplementary angles.

c $m\angle CEB$

144° ; $\angle AED$ and $\angle CEB$ are vertical angles.



The figure may not be drawn to scale.

4. Triangle JKL is rotated 180° about point L to create Triangle $J'K'L$.

a What is the length of side JK ? Explain your thinking.

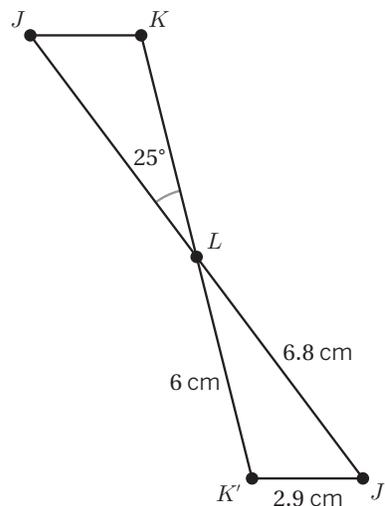
2.9 cm; Because a rotation is a rigid transformation, I know the side lengths and angle measures of the preimage and image are congruent.

b Name a pair of vertical angles. What are their angle measures?

$\angle JLK$ and $\angle J'LK'$; They both measure 25° .

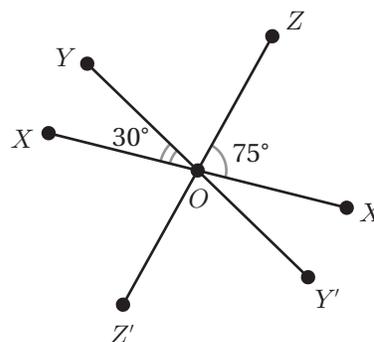
c Name two different angles that are also congruent.

Sample responses: $\angle JKL$ and $\angle J'K'L$;
 $\angle LJK$ and $\angle LJ'K'$



The figure may not be drawn to scale.

5. Points X , Y , and Z are located at different distances from point O . The points X , Y , and Z are each rotated 180° about point O resulting in points X' , Y' , and Z' .



The figure may not be drawn to scale.

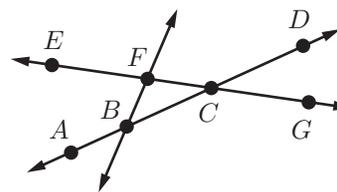
- a Name a segment that has the same length as segment YO . Explain your thinking.

Sample response: Segment $Y'O$ has the same length as segment YO because the length of the image of a 180° rotation is congruent to the length of the preimage.

- b List all the angles with a measure of 75° . Explain your thinking.

Sample response: $\angle ZOZ'$, $\angle YOZ$, $\angle XOZ'$, $\angle Z'OY'$; **Sample response:** $\angle ZOZ'$ and $\angle XOZ'$ are vertical angles. The measure of $\angle YOZ$ is 75° because $180 - 75 - 30 = 75$ and $\angle YOZ$ and $\angle Z'OY'$ are vertical angles.

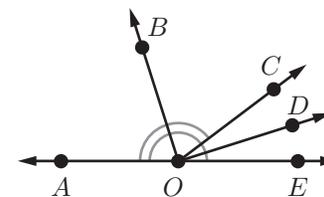
6. Suppose $m\angle ECD$ is 150° . Shawn says that $m\angle ACG$ is 150° . Is Shawn correct? Explain your thinking.



The figure may not be drawn to scale.

Shawn is correct. Sample response: $\angle ECD$ and $\angle ACG$ are vertical angles and vertical angles are congruent.

7. Points A , O , and E lie on the same line.
 $m\angle AOB = m\angle BOC$ and $m\angle COD = m\angle DOE$.
 What is the measure of angle BOD ? Explain your thinking.



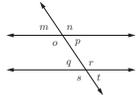
The figure may not be drawn to scale.

Sample response: Let x represent the $m\angle AOB$ and let y represent the $m\angle DOE$. So, $m\angle BOD$ is $180^\circ - x^\circ - y^\circ$.

Name: _____ Date: _____ Period: _____

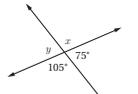
Additional Practice 1.10

- List *all* the pairs of vertical angles in the figure shown.
 $\angle m \cong \angle p$, $\angle n \cong \angle o$, $\angle q \cong \angle r$, $\angle s \cong \angle t$



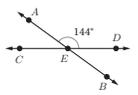
The figure may not be drawn to scale.

- Use the figure to determine the missing values.
 - $x = 105^\circ$
 - $y = 75^\circ$



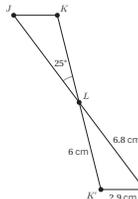
The figure may not be drawn to scale.

- Use the figure to calculate the measure of each angle. Explain your thinking.
 - $m\angle AEC = 36^\circ$; $\angle AED$ and $\angle AEC$ are supplementary angles.
 - $m\angle DEB = 36^\circ$; $\angle AED$ and $\angle DEB$ are supplementary angles.
 - $m\angle CEB = 144^\circ$; $\angle AED$ and $\angle CEB$ are vertical angles.



The figure may not be drawn to scale.

- Triangle JKL is rotated 180° about point L to create Triangle $J'K'L$.
 - What is the length of side JK ? Explain your thinking.
 2.9 cm ; Because a rotation is a rigid transformation, I know the side lengths and angle measures of the preimage and image are congruent.
 - Name a pair of vertical angles. What are their angle measures?
 $\angle JLK$ and $\angle J'K'L$; They both measure 25° .
 - Name two different angles that are also congruent.
 Sample responses: $\angle JKL$ and $\angle J'K'L$; $\angle LJK$ and $\angle LJ'K'$

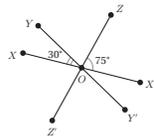


The figure may not be drawn to scale.

Unit 1 Lesson 10 19 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

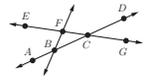
Name: _____ Date: _____ Period: _____

- Points X , Y , and Z are located at different distances from point O . The points X , Y , and Z are each rotated 180° about point O resulting in points X' , Y' , and Z' .
 - Name a segment that has the same length as segment YO . Explain your thinking.
 Sample response: Segment $Y'O$ has the same length as segment YO because the length of the image of a 180° rotation is congruent to the length of the preimage.
 - List all the angles with a measure of 75° . Explain your thinking.
 $\angle ZOY'$, $\angle YOZ'$, $\angle XOZ'$, $\angle ZOY'$; Sample response: $\angle ZOY'$ and $\angle XOZ'$ are vertical angles. The measure of $\angle YOZ'$ is 75° because $180 - 75 - 30 = 75$ and $\angle YOZ'$ and $\angle ZOY'$ are vertical angles.



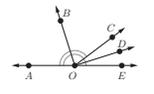
The figure may not be drawn to scale.

- Suppose $m\angle ECD$ is 150° . Shawn says that $m\angle ACG$ is 150° . Is Shawn correct? Explain your thinking.
 Shawn is correct. Sample response: $\angle ECD$ and $\angle ACG$ are vertical angles and vertical angles are congruent.



The figure may not be drawn to scale.

- Points A , O , and E lie on the same line. $m\angle AOB = m\angle BOC$ and $m\angle COD = m\angle DOE$. What is the measure of angle BOD ? Explain your thinking.
 $m\angle BOD$ is $180^\circ - x^\circ - y^\circ$; Sample response: Let x represent the $m\angle AOB$ and let y represent the $m\angle DOE$. So, $m\angle BOD$ is $180^\circ - x^\circ - y^\circ$.



The figure may not be drawn to scale.

Unit 1 Lesson 10 20 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.1.B
2	1	8.G.A.1.B
3	2	8.G.A.1.B
4	2	8.G.A.1
5	2	8.G.A.1.B
6	2	8.G.A.1.B
7	3	8.G.A.1.B

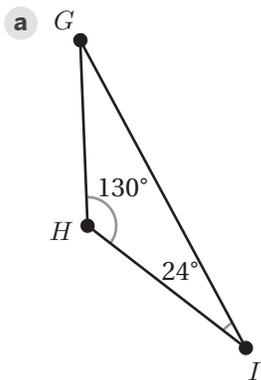
Notes:

Additional Practice

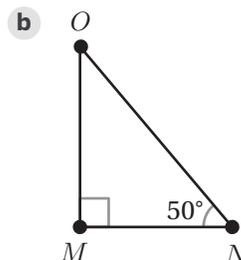
1.11

1. For each triangle, write a possible measure for the third angle.

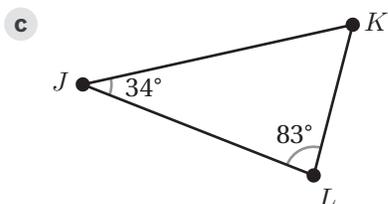
Note: The figures may not be drawn to scale.



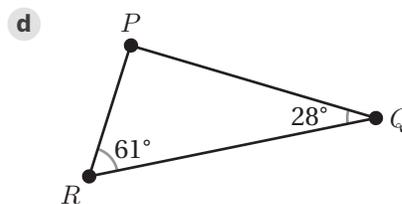
$$m\angle G = 180 - 130 - 24 = 26, 26^\circ$$



$$m\angle O = 180 - 90 - 50 = 40, 40^\circ$$



$$m\angle K = 180 - 83 - 34 = 63, 63^\circ$$



$$m\angle P = 180 - 61 - 28 = 91, 91^\circ$$

2. For each set of angles, determine whether a triangle with the given angle measures is possible. Write *yes* or *no*.

a 45°, 45°, 45°

No

b 90°, 50°, 40°

Yes

c 90°, 90°, 20°

No

d 100°, 60°, 30

No

e 110°, 40°, 30

Yes

3. Select three of the following measures that could be angles in the same triangle.

- A. 20°
- B. 60°
- C. 35°
- D. 90°
- E. 100°
- F. 180°

Explain your thinking.

A, B, E; Sample response: I know these could be the angles in a triangle because 20° , 60° , and 100° , add up to 180° .

4. Clare states that a triangle can have three acute angles. Do you agree with her? Explain your thinking.

Yes; Sample response: A triangle can have three acute measures. For example, a triangle which measures 60° , 60° , and 60° has three acute angles.

5. Shawn says that it is possible to create a triangle with two right angles and one acute angle. Is Shawn correct? Explain your thinking.

No; Sample response: The sum of the three interior angle measures should be 180° . Because two right angle measures already have a sum of 180° , the measure of the third angle must be 0° , which is not possible for a triangle.

6. Is there a relationship between the two acute angles in a right triangle? If so, what is it? Explain your thinking.

Yes; Sample response: The angles are complementary angles. The sum of their measures is $180^\circ - 90^\circ = 90^\circ$.

7. Write all of the possible combinations of three angle measures, from the following list, that can be the interior angle measures of a triangle. Use the number only once in your combination.

- | | | | | | | |
|-------------|------------|-------------|------------|------------|------------|------------|
| 120° | 20° | 100° | 40° | 60° | 70° | 10° |
|-------------|------------|-------------|------------|------------|------------|------------|

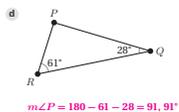
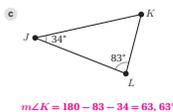
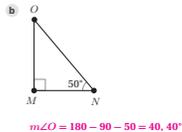
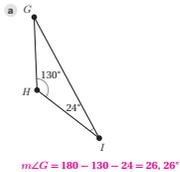
120° , 20° , and 40° , 100° , 70° , and 10° , 100° , 60° , and 20°

Name: _____ Date: _____ Period: _____

Additional Practice

1.11

1. For each triangle, write a possible measure for the third angle.
Note: The figures may not be drawn to scale.



2. For each set of angles, determine whether a triangle with the given angle measures is possible. Write yes or no.

- a $45^\circ, 45^\circ, 45^\circ$
No
- b $90^\circ, 50^\circ, 40^\circ$
Yes
- c $90^\circ, 90^\circ, 20^\circ$
No
- d $100^\circ, 60^\circ, 30^\circ$
No
- e $110^\circ, 40^\circ, 30^\circ$
Yes

Unit 1 Lesson 11

21

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

3. Select three of the following measures that could be angles in the same triangle.

- A. 20° B. 60°
 C. 35° D. 90°
 E. 100° F. 180°

Explain your thinking.

A, B, E; Sample response: I know these could be the angles in a triangle because 20° , 60° , and 100° add up to 180° .

4. Clare states that a triangle can have three acute angles. Do you agree with her? Explain your thinking.

Yes; Sample response: A triangle can have three acute measures. For example, a triangle which measures 60° , 60° , and 60° has three acute angles.

5. Shawn says that it is possible to create a triangle with two right angles and one acute angle. Is Shawn correct? Explain your thinking.

No; Sample response: The sum of the three interior angle measures should be 180° . Because two right angle measures already have a sum of 180° , the measure of the third angle must be 0° , which is not possible for a triangle.

6. Is there a relationship between the two acute angles in a right triangle? If so, what is it? Explain your thinking.

Yes; Sample response: The angles are complementary angles. The sum of their measures is $180^\circ - 90^\circ = 90^\circ$.

7. Write all of the possible combinations of three angle measures, from the following list, that can be the interior angle measures of a triangle. Use the number only once in your combination.

120° 20° 100° 40° 60° 70° 10°

120°, 20°, and 40°; 100°, 70°, and 10°; 100°, 60°, and 20°

Unit 1 Lesson 11

22

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.5
2	1	8.G.A.5
3	2	8.G.A.5
4	2	8.G.A.5
5	2	8.G.A.5
6	3	8.G.A.5
7	3	8.G.A.5

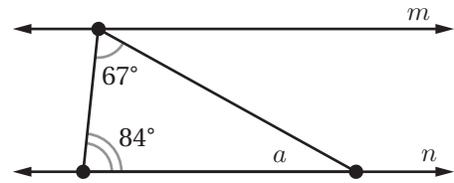
Notes:

Additional Practice

1.12

1. Line m is parallel to line n . Determine the value of a .

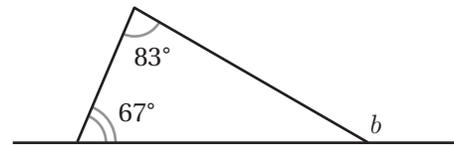
29°



The figure may not be drawn to scale.

2. Determine the value of b .

150°



The figure may not be drawn to scale.

3. The diagram shows parallel lines WV and XZ .

- a. What is $m\angle VYZ$?

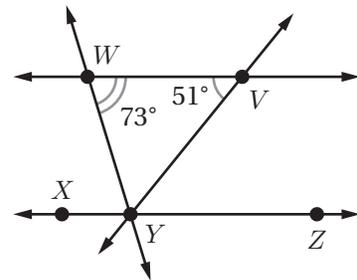
51°

- b. What is $m\angle WYX$?

73°

- c. What is $m\angle WYV$?

56°



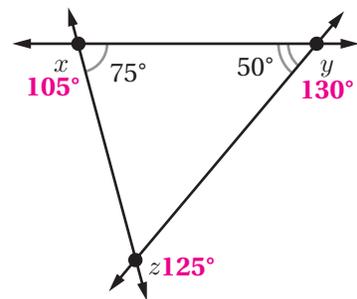
The figure may not be drawn to scale.

4. Three intersecting lines are shown.

- a. Determine the three missing angle measures.

- b. What is the sum of these three angle measures?

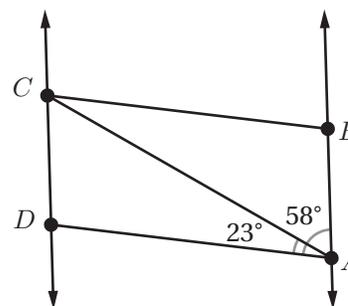
360°



The figure may not be drawn to scale.

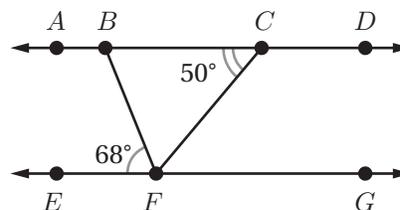
5. Line AB is parallel to line CD . Angle BAC measures 58° and Angle DAC measures 23° . What is the measure of $\angle ADC$? Show or explain your thinking.

$m\angle ADC = 99^\circ$; Sample response: $\angle CAB$ and $\angle ACD$ are alternate interior angles, so they both measure 58° .
 $m\angle CAD + m\angle ACD + m\angle ADC = 180$, because $\angle CAD$, $\angle ACD$, and $\angle ADC$ are interior angles of a triangle.
 Because $58 + 23 + m\angle ADC = 180$, $m\angle ADC = 99^\circ$.



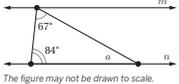
6. Line AD is parallel to line EG . Determine all five unknown angle measures. Show or explain your thinking.

$\angle BCF$ and $\angle FCD$ are supplementary angles, so $m\angle FCD = 130^\circ$.
 $\angle BCF$ and $\angle CFG$ are alternate interior angles, so $m\angle CFG = 50^\circ$.
 $\angle EFB$, $\angle BFC$, and $\angle CFG$ form a straight line measuring 180° , so $m\angle BFC = 62^\circ$.
 $\angle BFC$, $\angle BCF$, and $\angle CBF$ are interior angles in a triangle, so $m\angle CBF = 68^\circ$.
 $\angle CBF$ and $\angle ABF$ are supplementary angles, so $m\angle ABF = 112^\circ$.

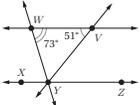


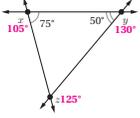
Name: _____ Date: _____ Period: _____

Additional Practice 1.12

- Line m is parallel to line n . Determine the value of a .
 29°


The figure may not be drawn to scale.
- Determine the value of b .
 150°

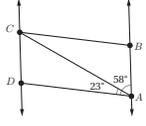
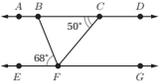

The figure may not be drawn to scale.
- The diagram shows parallel lines WV and XZ .
 - What is $m\angle YZY$?
 51°
 - What is $m\angle WYX$?
 73°
 - What is $m\angle WYV$?
 56°

The figure may not be drawn to scale.
- Three intersecting lines are shown.
 - Determine the three missing angle measures.
 105° , 75° , 130°
 - What is the sum of these three angle measures?
 360°

The figure may not be drawn to scale.

Unit 1 Lesson 12 23 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Line AB is parallel to line CD . Angle BAC measures 58° and Angle DAC measures 23° . What is the measure of $\angle ADC$?
 Show or explain your thinking.
 $m\angle ADC = 99^\circ$. **Sample response:** $\angle CAB$ and $\angle ACD$ are alternate interior angles, so they both measure 58° . $m\angle CAD + m\angle ACD + m\angle ADC = 180$, because $\angle CAD$, $\angle ACD$, and $\angle ADC$ are interior angles of a triangle. Because $58 + 23 + m\angle ADC = 180$, $m\angle ADC = 99^\circ$.
 
- Line AD is parallel to line EG . Determine all five unknown angle measures. Show or explain your thinking.
 $\angle BCF$ and $\angle FCD$ are supplementary angles, so $m\angle FCD = 130^\circ$.
 $\angle BCF$ and $\angle CFG$ are alternate interior angles, so $m\angle CFG = 50^\circ$.
 $\angle EFB$, $\angle BFC$, and $\angle CFG$ form a straight line measuring 180° , so $m\angle BFC = 62^\circ$.
 $\angle BFC$, $\angle BCF$, and $\angle CBF$ are interior angles in a triangle, so $m\angle CBF = 68^\circ$.
 $\angle CBF$ and $\angle ABF$ are supplementary angles, so $m\angle ABF = 112^\circ$.
 

Unit 1 Lesson 12 24 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.G.A.5
2	1	8.G.A.5
3	2	8.G.A.5
4	2	8.G.A.5
5	2	8.G.A.5
6	3	8.G.A.5

Notes:

Additional Practice

7.05

1. Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm?
Write *yes* or *no*.
No
2. A triangle has side lengths of 12 in. and 5 in. Which of the following side lengths is a possible length of the third side?
A. 13 in.
B. 2 in.
C. 30 in.
D. 32 in.
3. Diego was asked to determine all the possible values for the length of the third side of the triangle with side lengths of 6 in, 9 in., and an unknown third side length. His response is shown.

Let x represent the length of the unknown side. The value of x can be any length that is greater than 3 in. because $6 + x > 9$. It also has to be less than 15 in. because $6 + 9 > x$.

Is Diego correct? Explain your thinking.

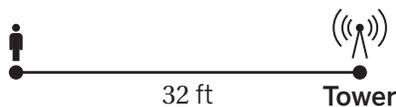
Diego is correct.

Sample response: The value of x can be any length that is greater than 3 in. because $6 + x > 9$. It also has to be less than 15 in. because $6 + 9 > x$.

4. Select *all* of the sets of three side lengths that will form a triangle.

- A. 7 in., 6 in., 11 in.
- B. 9 in., 5 in., 13 in.
- C. 8 in., 3 in., 12 in.
- D. 5 in., 5 in., 9 in.
- E. 5 in., 5 in., 10 in.

5. A cell phone is exactly 58 ft from the nearest cell phone tower. The phone's owner is currently standing 32 ft from the same cell phone tower. Han says the only distance the phone could be from the owner is 26 ft. Do you agree with Han? Explain your thinking.



I disagree; Sample response: The closest distance the phone can be to the owner is $58 - 32$, or 26 ft. Another possible distance the phone could be is $58 + 32$, or 90 ft away from the owner.

6. An isosceles triangle has one side with a length of 10 cm. If each side has a length that is a whole number, what are the possible lengths of the other two sides?

Sample response: Second side: 10 cm; Third side: any length between 1 cm and 19 cm. Or the second and third side could be any pair of lengths greater than 5 cm.

Name: _____ Date: _____ Period: _____

Additional Practice 7.05

- Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm? Write yes or no.
No
- A triangle has side lengths of 12 in. and 5 in. Which of the following side lengths is a possible length of the third side?
 A. 13 in.
 B. 2 in.
 C. 30 in.
 D. 32 in.
- Diego was asked to determine all the possible values for the length of the third side of the triangle with side lengths of 6 in., 9 in., and an unknown third side length. His response is shown.

Let x represent the length of the unknown side. The value of x can be any length that is greater than 3 in. because $6 + x > 9$. It also has to be less than 15 in. because $6 + 9 > x$.

Is Diego correct? Explain your thinking.

Diego is correct.
Sample response: The value of x can be any length that is greater than 3 in. because $6 + x > 9$. It also has to be less than 15 in. because $6 + 9 > x$.

Unit 7 Lesson 5 163 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Select *all* of the sets of three side lengths that will form a triangle.
 - A. 7 in., 6 in., 11 in.
 - B. 9 in., 5 in., 13 in.
 - C. 8 in., 3 in., 12 in.
 - D. 5 in., 5 in., 9 in.
 - E. 5 in., 5 in., 10 in.
- A cell phone is exactly 58 ft from the nearest cell phone tower. The phone's owner is currently standing 32 ft from the same cell phone tower. Han says the only distance the phone could be from the owner is 26 ft. Do you agree with Han? Explain your thinking.

I disagree; Sample response: The closest distance the phone can be to the owner is $58 - 32$, or 26 ft. Another possible distance the phone could be is $58 + 32$, or 90 ft away from the owner.
- An isosceles triangle has one side with a length of 10 cm. If each side has a length that is a whole number, what are the possible lengths of the other two sides?
Sample response: Second side: 10 cm; Third side: any length between 1 cm and 19 cm. Or the second and third side could be any pair of lengths greater than 5 cm.

Unit 7 Lesson 5 164 Additional Practice

Practice Problem Analysis

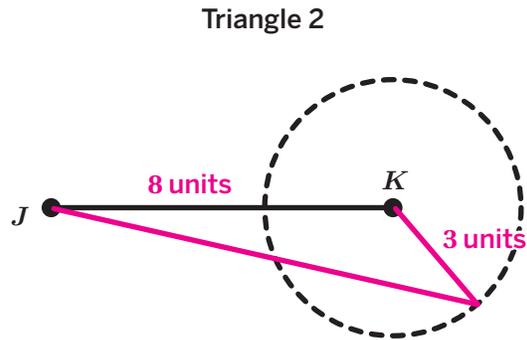
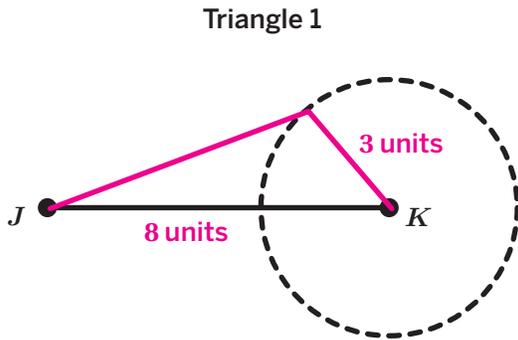
Problem	DOK	Standard(s)
1	1	7.G.A.2
2	1	7.G.A.2
3	2	7.G.A.2
4	2	7.G.A.2
5	2	7.G.A.2
6	3	7.G.A.2

Notes:

Additional Practice

7.06

1. Segment JK is 8 units long and the radius of the circle is 3 units. Draw two different triangles where one side is 8 units long and the other side is 3 units long.



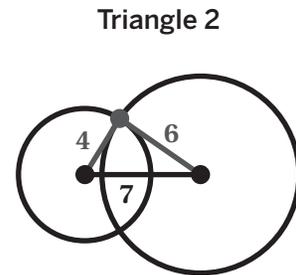
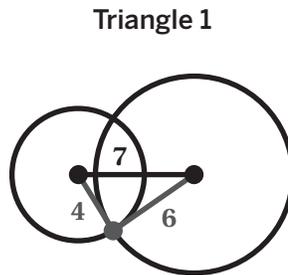
2. Daniel drew two triangles with side lengths of 4, 6, and 7 units.

Are the triangles identical?

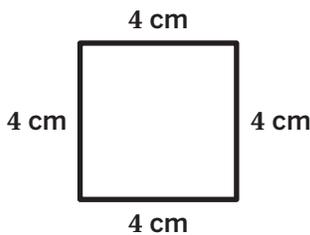
Yes.

Explain your thinking.

Triangle 1 and Triangle 2 have the same shape and size.

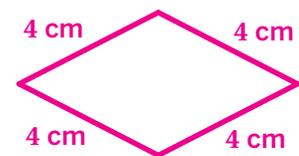


3. Megan was asked to draw a figure with 4 equal sides. Megan drew the figure shown.



Is the only possible figure Megan could have drawn? **No.**

If Yes, explain why. If No, provide a sketch of another figure with 4 equal sides different from Megan's.



4. Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm?

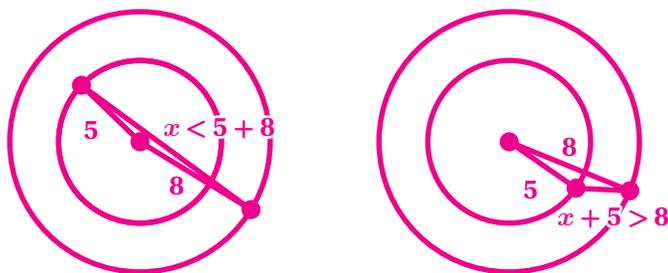
Circle your choice.

Yes **No** Need more information

Explain your thinking.

Responses vary. The sum of two shorter lengths must add up to a number greater than the longest length. Since $4 + 3$ is not greater than 10, these side lengths cannot form a triangle.

5. Noah drew two Circles A and B with the same center. One circle has a radius of 5 units and another has a radius of 8 units. Noah measures the distance between the points of Circles A and B. What are the maximum and minimum distances he can get? Draw a picture and explain your reasoning.



Responses vary. The maximum distance is almost 13 units and the shortest distance is just over 3 units.

Problems 6–7: A box contains wood planks of several different lengths. There is one 2-foot plank, one 5-foot plank, one 6-foot plank, and one 8-foot plank.

6. What is the maximum number of different triangles that can be made using these planks as sides?
- A. 1
B. 2
 C. 3
 D. 4
7. Describe the lengths of the different triangles that can be made with the given planks.

One triangle can be made from 2, 5 and 6-foot planks and another triangle can be made from 5, 6 and 8-foot planks.

Name: _____ Date: _____ Period: _____

Additional Practice 7.06

- Segment JK is 8 units long and the radius of the circle is 3 units. Draw two different triangles where one side is 8 units long and the other side is 3 units long.

Triangle 1

Triangle 2
- Daniel drew two triangles with side lengths of 4, 6, and 7 units.

Triangle 1

Triangle 2

Are the triangles identical?
Yes.
 Explain your thinking.
Triangle 1 and Triangle 2 have the same shape and size.
- Megan was asked to draw a figure with 4 equal sides. Megan drew the figure shown.

Is the only possible figure Megan could have drawn? **No.**
 If Yes, explain why. If No, provide a sketch of another figure with 4 equal sides different from Megan's.

Unit 7 Lesson 6 165 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Is it possible to form a triangle with the side lengths 4 cm, 3 cm, and 10 cm?
 Circle your choice.
 Yes **No** Need more information
 Explain your thinking.
Responses vary. The sum of two shorter lengths must add up to a number greater than the longest length. Since $4 + 3$ is not greater than 10, these side lengths cannot form a triangle.
- Noah drew two Circles A and B with the same center. One circle has a radius of 5 units and another has a radius of 8 units. Noah measures the distance between the points of Circles A and B. What are the maximum and minimum distances he can get? Draw a picture and explain your reasoning.

Responses vary. The maximum distance is almost 13 units and the shortest distance is just over 3 units.
Problems 6–7: A box contains wood planks of several different lengths. There is one 2-foot plank, one 5-foot plank, one 6-foot plank, and one 8-foot plank.

 - What is the maximum number of different triangles that can be made using these planks as sides?
 A. 1
B. 2
 C. 3
 D. 4
 - Describe the lengths of the different triangles that can be made with the given planks.
One triangle can be made from 2, 5 and 6-foot planks and another triangle can be made from 5, 6 and 8-foot planks.

Unit 7 Lesson 6 166 Additional Practice

Practice Problem Analysis		
Problem	DOK	Standard(s)
1	2	7.G.A.2
2	1	7.G.A.2
3	2	7.G.A.2
4	2	7.G.A.2
5	2	7.G.A.2
6	1	7.G.A.2
7	1	7.G.A.2

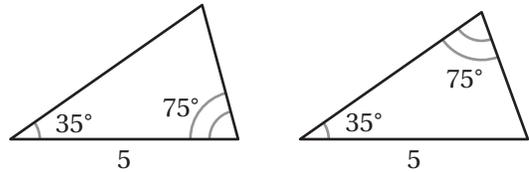
Notes:

Additional Practice

7.07

1. Are these triangles identical based solely on the measurements indicated? Write yes or no.

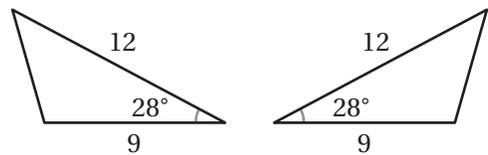
No



The figures may not be drawn to scale.

2. Are these triangles identical based solely on the measurements indicated? Write yes or no.

Yes



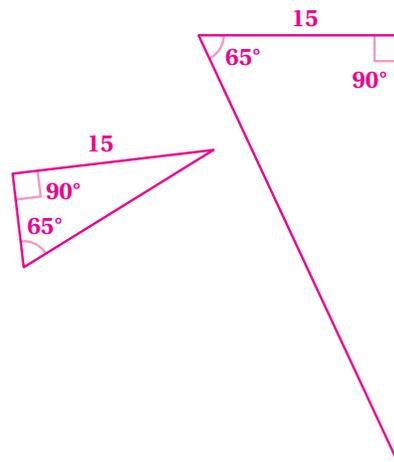
The figures may not be drawn to scale.

3. Two triangles each have two angle measures of 60° and one angle measure of 20°. Based on these measurements alone, can you guarantee these two triangles are identical? Explain your thinking.

No; Sample response: I do not know for certain if these triangles are identical because just knowing that three corresponding angles have equal measures does not guarantee the triangles are identical.

4. Two triangles both have angles measuring 90° and 65° and both have a side of 15 units. Can you guarantee that the triangles are identical? If yes, explain your thinking. If no, provide an example.

No; Sample response: We need to know the location of the side length.



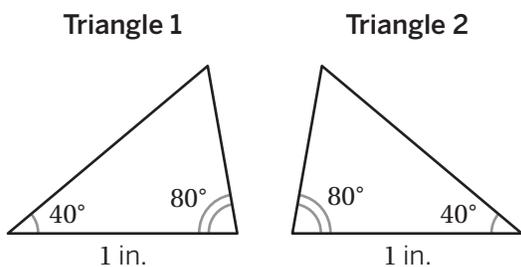
5. Priya wants to create two triangles, each with side measures of 3 units and 4 units, and an angle measuring 30° . What other information is needed to guarantee that the triangles will be identical? Explain your thinking.

The location of the given angle. The order of the measurements matters when proving that two triangles are identical.

6. Which of the following measures of corresponding parts of two triangles could you use to determine whether two triangles are identical? Select *all* that apply.

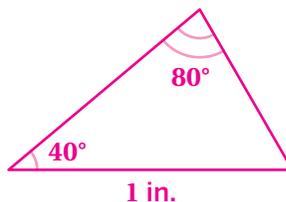
- A. Two angle measures
- B. Two sides measures
- C. One angle measure and one side length measure
- D. Two angle measures and one side length measure
- E. The two side length measures and one angle measure between the side lengths

7. Triangles 1 and 2 are identical and share three of the same measurements. Is it possible to draw a third triangle using the same three measurements that is not identical to the other two? Show or explain your thinking.



Yes, it is possible to draw a third triangle that is not identical to the other two.

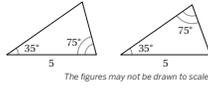
Sample response:



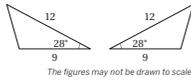
Name: _____ Date: _____ Period: _____

Additional Practice 7.07

1. Are these triangles identical based solely on the measurements indicated? Write yes or no.
No

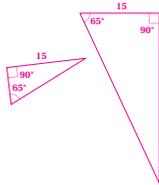


2. Are these triangles identical based solely on the measurements indicated? Write yes or no.
Yes



3. Two triangles each have two angle measures of 60° and one angle measure of 20° . Based on these measurements alone, can you guarantee these two triangles are identical? Explain your thinking.
No; Sample response: I do not know for certain if these triangles are identical because just knowing that three corresponding angles have equal measures does not guarantee the triangles are identical.

4. Two triangles both have angles measuring 90° and 65° and both have a side of 15 units. Can you guarantee that the triangles are identical? If yes, explain your thinking. If no, provide an example.
No; Sample response: We need to know the location of the side length.



Unit 7 Lesson 7

167

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

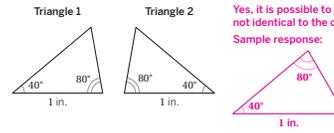
Name: _____ Date: _____ Period: _____

5. Priya wants to create two triangles, each with side measures of 3 units and 4 units, and an angle measuring 30° . What other information is needed to guarantee that the triangles will be identical? Explain your thinking.
The location of the given angle. The order of the measurements matters when proving that two triangles are identical.

6. Which of the following measures of corresponding parts of two triangles could you use to determine whether two triangles are identical? Select all that apply.

- A. Two angle measures
- B. Two sides measures
- C. One angle measure and one side length measure
- D. Two angle measures and one side length measure
- E. The two side length measures and one angle measure between the side lengths

7. Triangles 1 and 2 are identical and share three of the same measurements. Is it possible to draw a third triangle using the same three measurements that is not identical to the other two? Show or explain your thinking.



Unit 7 Lesson 7

168

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.A.2
2	1	7.G.A.2
3	2	7.G.A.2
4	2	7.G.A.2
5	2	7.G.A.2
6	2	7.G.A.2
7	3	7.G.A.2

Notes:

Additional Practice

7.08

Problems 1–2: A triangle has one 8-inch side, one 10-inch side and one 40° angle. Circle True or Need More Information for each statement about this triangle.

- | | | |
|--|------|-----------------------|
| 1. More than one unique triangle can be made using these measurements. | True | Need More Information |
| 2. The triangle contains only acute angles. | True | Need More Information |

Problems 3–5: For each set of three measurements, decide whether you can create zero triangles, one triangle, or more than one non-identical triangle.

Circle your choice.

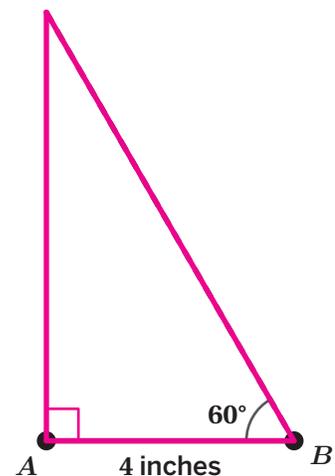
- | | | | |
|--|------|-----|---------------|
| 3. One 5-centimeter side, one 7-centimeter side, and one 10-cm side. | Zero | One | More than One |
| 4. One 80° angle, one 60° angle, and one 50° angle. | Zero | One | More than One |
| 5. One 70° angle, one 12-inch side, and one 6-inch side. | Zero | One | More than One |

6. A triangle has a 60° angle, a 90° angle, and a side that is 4 units long.

The 4-inch side is in between the 90° and 60° angles.

Complete the diagram and label your diagram with the given measurements.

Sample response shown.

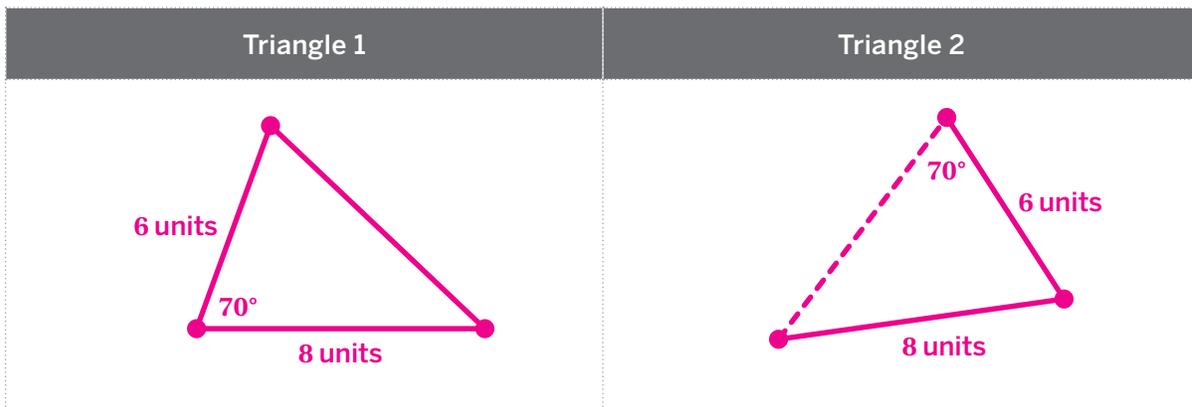


Problems 7–9:

7. Write two side lengths and one angle measure so that more than one unique triangle can be created with these measurements.

Responses vary. A side length of 8-units, a side length of 6-units and an angle measure of 70 degrees.

8. Then, sketch a diagram of two different triangles with these measurements. Label each diagram with the given measurements.



9. Change one measurement about your triangle so that only one triangle is possible. Explain or show your thinking.

Responses vary. Any change to creating three given side lengths (that make a triangle) would be acceptable.

Name: _____ Date: _____ Period: _____

Additional Practice 7.08

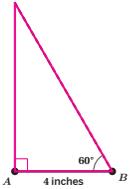
Problems 1–2: A triangle has one 8-inch side, one 10-inch side and one 40° angle. Circle True or Need More Information for each statement about this triangle.

- More than one unique triangle can be made using these measurements. True Need More Information
- The triangle contains only acute angles. True Need More Information

Problems 3–5: For each set of three measurements, decide whether you can create zero triangles, one triangle, or more than one non-identical triangle. Circle your choice.

- One 5-centimeter side, one 7-centimeter side, and one 10-cm side. Zero One More than One
- One 80° angle, one 60° angle, and one 50° angle. Zero One More than One
- One 70° angle, one 12-inch side, and one 6-inch side. Zero One More than One

6. A triangle has a 60° angle, a 90° angle, and a side that is 4 units long. The 4-inch side is in between the 90° and 60° angles. Complete the diagram and label your diagram with the given measurements. **Sample response shown.**



© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

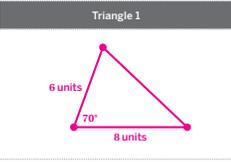
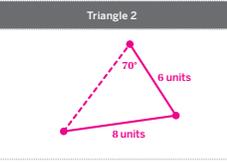
Unit 7 Lesson 8169Additional Practice

Name: _____ Date: _____ Period: _____

Problems 7–9:

7. Write two side lengths and one angle measure so that more than one unique triangle can be created with these measurements. **Responses vary. A side length of 8-units, a side length of 6-units and an angle measure of 70° degrees.**

8. Then, sketch a diagram of two different triangles with these measurements. Label each diagram with the given measurements.

Triangle 1	Triangle 2
	

9. Change one measurement about your triangle so that only one triangle is possible. Explain or show your thinking. **Responses vary. Any change to creating three given side lengths (that make a triangle) would be acceptable.**

Unit 7 Lesson 8170Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.A, 7.G.A.2
2	1	7.G.A, 7.G.A.2
3	1	7.G.A, 7.G.A.2
4	1	7.G.A, 7.G.A.2
5	1	7.G.A, 7.G.A.2
6	1	7.G.A, 7.G.A.2
7	2	7.G.A, 7.G.A.2
8	2	7.G.A, 7.G.A.2
9	2	7.G.A, 7.G.A.2

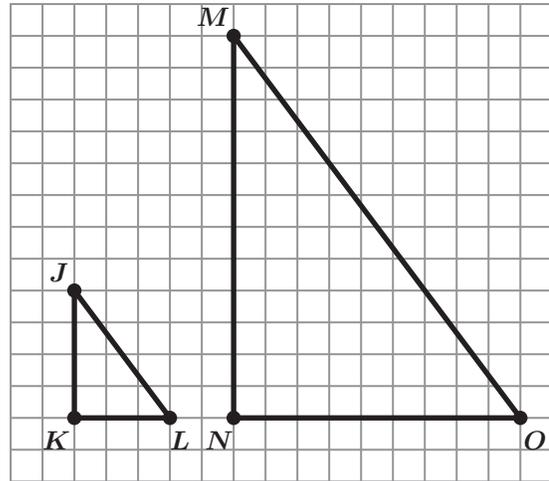
Notes:

Additional Practice

1.02

1. Triangle MNO is a scaled copy of Triangle JKL . What is the scale factor?

- A. 2
- B. 3**
- C. 4
- D. 5



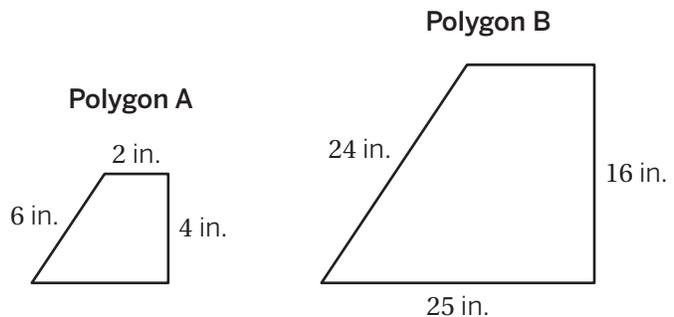
2. Polygon B is a scaled copy of Polygon A.

- a What is the length of the shortest side of Polygon B?

8 in.

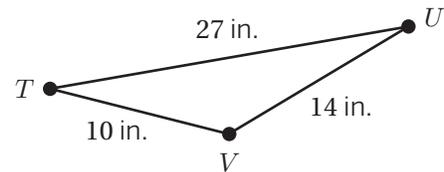
- b What is the length of the longest side of Polygon A?

6.25 in. (or equivalent)



3. Which values could represent the corresponding side lengths, in inches, of the scaled copy of Triangle TUV if the scale factor is $\frac{1}{2}$? Select *all* three side lengths.

- A. 7
- B. 28
- C. 13.5
- D. 20
- E. 5
- F. 54

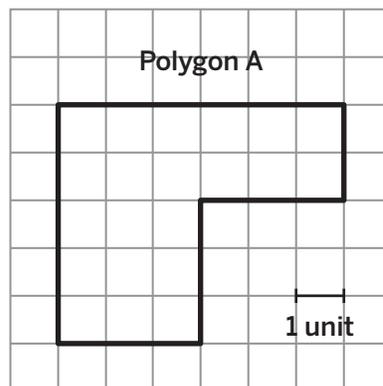


4. Polygon A has side lengths of 10, 18, 20, and 22 units. Polygon B is a scaled copy of Polygon A. Which of the following sets of values could *not* be the side lengths of Polygon B?

- A. 5, 9, 10, 11
- B. 25, 45, 50, 55
- C. 20, 28, 30, 32**
- D. 2, 3.6, 4, 4.4

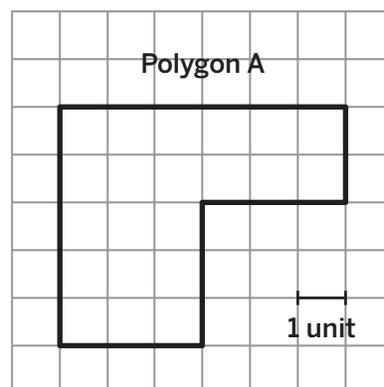
5. Quadrilateral $ZOID$ is a scaled copy of Quadrilateral $TRAP$. Select *all* the true statements.

- A. Angle DIO is smaller than angle PAR .
- B. The scale factor is greater than 1.
- C. Point T corresponds to point Z .
- D. Side PT is 2.25 times longer than side DZ .
- E. The measure of angle DZO is 105° .
- F. Side RA corresponds to side ZD .



6. Polygon B is a scaled copy of Polygon A, shown here. Suppose the shortest side of Polygon B is 13.5 units.

- a What is the scale factor that takes Polygon A to Polygon B?
6.75 (or equivalent)
- b What is the length of the longest side of Polygon B?
40.5 (or equivalent)



Name: _____ Date: _____ Period: _____

Additional Practice 1.02

- Triangle MNO is a scaled copy of Triangle JKL . What is the scale factor?
 - A. 2
 - B. 3
 - C. 4
 - D. 5
- Polygon B is a scaled copy of Polygon A.
 - a. What is the length of the shortest side of Polygon B? **8 in.**
 - b. What is the length of the longest side of Polygon A? **6.25 in. (or equivalent)**
- Which values could represent the corresponding side lengths, in inches, of the scaled copy of Triangle TUV if the scale factor is $\frac{3}{5}$? Select *all* three side lengths.
 - A. 7
 - B. 28
 - C. 13.5
 - D. 20
 - E. 5
 - F. 54
- Polygon A has side lengths of 10, 18, 20, and 22 units. Polygon B is a scaled copy of Polygon A. Which of the following sets of values could not be the side lengths of Polygon B?
 - A. 5, 9, 10, 11
 - B. 25, 45, 50, 55
 - C. 20, 28, 30, 32
 - D. 2, 3, 6, 4, 4, 4

Unit 1 Lesson 2 3 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Quadrilateral $ZOID$ is a scaled copy of Quadrilateral $TRAP$. Select *all* the true statements.
 - A. Angle DIO is smaller than angle PAR .
 - B. The scale factor is greater than 1.
 - C. Point T corresponds to point Z .
 - D. Side PT is 2.25 times longer than side DZ .
 - E. The measure of angle DZO is 105.
 - F. Side RA corresponds to side ZD .
- Polygon B is a scaled copy of Polygon A, shown here. Suppose the shortest side of Polygon B is 13.5 units.
 - a. What is the scale factor that takes Polygon A to Polygon B? **6.75 (or equivalent)**
 - b. What is the length of the longest side of Polygon B? **40.5 (or equivalent)**

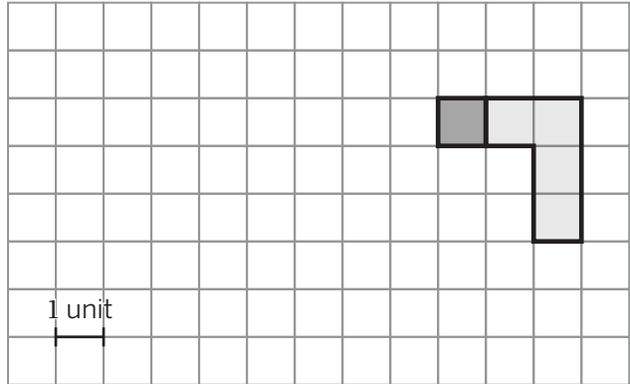
Unit 1 Lesson 2 4 Additional Practice

Practice Problem Analysis		
Problem	DOK	Standard(s)
1	1	7.G.A.1
2	1	7.G.A.1
3	2	7.G.A.1
4	2	7.G.A.1
5	2	7.G.A.1
6	2	7.G.A.1

Notes:

Additional Practice **1.03**

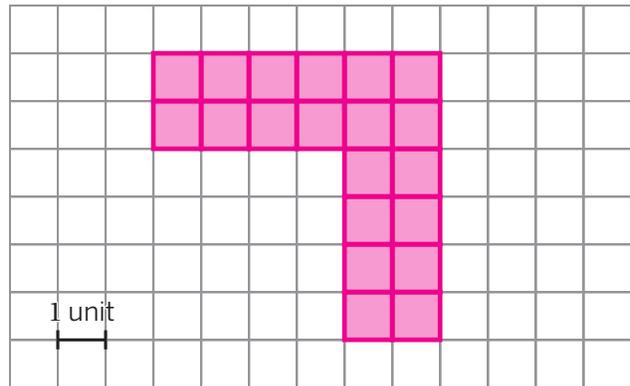
Problems 1–2: Here is a polygon.



1. Draw a scaled copy of the polygon using a scale factor of 2.

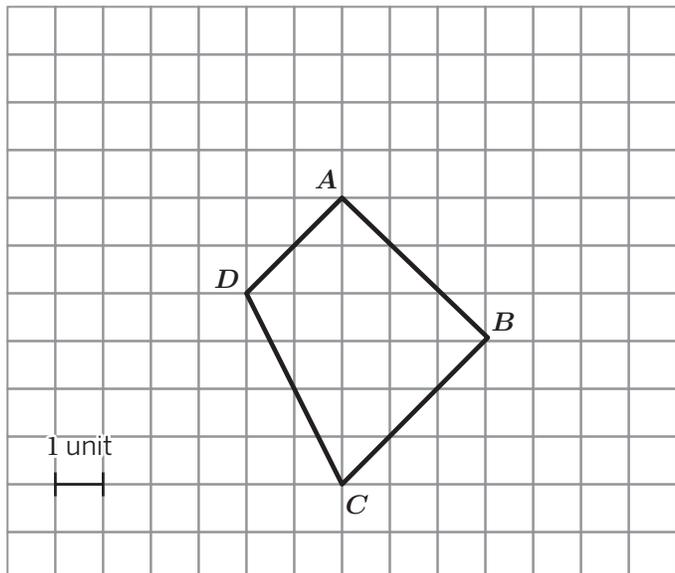
2. What is the area and perimeter of your scaled copy?

The perimeter of the scaled copy is 24 units. The area of the scaled copy is 20 square units.

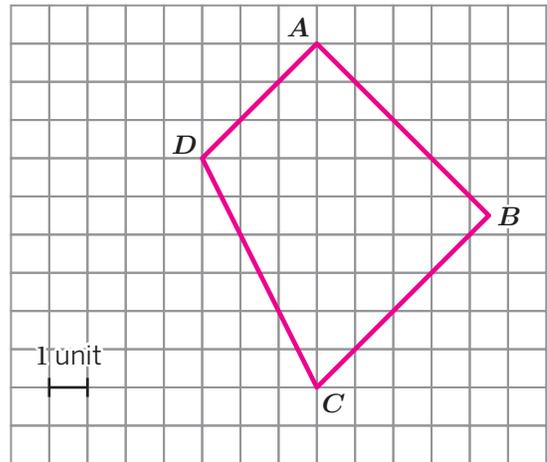


Here is figure *ABCD*.

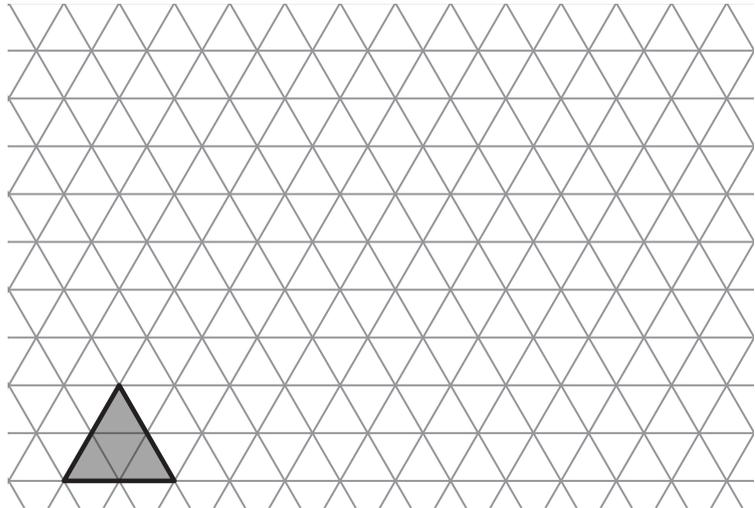
Use this figure for Problem 3.



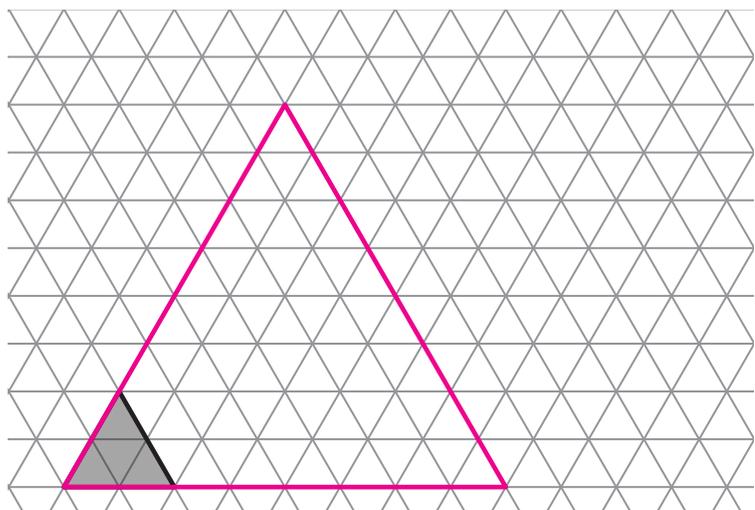
3. Draw a scaled copy of figure $ABCD$ using a scale factor of 1.5.



Problems 4–5: Here is an equilateral triangle.



4. Draw a scaled copy of this equilateral triangle using a scale factor of 4.



5. Equilateral triangles are always scaled copies. Are squares also scaled copies?

Yes No Maybe

Name: _____ Date: _____ Period: _____

Additional Practice 1.03

Problems 1-2: Here is a polygon.

- Draw a scaled copy of the polygon using a scale factor of 2.
- What is the area and perimeter of your scaled copy?
The perimeter of the scaled copy is 24 units. The area of the scaled copy is 20 square units.

Here is figure $ABCD$.
Use this figure for Problem 3.

Unit 1 Lesson 3 5 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Draw a scaled copy of figure $ABCD$ using a scale factor of 1.5.

Problems 4-5: Here is an equilateral triangle.

- Draw a scaled copy of this equilateral triangle using a scale factor of 4.
- Equilateral triangles are always scaled copies. Are squares also scaled copies?
 Yes No Maybe

Unit 1 Lesson 3 6 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.G.A.1
2	1	7.G.A.1
3	2	7.G.A.1
4	2	7.G.A.1
5	1	7.G.A.1

Notes:

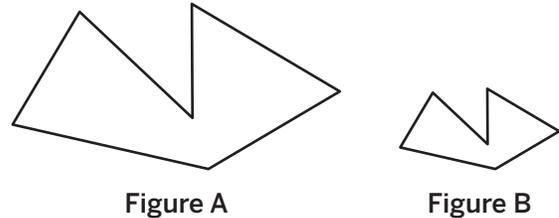
Additional Practice

1.04

1. If a scaled copy is created by applying a scale factor of 10 to a polygon, what scale factor would take the scaled copy back to its original size? Explain your thinking.

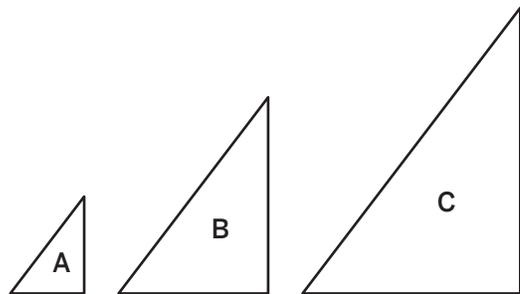
$\frac{1}{10}$, or 0.1. Sample response: $\frac{1}{10}$ is the reciprocal of 10, which would take the figure back to its original size.

2. Figure B is a scaled copy of Figure A. Which of the following values could be the scale factor that maps Figure A onto Figure B?



- A. 1
- B. $\frac{1}{2}$
- C. 2
- D. $\frac{5}{2}$

3. Triangles A, B, and C are scaled copies of one another. For each pair, decide if the scale factor that takes one figure to another is *greater than 1* or *less than 1*. Explain your thinking.

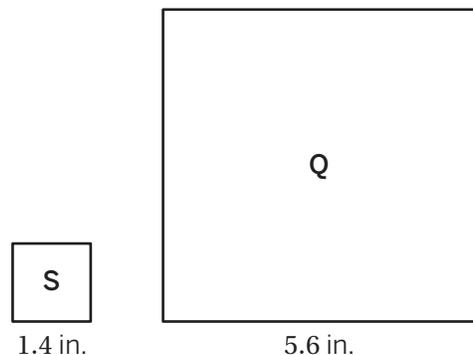


- a From Triangle A to B
Greater than 1
- b From Triangle B to C
Greater than 1
- c From Triangle B to A
Less than 1
- d From Triangle C to A
Less than 1

Sample response: If the scaled copy is larger than the original, then the scale factor is greater than 1; if the scaled copy is smaller than the original, then the scale factor is less than 1.

4. Squares S and Q are scaled copies of one another.

- a What scale factor maps Square S onto Square Q?
4 (or equivalent)
- b What scale factor maps Square Q onto Square S?
 $\frac{1}{4}$ (or equivalent)

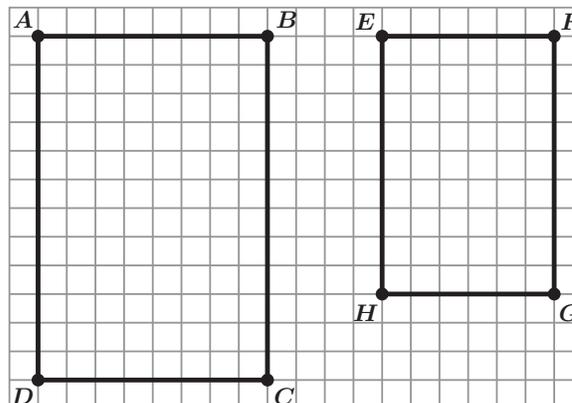


5. Suppose Figure B is a scaled copy of Figure A. If each of the listed values represents a scale factor that map Figure A onto Figure B, determine the scale factor that will map Figure B back onto Figure A.

- a 4 $\frac{1}{4}$ (or equivalent)
- b $\frac{1}{2}$ 2 (or equivalent)
- c $\frac{3}{5}$ $\frac{5}{3}$ (or equivalent)
- d 3.5 $\frac{2}{7}$ (or equivalent)

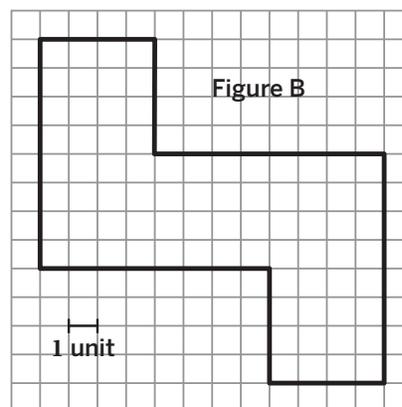
6. Polygon $EFGH$ is a scaled copy of Polygon $ABCD$.

- a What scale factor will take Polygon $EFGH$ back to its original size?
 $\frac{4}{3}$ (or equivalent)
- b What scale factor will result in Polygon $EFGH$ remaining the same size?
1 (or equivalent)



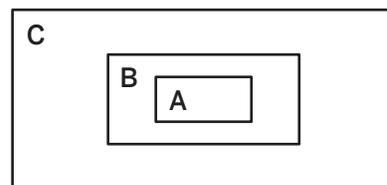
7. Figure B is a scaled copy of Figure A (not drawn). The scale factor that takes Figure A to Figure B is $\frac{2}{3}$. Determine the side lengths of Figure A. Explain your thinking.

The side lengths of Figure A are 6, 6, 12, 12, 6, 6, 12, and 12 units. Sample response: Because the scale factor is $\frac{2}{3}$, the given side lengths are $\frac{2}{3}$ of the original side lengths. 4 is $\frac{2}{3}$ of 6 and 8 is $\frac{2}{3}$ of 12. The side lengths of Figure A that have a length of 6 and 12 units correspond to the side lengths in Figure B that have a length of 4 and 8 units, respectively.



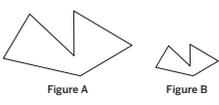
8. Andre and Tyler are creating the design shown. They use a scale factor of 2 from Rectangle A to Rectangle B and from Rectangle B to Rectangle C. They create Rectangle A with dimensions 1 in. by $\frac{1}{2}$ in.

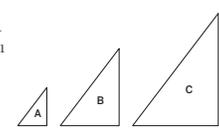
- a What dimensions should Tyler use to create Rectangle B? Explain your thinking.
2 in. by 1 in. Sample response: If you multiply the dimensions of Rectangle A by a scale factor of 2, you get 2 in. by 1 in.
- b Andre plans to create Rectangle C with dimensions 3 in. by $1\frac{1}{2}$ in. Are Andre's dimensions correct? Explain your thinking.
Andre is incorrect; Sample response: If the scale factor from Rectangle B to Rectangle C is 2, then the side lengths of Rectangle B must be multiplied by 2, which is 4 in. by 2 in. (Andre multiplied the side lengths of Rectangle A by 3.)



Name: _____ Date: _____ Period: _____

Additional Practice 1.04

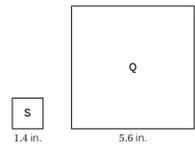
- If a scaled copy is created by applying a scale factor of 10 to a polygon, what scale factor would take the scaled copy back to its original size? Explain your thinking.
 $\frac{1}{10}$, or 0.1. Sample response: $\frac{1}{10}$ is the reciprocal of 10, which would take the figure back to its original size.
- Figure B is a scaled copy of Figure A. Which of the following values could be the scale factor that maps Figure A onto Figure B?


A. 1
B. $\frac{1}{2}$
 C. 2
 D. $\frac{5}{2}$
- Triangles A, B, and C are scaled copies of one another. For each pair, decide if the scale factor that takes one figure to another is *greater than 1* or *less than 1*. Explain your thinking.


a. From Triangle A to B
Greater than 1

b. From Triangle B to C
Greater than 1

c. From Triangle B to A
Less than 1

d. From Triangle C to A
Less than 1
Sample response: If the scaled copy is larger than the original, then the scale factor is greater than 1; if the scaled copy is smaller than the original, then the scale factor is less than 1.
- Squares S and Q are scaled copies of one another.


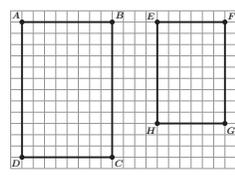
a. What scale factor maps Square S onto Square Q?
4 (or equivalent)

b. What scale factor maps Square Q onto Square S?
 $\frac{1}{4}$ (or equivalent)

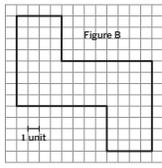
Unit 1 Lesson 4 7 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

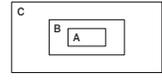
Name: _____ Date: _____ Period: _____

- Suppose Figure B is a scaled copy of Figure A. If each of the listed values represents a scale factor that map Figure A onto Figure B, determine the scale factor that will map Figure B back onto Figure A.

a. 4 $\frac{1}{4}$ (or equivalent) b. $\frac{1}{2}$ 2 (or equivalent)
 c. $\frac{3}{5}$ $\frac{5}{3}$ (or equivalent) d. 3.5 $\frac{2}{7}$ (or equivalent)
- Polygon EFGH is a scaled copy of Polygon ABCD.


a. What scale factor will take Polygon EFGH back to its original size?
 $\frac{4}{3}$ (or equivalent)

b. What scale factor will result in Polygon EFGH remaining the same size?
1 (or equivalent)
- Figure B is a scaled copy of Figure A (not drawn). The scale factor that takes Figure A to Figure B is $\frac{2}{3}$. Determine the side lengths of Figure A. Explain your thinking.


The side lengths of Figure A are 6, 12, 12, 6, 6, 12, and 12 units. Sample response: Because the scale factor is $\frac{2}{3}$, the given side lengths are $\frac{2}{3}$ of the original side lengths. 4 is $\frac{2}{3}$ of 6 and 8 is $\frac{2}{3}$ of 12. The side lengths of Figure A that have a length of 6 and 12 units correspond to the side lengths in Figure B that have a length of 4 and 8 units, respectively.
- Andre and Tyler are creating the design shown. They use a scale factor of 2 from Rectangle A to Rectangle B and from Rectangle B to Rectangle C. They create Rectangle A with dimensions 1 in. by $\frac{1}{2}$ in.


a. What dimensions should Tyler use to create Rectangle B? Explain your thinking.
2 in. by 1 in. Sample response: If you multiply the dimensions of Rectangle A by a scale factor of 2, you get 2 in. by 1 in.

b. Andre plans to create Rectangle C with dimensions 3 in. by $1\frac{1}{2}$ in. Are Andre's dimensions correct? Explain your thinking.
Andre is incorrect; Sample response: If the scale factor from Rectangle B to Rectangle C is 2, then the side lengths of Rectangle B must be multiplied by 2, which is 4 in. by 2 in. (Andre multiplied the side lengths of Rectangle A by 3.)

Unit 1 Lesson 4 8 Additional Practice

Practice Problem Analysis

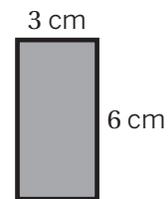
Problem	DOK	Standard(s)
1	1	7.G.A.1
2	1	7.G.A.1
3	2	7.G.A.1
4	2	7.G.A.1
5	2	7.G.A.1
6	2	7.G.A.1
7	2	7.G.A.1
8	3	7.G.A.1

Notes:

Additional Practice

1.07

Problems 1–4. Here is part of a scale drawing of Nova’s kitchen. The scale is 9 centimeters to 21 feet.



1. What are the dimensions of Nova’s actual kitchen?

7 feet by 14 feet

2. What is the actual area of Nova’s kitchen?

98 square feet

3. Nova wants to put a table in their kitchen that is 3.5 feet wide. How wide would the table be if it were drawn on the scale drawing?

1.5 centimeters

4. Nova’s living room is near their kitchen and measures 6 centimeters by 10 centimeters. Is Nova’s living room twice as large as their kitchen? Explain your thinking.

Explanations vary. No. Nova’s living room is not twice as large as their kitchen. Using the scale of 9 centimeters to 21 feet, the dimensions of the actual living room as 14 feet by $23\frac{1}{3}$ feet. This is not the same as the kitchen.

Additional Practice**1.10**

Problems 1–4: James and Piper buried a treasure together on their school's field. The field is 400 feet wide. James made a map that is 8 inches wide to record its location.

1. Write two possible scales James could have used to make his drawing.

Explanations vary. James could use a scale that every 1 unit is 4 inches wide. James could also use a scale that every 2 units is 8 inches wide.

2. Piper made her own map using a scale of 1 inch to 20 feet. Whose map is larger: James's or Piper's? Explain your thinking.

Explanations vary. Since James is possibly using a scale of 4 inches for every unit, this is smaller than Piper's scale. So, James' map will need to be larger.

3. On Piper's map, the treasure is 2 inches from the south edge of the field. How far is the treasure from the south edge on Piper's map?

Since Piper is using a scale of 1 inch to 20 feet, the treasure is 40 feet from the south edge of Piper's map.

4. On Piper's map, the area of the field is 16 square inches. Piper says that the actual area of the field is 320 square feet. Is Piper correct? Explain your thinking.

Explanations vary. Piper is incorrect. Piper did not correctly scale the length and width of the field first. She needed to find the actual area of the length and width first. Then, multiply to find the area.

5. Select *all* the scales that are equivalent to 4 centimeters to 20 meters.

- A. 4 inches to 20 inches
- B. 1 centimeter to 5 meters
- C. 10 meters to 2 centimeters
- D. 5 millimeters to 3 meters
- E. 1 inch to 4 feet

Explain your thinking for the scale(s) you selected.

Explanations vary. Since the scale is 4 centimeters to 20 meters, I can divide both sides by 4 to get an equivalent scale of 1 centimeter to 5 meters. I can also divide both sides of the scale by 2 and flip the order, to get the equivalent scale 10 meters to 2 centimeters.

6. On a blueprint, the living room is 4.2 inches wide. The blueprint has a scale of 1 inch to 5 feet. How wide would the living room be on a blueprint that has a scale of 1 inch to 20 feet?

- A. 1.2 inches
- B. 2.1 inches
- C. 3.2 inches
- D. 31 inches

Name: _____ Date: _____ Period: _____

Additional Practice

1.10

Problems 1–4: James and Piper buried a treasure together on their school's field. The field is 400 feet wide. James made a map that is 8 inches wide to record its location.

1. Write two possible scales James could have used to make his drawing.

Explanations vary. James could use a scale that every 1 unit is 4 inches wide. James could also use a scale that every 2 units is 8 inches wide.

2. Piper made her own map using a scale of 1 inch to 20 feet. Whose map is larger: James's or Piper's? Explain your thinking.

Explanations vary. Since James is possibly using a scale of 4 inches for every unit, this is smaller than Piper's scale. So, James' map will need to be larger.

3. On Piper's map, the treasure is 2 inches from the south edge of the field. How far is the treasure from the south edge on Piper's map?

Since Piper is using a scale of 1 inch to 20 feet, the treasure is 40 feet from the south edge of Piper's map.

4. On Piper's map, the area of the field is 16 square inches. Piper says that the actual area of the field is 320 square feet. Is Piper correct? Explain your thinking.

Explanations vary. Piper is incorrect. Piper did not correctly scale the length and width of the field first. She needed to find the actual area of the length and width first. Then, multiply to find the area.

Unit 1 Lesson 10

19

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

5. Select *all* the scales that are equivalent to 4 centimeters to 20 meters.

- A. 4 inches to 20 inches
- B. 1 centimeter to 5 meters
- C. 10 meters to 2 centimeters
- D. 5 millimeters to 3 meters
- E. 1 inch to 4 feet

Explain your thinking for the scale(s) you selected.

Explanations vary. Since the scale is 4 centimeters to 20 meters, I can divide both sides by 4 to get an equivalent scale of 1 centimeter to 5 meters. I can also divide both sides of the scale by 2 and flip the order, to get the equivalent scale 10 meters to 2 centimeters.

6. On a blueprint, the living room is 4.2 inches wide. The blueprint has a scale of 1 inch to 5 feet. How wide would the living room be on a blueprint that has a scale of 1 inch to 20 feet?

- A. 1.2 inches
- B. 2.1 inches
- C. 3.2 inches
- D. 31 inches

Unit 1 Lesson 10

20

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.G.A.1
2	2	7.G.A.1
3	2	7.G.A.1
4	2	7.G.A.1
5	2	7.G.A.1
6	1	7.G.A.1

Notes:

Additional Practice

6.01

Problems 1–4: A local gym charges \$115 a month for a gym membership and 3 training sessions and \$145 a month for a gym membership with 4 training sessions.

1. How much does the gym charge for the monthly membership only?

\$25

2. How much does the gym charge for each training session?

\$30

3. Is the relationship between the number of training sessions and the total amount charged proportional? Explain your thinking.

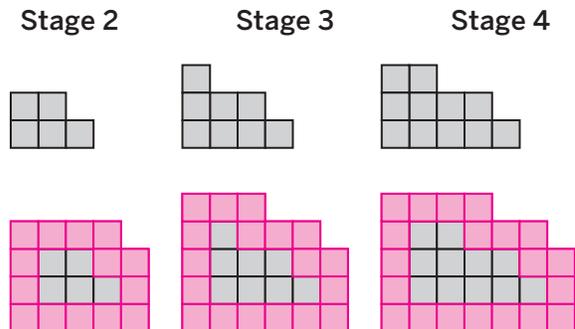
No. *Explanations vary.* If someone purchased 0 training sessions, it would cost them \$25. The graph of this relationship would not pass through the origin.

4. If the total monthly charge was \$265, how many training sessions were purchased? Explain your thinking.

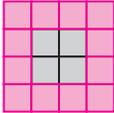
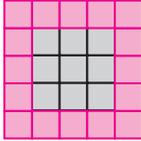
8 sessions: *Explanations vary.* If the cost for a monthly membership is \$25, then $\$265 - \$25 = \$240$. If we divide \$240 by the cost of each training session, $\frac{240}{30} = 8$ training sessions.

5. Here are scaled copies of a figure. The top three have a toothpick border and the bottom three have a tile border. Complete the table to show the number of toothpicks and tiles for different stages.

Stage	Border Toothpicks	Border Tiles
2	10	14
3	14	18
4	16	20
5	18	22
6	20	24



Problems 6–10: Use the pattern below to answer the following questions.

Stage 1	Stage 2	Stage 3
		
Border Tiles: 8	Border Tiles: 12	Border Tiles: 16

6. Determine the number of border tiles for each Stage.

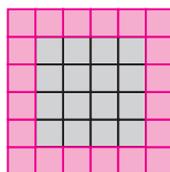
7. Describe how you can determine the number of border tiles at any stage without drawing the figure.

Explanations vary. The number of tiles is 4 more than the perimeter of the inner figure.

8. Describe the pattern of the inner figure.

Explanations vary. They are all squares, with one unit side added with each Stage.

9. Sketch the figure for Stage 4 below and identify the number of border tiles it has.



Border Tiles: **20**

10. Without sketching it, determine how many border tiles Stage 6 will have. Explain your thinking.

24. Explanations vary. A square with the dimensions 5 by 5 will have a perimeter of 20. Therefore, the number of border tiles will be 20 + 4 or 24.

Name: _____ Date: _____ Period: _____

Additional Practice 6.01

Problems 1–4: A local gym charges \$115 a month for a gym membership and 3 training sessions and \$145 a month for a gym membership with 4 training sessions.

- How much does the gym charge for the monthly membership only?
\$25
- How much does the gym charge for each training session?
\$30
- Is the relationship between the number of training sessions and the total amount charged proportional? Explain your thinking.
No. Explanations vary. If someone purchased 0 training sessions, it would cost them \$25. The graph of this relationship would not pass through the origin.
- If the total monthly charge was \$265, how many training sessions were purchased? Explain your thinking.
8 sessions: Explanations vary. If the cost for a monthly membership is \$25, then $\$265 - \$25 = \$240$. If we divide \$240 by the cost of each training session, $\frac{240}{30} = 8$ training sessions.

5. Here are scaled copies of a figure. The top three have a toothpick border and the bottom three have a tile border. Complete the table to show the number of toothpicks and tiles for different stages.

Stage	Border Toothpicks	Border Tiles
2	10	14
3	14	18
4	16	20
5	18	22
6	20	24

Stage 2



Stage 3



Stage 4







© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Unit 6 Lesson 1 121 Additional Practice

Name: _____ Date: _____ Period: _____

Problems 6–10: Use the pattern below to answer the following questions.

Stage 1	Stage 2	Stage 3
		
Border Tiles: 8	Border Tiles: 12	Border Tiles: 16

- Determine the number of border tiles for each Stage.
- Describe how you can determine the number of border tiles at any stage without drawing the figure.
Explanations vary. The number of tiles is 4 more than the perimeter of the inner figure.
- Describe the pattern of the inner figure.
Explanations vary. They are all squares, with one unit side added with each Stage.
- Sketch the figure for Stage 4 below and identify the number of border tiles it has.



Border Tiles: **20**

- Without sketching it, determine how many border tiles Stage 6 will have. Explain your thinking.
24. Explanations vary. A square with the dimensions 5 by 5 will have a perimeter of 20. Therefore, the number of border tiles will be $20 + 4$ or 24.

Unit 6 Lesson 1 122 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	1	7.EE.B.4
3	2	7.EE.B.4
4	2	7.EE.B.4
5	1	7.EE.B.4
6	1	7.EE.B.4
7	2	7.EE.B.4
8	2	7.EE.B.4
9	1	7.EE.B.4
10	2	7.EE.B.4

Notes:

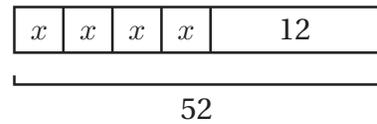
Additional Practice

6.03

1. Han purchased 4 packs of tomato plants. He also purchased 5 pepper plants. He bought 17 plants in all. Which equation represents the scenario?

- A. $17 = 4x + 5$ B. $17 = 4(x + 5)$
 C. $17 - 5 = 4x$ D. $4x + 17 = 5$

2. Refer to the tape diagram shown. Clare had 4 packages of stickers. After her sister gave her 12 more stickers, she had a total of 52 stickers. In the tape diagram, what does x represent, the number of packages of stickers or the number of stickers in each package?



The number of stickers in each package

3. Read these real-world scenarios, and study the two equations shown.

Scenario 1: Lin's mother bought 4 kids-meals. She also bought a meal for herself that cost \$8. She spent a total of \$28 on lunch.

$$8x + 4 = 28$$

$$4x + 8 = 28$$

Scenario 2: A preschool teacher has 28 toy cars. She gives equal amounts of toy cars to 8 students. She has 4 toy cars left over.

- a. Decide which equation represents each scenario. What does x represent in each equation?

Scenario 1: $4x + 8 = 28$; x is the cost of each kid's meal.

Scenario 2: $8x + 4 = 28$; x is the number of toy cars each student gets.

- b. Determine the solution to each equation. Show or explain your thinking.

Scenario 1:

$$4x + 8 = 28$$

$$4x + 8 - 8 = 28 - 8$$

$$4x = 20$$

$$4x \div 4 = 20 \div 4$$

$$x = 5$$

Scenario 2:

$$8x + 4 = 28$$

$$8x + 4 - 4 = 28 - 4$$

$$8x = 24$$

$$8x \div 8 = 24 \div 8$$

$$x = 3$$

- c. What does each solution tell you about its scenario?

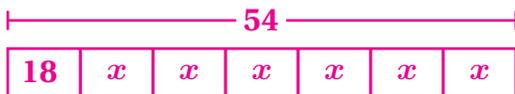
Scenario 1: Each kid's meal costs \$5.

Scenario 2: Each student receives 3 toy cars.

4. Diego and two friends each spent $\$x$ on a round of mini-golf. They spent $\$16$ on a veggie pizza. The total cost of the mini-golf and the pizza was $\$34$.

a Draw a tape diagram and write an equation that represents the scenario.

Sample response: $3x + 16 = 34$



b Solve the equation. Show your thinking. What is the cost of one round of mini-golf?

$\$6$; Sample response:

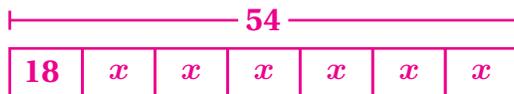
$$\begin{aligned}
 3x + 16 - 16 &= 34 - 16 \\
 3x &= 18 \\
 3x \div 3 &= 18 \div 3 \\
 x &= 6
 \end{aligned}$$

Problems 5–9: Priya wanted to run 54 miles. Each day that she goes out running, she runs 6 miles. She has already run 18 miles. Priya wants to know how many days she needs to run to meet her goal.

5. Identify what the variable, x , represents in this context.

Responses vary. The variable x represents the number of additional days Priya needs to run to meet her goal.

6. Draw a tape diagram to represent this situation.



7. Using your tape diagram, write an equation to represent this situation.

$6x + 18 = 54$, or equivalent

8. What is the value of x ? Explain how you arrived at this solution.

6 days. Explanations vary. I subtracted 18 from 54 to get the number of groups of 6 needed to run the remaining miles. Then, I divided 36 by 6 to get 6.

Name: _____ Date: _____ Period: _____

Additional Practice 6.03

- Han purchased 4 packs of tomato plants. He also purchased 5 pepper plants. He bought 17 plants in all. Which equation represents the scenario?
 - A. $17 = 4x + 5$
 - B. $17 = 4(x + 5)$
 - C. $17 - 5 = 4x$
 - D. $4x + 17 = 5$
- Refer to the tape diagram shown. Clare had 4 packages of stickers. After her sister gave her 12 more stickers, she had a total of 52 stickers. In the tape diagram, what does x represent, the number of packages of stickers or the number of stickers in each package?

The number of stickers in each package
- Read these real-world scenarios, and study the two equations shown.

Scenario 1: Lin's mother bought 4 kids-meals. She also bought a meal for herself that cost \$8. She spent a total of \$28 on lunch.

$8x + 4 = 28$
 $4x + 8 = 28$

Scenario 2: A preschool teacher has 28 toy cars. She gives equal amounts of toy cars to 8 students. She has 4 toy cars left over.

 - Decide which equation represents each scenario. What does x represent in each equation?

Scenario 1: $4x + 8 = 28$; x is the cost of each kid's meal.

Scenario 2: $8x + 4 = 28$; x is the number of toy cars each student gets.
 - Determine the solution to each equation. Show or explain your thinking.

Scenario 1: $4x + 8 = 28$
 $4x + 8 - 8 = 28 - 8$
 $4x = 20$
 $4x \div 4 = 20 \div 4$
 $x = 5$

Scenario 2: $8x + 4 = 28$
 $8x + 4 - 4 = 28 - 4$
 $8x = 24$
 $8x \div 8 = 24 \div 8$
 $x = 3$
 - What does each solution tell you about its scenario?

Scenario 1: Each kid's meal costs \$5.

Scenario 2: Each student receives 3 toy cars.

Unit 6 Lesson 3 125 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Diego and two friends each spent \$ x on a round of mini-golf. They spent \$16 on a veggie pizza. The total cost of the mini-golf and the pizza was \$34.
 - Draw a tape diagram and write an equation that represents the scenario.
Sample response: $3x + 16 = 34$
 - Solve the equation. Show your thinking. What is the cost of one round of mini-golf?
S6; Sample response:
 $3x + 16 - 16 = 34 - 16$
 $3x = 18$
 $3x \div 3 = 18 \div 3$
 $x = 6$
- Problems 5–9:** Priya wanted to run 54 miles. Each day that she goes out running, she runs 6 miles. She has already run 18 miles. Priya wants to know how many days she needs to run to meet her goal.
 - Identify what the variable, x , represents in this context.
Responses vary. The variable x represents the number of additional days Priya needs to run to meet her goal.
 - Draw a tape diagram to represent this situation.
 - Using your tape diagram, write an equation to represent this situation.
 $6x + 18 = 54$, or equivalent
 - What is the value of x ? Explain how you arrived at this solution.
6 days. Explanations vary. I subtracted 18 from 54 to get the number of groups of 6 needed to run the remaining miles. Then, I divided 36 by 6 to get 6.

Unit 6 Lesson 3 126 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.3, 7.EE.B.4.A
2	1	7.EE.B.3, 7.EE.B.4.A
3	2	7.EE.B.3, 7.EE.B.4.A
4	2	7.EE.B.3, 7.EE.B.4.A
5	1	7.EE.B.3
6	2	7.EE.B.3
7	2	7.EE.B.3
8	2	7.EE.B.3

Notes:

Additional Practice

6.04

1. Kiran gives away a total of 28 bouncy balls to his 4 cousins. He first gives an equal amount to each cousin, and then gives each cousin 2 more. Which equation represents this situation?

- A. $6(x + 2) = 28$
- B. $2(x + 4) = 28$
- C. $4(x + 2) = 28$**
- D. $6(x + 4) = 28$

2. What is the solution to the equation $64 = 8(x + 2)$?

- A. $x = 10$
- B. $x = 8$
- C. $x = 6$**
- D. $x = -10$

3. Solve each equation. Show your thinking.

a $91 = 7(x + 6)$

Sample response:

$$91 \div 7 = 7(x + 6) \div 7$$

$$13 = x + 6$$

$$13 - 6 = x + 6 - 6$$

$$7 = x$$

b $\frac{3}{4}(x + 1) = 12$

Sample response:

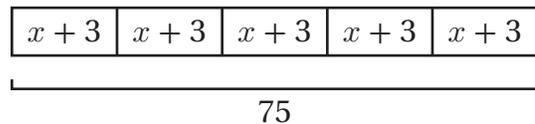
$$\frac{3}{4}(x + 1) \div \frac{3}{4} = 12 \div \frac{3}{4}$$

$$x + 1 = 16$$

$$x + 1 - 1 = 16 - 1$$

$$x = 15$$

4. Refer to the tape diagram shown. Clare says that the tape diagram could match the following scenario:



A kindergarten teacher placed an equal amount of stickers at 5 tables. Then he placed 3 more stickers at each table. He placed 75 stickers in all.

Do you agree with Clare? Explain your thinking.

I agree with Clare because the tape diagram has 5 groups and in each group there are x stickers + 3 stickers. There are a total of 75 stickers for the 5 groups.

5. Match each story with the equation that represents it.

Stories

- a. Mai packaged 48 cans of vegetable soup in 6 boxes for a canned food drive. She first placed an equal amount in each box and then added 4 cans to each box.

- b. A group of 4 friends each purchased a ticket to drive go-karts. Each friend also spent \$6 on a meal. They spent \$48 in all.

Equations

- **a** $6(x + 4) = 48$

- **b** $4(x + 6) = 48$

6. Solve each equation. Show your thinking.

a $9 = 2.25(x + 1.5)$

Sample response:

$$9 \div 2.25 = 2.25(x + 1.5) \div 2.25$$

$$4 = x + 1.5$$

$$4 - 1.5 = x + 1.5 - 1.5$$

$$2.5 = x$$

b $\frac{2}{3}(x + \frac{9}{6}) = \frac{6}{3}$

Sample response:

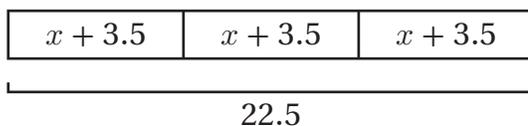
$$\frac{2}{3}(x + \frac{9}{6}) \div \frac{2}{3} = \frac{6}{3} \div \frac{2}{3}$$

$$x + \frac{9}{6} = 3$$

$$x + \frac{9}{6} - \frac{9}{6} = 3 - \frac{9}{6}$$

$$x = 1 \frac{1}{2}$$

7. Refer to the tape diagram shown.



- a** Write a scenario that could be represented by the tape diagram.

Sample response: Three friends did some yard work for a neighbor. During the week, they all worked the same number of hours. On the weekend, they each worked an additional 3.5 hours. If they worked a total of 22.5 hour together, how many hours did they each work during the week?

- b** Write an equation that represents the diagram and the scenario.

$3(x + 3.5) = 22.5$ or equivalent

- c** What does x represent?

Sample response: x represents the amount each friend worked during the week.

- d** Solve the equation.

$x = 4$

- e** Interpret the solution.

Sample response: Each friend worked 4 hours during the week.

Name: _____ Date: _____ Period: _____

Additional Practice

6.04

1. Kiran gives away a total of 28 bouncy balls to his 4 cousins. He first gives an equal amount to each cousin, and then gives each cousin 2 more. Which equation represents this situation?
- A. $6(x + 2) = 28$
 - B. $2(x + 4) = 28$
 - C. $4(x + 2) = 28$**
 - D. $6(x + 4) = 28$

2. What is the solution to the equation $64 = 8(x + 2)$?
- A. $x = 10$
 - B. $x = 8$
 - C. $x = 6$**
 - D. $x = -10$

3. Solve each equation. Show your thinking.

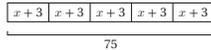
a $91 = 7(x + 6)$

Sample response:
 $91 \div 7 = 7(x + 6) \div 7$
 $13 = x + 6$
 $13 - 6 = x + 6 - 6$
 $7 = x$

b $\frac{3}{4}(x + 1) = 12$

Sample response:
 $\frac{3}{4}(x + 1) \div \frac{3}{4} = 12 \div \frac{3}{4}$
 $x + 1 = 16$
 $x + 1 - 1 = 16 - 1$
 $x = 15$

4. Refer to the tape diagram shown. Clare says that the tape diagram could match the following scenario:



A kindergarten teacher placed an equal amount of stickers at 5 tables. Then he placed 3 more stickers at each table. He placed 75 stickers in all.

Do you agree with Clare? Explain your thinking.

I agree with Clare because the tape diagram has 5 groups and in each group there are x stickers + 3 stickers. There are a total of 75 stickers for the 5 groups.

Unit 6 Lesson 4

127

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

5. Match each story with the equation that represents it.

Stories

Equations

- a. Mai packaged 48 cans of vegetable soup in 6 boxes for a canned food drive. She first placed an equal amount in each box and then added 4 cans to each box. **.....a. $6(x + 4) = 48$**
- b. A group of 4 friends each purchased a ticket to drive go-karts. Each friend also spent \$6 on a meal. They spent \$48 in all. **.....b. $4(x + 6) = 48$**

6. Solve each equation. Show your thinking.

a $9 = 2.25(x + 1.5)$

Sample response:
 $9 \div 2.25 = 2.25(x + 1.5) \div 2.25$
 $4 = x + 1.5$
 $4 - 1.5 = x + 1.5 - 1.5$
 $2.5 = x$

b $\frac{2}{3}(x + \frac{9}{6}) = \frac{6}{3}$

Sample response:
 $\frac{2}{3}(x + \frac{9}{6}) \div \frac{2}{3} = \frac{6}{3} \div \frac{2}{3}$
 $x + \frac{9}{6} = 3$
 $x + \frac{9}{6} - \frac{9}{6} = 3 - \frac{9}{6}$
 $x = 1\frac{1}{2}$

7. Refer to the tape diagram shown.



- a Write a scenario that could be represented by the tape diagram.

Sample response: Three friends did some yard work for a neighbor. During the week, they all worked the same number of hours. On the weekend, they each worked an additional 3.5 hours. If they worked a total of 22.5 hour together, how many hours did they each work during the week?

- b Write an equation that represents the diagram and the scenario.

$3(x + 3.5) = 22.5$ or equivalent

- c What does x represent?

Sample response: x represents the amount each friend worked during the week.

- d Solve the equation.

$x = 4$

- e Interpret the solution.

Sample response: Each friend worked 4 hours during the week.

Unit 6 Lesson 4

128

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.3,7.EE.B.4.A
2	1	7.EE.B.3,7.EE.B.4.A
3	2	7.EE.B.3,7.EE.B.4.A
4	2	7.EE.B.3,7.EE.B.4.A
5	2	7.EE.B.3,7.EE.B.4.A
6	2	7.EE.B.3,7.EE.B.4.A
7	3	7.EE.B.3,7.EE.B.4.A

Notes:

Additional Practice

6.05

1. Determine what changes were made to the first hanger diagram that resulted in the second hanger diagram. Name the property (or properties) that tell you that if the first hanger is balanced, then the second hanger diagram remains balanced.

First hanger	Second hanger	What was done?	What property?
		Two units were added to each side.	Addition Property of Equality
		Both sides were partitioned into 2 equal groups, and one half of each side remained. (Each side was divided by 2.)	Division Property of Equality

2. Each hanger diagram in the table from Problem 1 is balanced. Determine the weight of each lettered shape, and explain your thinking. You may draw on the diagrams to help with your thinking.

- a $z = \dots\dots\dots$ b $x = \dots\dots\dots$ c $2z = \dots\dots\dots$ d $0.5x = \dots\dots\dots$

$z = 1$; Sample response: In the second diagram, three units can be removed from both sides, leaving two shapes represented by z balanced with two units.

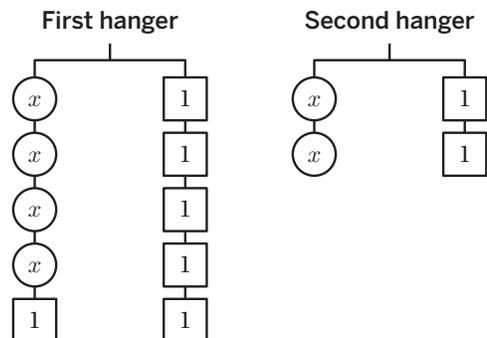
$x = 1$; Sample response: The second diagram shows two units balanced with two shapes represented by x .

$2z = 2$; Sample response: If we know that $z = 1$, then 2 times z would be 2.

$0.5x = 0.5$; Sample response: If we know that $x = 1$, then 0.5 times x would be 0.5.

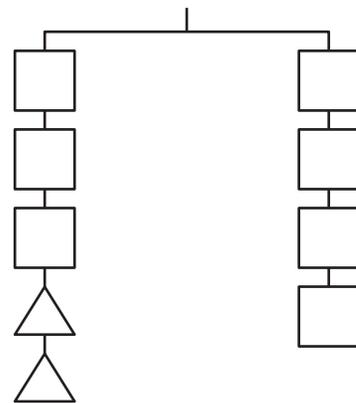
3. Refer to these hanger diagrams. What changes were made to the first hanger diagram that resulted in the second hanger diagram?

- A. One unit was added to each side. Then each side was divided by 2.
- B.** One unit was removed from each side. Then each side was divided by 2.
- C. One unit was added to each side. Then each side was divided by 3.
- D. Each side was partitioned into 2 equal groups, and one half of each side was removed.



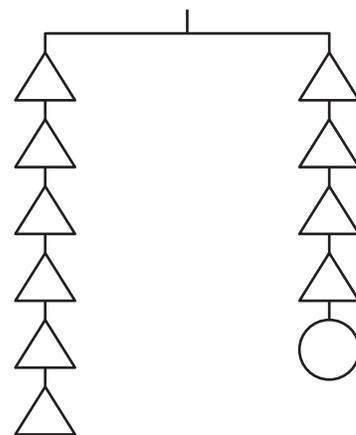
4. Refer to the balanced hanger diagram. Determine the weight of a triangle if each square weighs:

- a 2 lb 1 lb
- b 3 lb $1\frac{1}{2}$ lb
- c $1\frac{1}{2}$ lb $\frac{3}{4}$ lb
- d $\frac{1}{2}$ lb $\frac{1}{4}$ lb

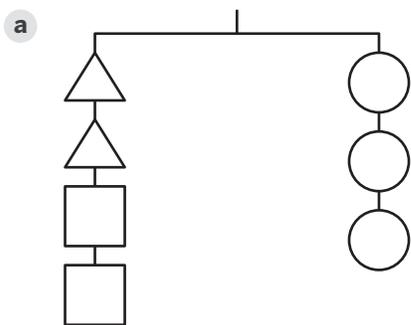


5. Refer to the balanced hanger diagram. The weight of each triangle is 2.5 g. What is the weight of the circle? Explain your thinking.

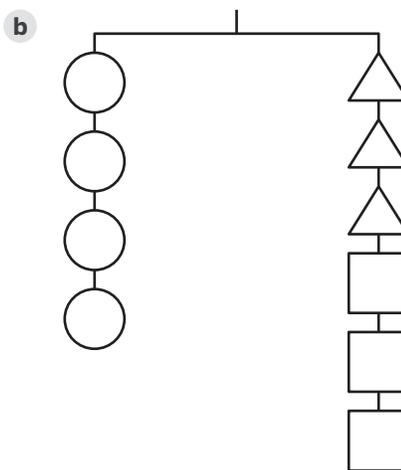
5 g; Sample response: Because the hanger diagram is balanced, the weight of the circle must equal the weight of two triangles. So, $2 \cdot 2.5 = 5$.



6. Suppose the weight of each triangle is x lb, the weight of each circle is 2 lb, and the weight of each square is $\frac{1}{4}$ lb. Write an equation to represent the hanger diagrams shown.



$$2x + \frac{1}{2} = 6 \text{ or } 2\left(x + \frac{1}{4}\right) = 6$$



$$8 = 3x + \frac{3}{4} \text{ or } 8 = 3\left(x + \frac{1}{4}\right)$$

Name: _____ Date: _____ Period: _____

Additional Practice

6.05

1. Determine what changes were made to the first hanger diagram that resulted in the second hanger diagram. Name the property (or properties) that tell you that if the first hanger is balanced, then the second hanger diagram remains balanced.

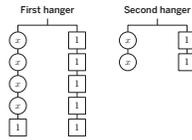
First hanger	Second hanger	What was done?	What property?
		Two units were added to each side.	Addition Property of Equality
		Both sides were partitioned into 2 equal groups, and one half of each side remained. (Each side was divided by 2.)	Division Property of Equality

2. Each hanger diagram in the table from Problem 1 is balanced. Determine the weight of each lettered shape, and explain your thinking. You may draw on the diagrams to help with your thinking.

- a. $z = \underline{\hspace{1cm}}$ b. $x = \underline{\hspace{1cm}}$ c. $2z = \underline{\hspace{1cm}}$ d. $0.5x = \underline{\hspace{1cm}}$
- z = 1:** Sample response: In the second diagram, three units can be removed from both sides, leaving two shapes represented by z balanced with two units.
- x = 1:** Sample response: The second diagram shows two units balanced with two shapes represented by x .
- 2z = 2:** Sample response: If we know that $z = 1$, then 2 times z would be 2.
- 0.5x = 0.5:** Sample response: If we know that $x = 1$, then 0.5 times x would be 0.5.

3. Refer to these hanger diagrams. What changes were made to the first hanger diagram that resulted in the second hanger diagram?

- A. One unit was added to each side. Then each side was divided by 2.
- B.** One unit was removed from each side. Then each side was divided by 2.
- C. One unit was added to each side. Then each side was divided by 3.
- D. Each side was partitioned into 2 equal groups, and one half of each side was removed.



Unit 6 Lesson 5

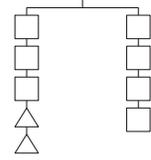
129

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

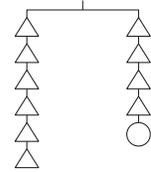
4. Refer to the balanced hanger diagram. Determine the weight of a triangle if each square weighs:

- a. 2 lb 1 lb
- b. 3 lb $1\frac{1}{2}$ lb
- c. $1\frac{1}{2}$ lb $\frac{3}{4}$ lb
- d. $\frac{1}{2}$ lb $\frac{1}{4}$ lb

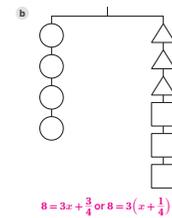
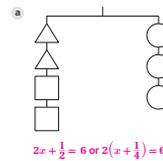


5. Refer to the balanced hanger diagram. The weight of each triangle is 2.5 g. What is the weight of the circle? Explain your thinking.

5 g: Sample response: Because the hanger diagram is balanced, the weight of the circle must equal the weight of two triangles. So, $2 \cdot 2.5 = 5$.



6. Suppose the weight of each triangle is x lb, the weight of each circle is 2 lb, and the weight of each square is $\frac{1}{4}$ lb. Write an equation to represent the hanger diagrams shown.



Unit 6 Lesson 5

130

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	2	7.EE.B.4
3	1	7.EE.B.4
4	2	7.EE.B.4
5	2	7.EE.B.4
6	3	7.EE.B.4

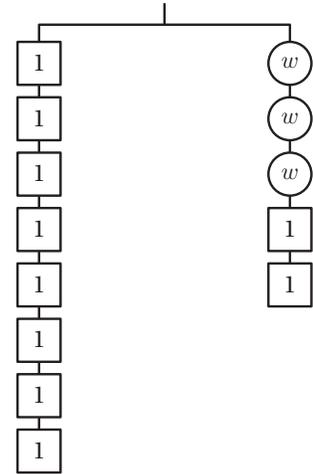
Notes:

Additional Practice

6.06

1. Refer to the hanger diagram. Which equation is represented by the hanger diagram?

- A. $8 = 2w + 3$
- B. $10 = 3w$
- C. $8 = 3w + 2$**
- D. $6 = 3w$



2. Clare described a hanger diagram as having three unknowns and two weights balanced with five weights. Which hanger diagram represents this description? **Diagram B**

Diagram A

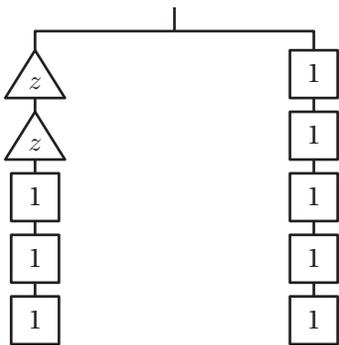
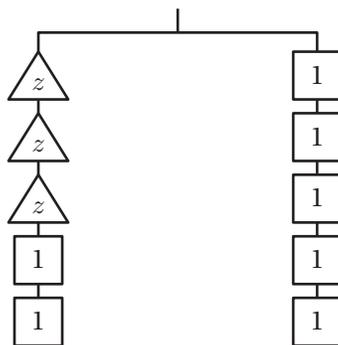
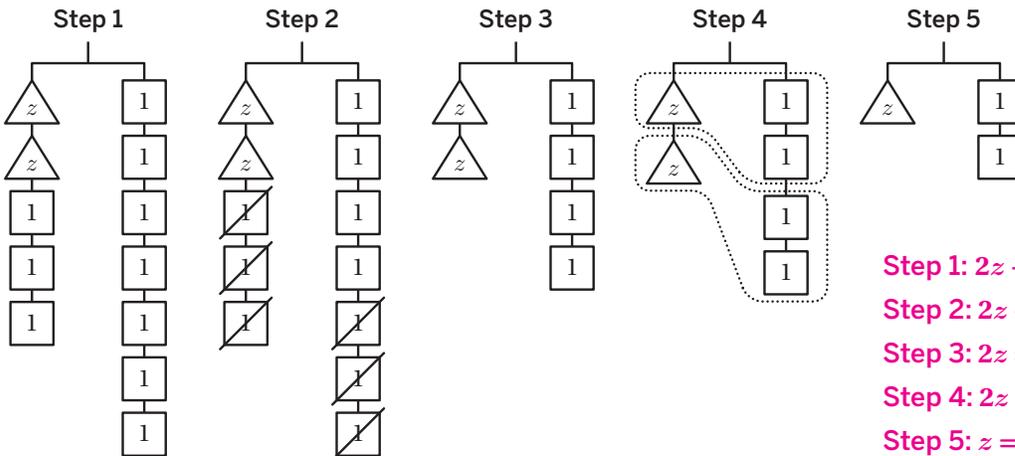


Diagram B



3. Andre used a hanger diagram to find the solution to the equation $2z + 3 = 7$. Write an equation to represent each step.



- Step 1: $2z + 3 = 7$
- Step 2: $2z + 3 - 3 = 7 - 3$
- Step 3: $2z = 4$
- Step 4: $2z \div 2 = 4 \div 2$
- Step 5: $z = 2$

4. Bard started to solve the equation $2x + 3 = 6$ using the hanger diagram shown. Complete Bard's response, including marking up the hanger diagram.

Bard's thinking:

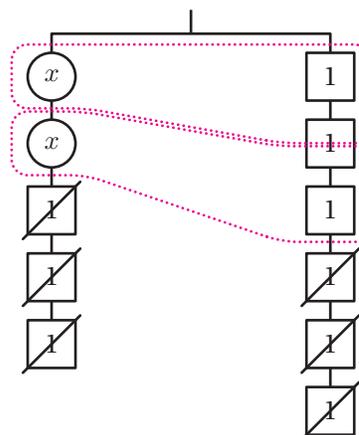
$$2x + 3 = 6$$

$$2x + 3 - 3 = 6 - 3$$

$$2x = 3$$

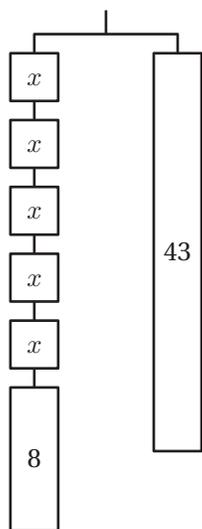
$$2x \div 2 = 3 \div 2$$

$$x = \frac{3}{2} \text{ (or equivalent)}$$



5. Solve each equation. Refer to the hanger to help with your thinking.

a $5x + 8 = 43$



$$x = 7;$$

$$5x + 8 = 43$$

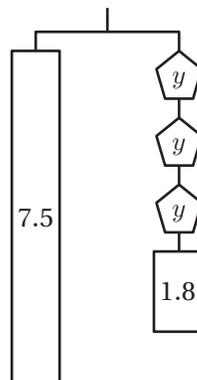
$$5x + 8 - 8 = 43 - 8$$

$$5x = 35$$

$$5x \div 5 = 35 \div 5$$

$$x = 7$$

b $7.5 = 3y + 1.8$



$$y = 1.9;$$

$$7.5 = 3y + 1.8$$

$$7.5 - 1.8 = 3y + 1.8 - 1.8$$

$$5.7 = 3y$$

$$5.7 \div 3 = 3y \div 3$$

$$1.9 = y$$

6. Solve each equation. Draw a hanger diagram, if needed.

a $1.25y + 6.2 = 11.2$

$$y = 4;$$

$$1.25y + 6.2 = 11.2$$

$$1.25y + 6.2 - 6.2 = 11.2 - 6.2$$

$$1.25y = 5$$

$$1.25y \div 1.25 = 5 \div 1.25$$

$$y = 4$$

b $\frac{1}{2}x + \frac{3}{4} = 2\frac{3}{4}$

$$x = 10;$$

$$\frac{1}{2}x + \frac{3}{4} = 2\frac{3}{4}$$

$$\frac{1}{2}x + \frac{3}{4} - \frac{3}{4} = 2\frac{3}{4} - \frac{3}{4}$$

$$\frac{1}{2}x = \frac{20}{4}$$

$$\frac{1}{2}x \div \frac{1}{2} = \frac{20}{4} \div \frac{1}{2}$$

$$x = 10$$

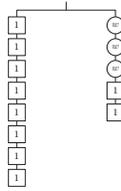
Name: _____ Date: _____ Period: _____

Additional Practice

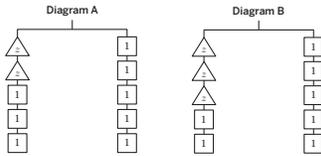
6.06

1. Refer to the hanger diagram. Which equation is represented by the hanger diagram?

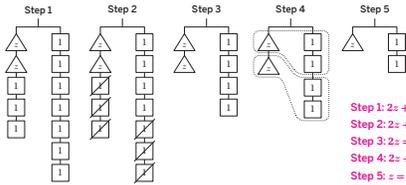
- A. $8 = 2w + 3$
- B. $10 = 3w$
- C. $8 = 3w + 2$**
- D. $6 = 3w$



2. Clare described a hanger diagram as having three unknowns and two weights balanced with five weights. Which hanger diagram represents this description? **Diagram B**



3. Andre used a hanger diagram to find the solution to the equation $2z + 3 = 7$. Write an equation to represent each step.



- Step 1: $2z + 3 = 7$
- Step 2: $2z + 3 - 3 = 7 - 3$
- Step 3: $2z = 4$
- Step 4: $2z \div 2 = 4 \div 2$
- Step 5: $z = 2$

Unit 6 Lesson 6

131

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

4. Bard started to solve the equation $2x + 3 = 6$ using the hanger diagram shown. Complete Bard's response, including marking up the hanger diagram.

Bard's thinking:

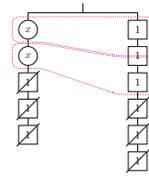
$$2x + 3 = 6$$

$$2x + 3 - 3 = 6 - 3$$

$$2x = 3$$

$$2x \div 2 = 3 \div 2$$

$$x = \frac{3}{2} \text{ (or equivalent)}$$



5. Solve each equation. Refer to the hanger to help with your thinking.

a. $5x + 8 = 43$

$$x = 7;$$

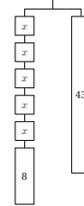
$$5x + 8 = 43$$

$$5x + 8 - 8 = 43 - 8$$

$$5x = 35$$

$$5x \div 5 = 35 \div 5$$

$$x = 7$$



b. $7.5 = 3y + 1.8$

$$y = 1.9;$$

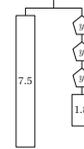
$$7.5 = 3y + 1.8$$

$$7.5 - 1.8 = 3y + 1.8 - 1.8$$

$$5.7 = 3y$$

$$5.7 \div 3 = 3y \div 3$$

$$1.9 = y$$



6. Solve each equation. Draw a hanger diagram, if needed.

a. $1.25y + 6.2 = 11.2$

$$y = 4;$$

$$1.25y + 6.2 = 11.2$$

$$1.25y + 6.2 - 6.2 = 11.2 - 6.2$$

$$1.25y = 5$$

$$1.25y \div 1.25 = 5 \div 1.25$$

$$y = 4$$

b. $\frac{1}{2}x + \frac{3}{4} = \frac{3}{4}$

$$x = 10;$$

$$\frac{1}{2}x + \frac{3}{4} = \frac{3}{4}$$

$$\frac{1}{2}x + \frac{3}{4} - \frac{3}{4} = \frac{3}{4} - \frac{3}{4}$$

$$\frac{1}{2}x = 0$$

$$\frac{1}{2}x \div \frac{1}{2} = 0 \div \frac{1}{2}$$

$$x = 0$$

Unit 6 Lesson 6

132

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	1	7.EE.B.4
3	2	7.EE.B.4
4	2	7.EE.B.4
5	3	7.EE.B.4.A
6	3	7.EE.B.4.A

Notes:

Additional Practice

6.07

Problems 1–3: Solve each equation by filling in the blanks.

1. $12x - 6 = 54$

$12x = \dots 60 \dots$

$x = \dots 5 \dots$

2. $5(x + 3) = -25$

$x + 3 = \dots -5 \dots$

$x = \dots -8 \dots$

3. $-75x + 150 = 0$

$-75x = \dots -150 \dots$

$x = \dots 2 \dots$

Problems 4–7: Solve each equation. Draw a hanger diagram to help with your thinking, if needed. Show your thinking.

4. $-10(x - 3) = 50$

$$\begin{aligned} -10(x - 3) \div -10 &= 50 \div -10 \\ x - 3 &= -5 \\ x - 3 + 3 &= -5 + 3 \\ x &= -2 \end{aligned}$$

5. $18 = \frac{2}{3}(w + 4)$

$$\begin{aligned} 18 \cdot \frac{3}{2} &= \frac{3}{2} \cdot \frac{2}{3}(w + 4) \\ 27 &= w + 4 \\ 27 - 4 &= w + 4 - 4 \\ 23 &= w \end{aligned}$$

6. $15 = -0.5(y + 6)$

$$\begin{aligned} 15 \div -0.5 &= -0.5(y + 6) \div -0.5 \\ -30 &= y + 6 \\ -30 - 6 &= y + 6 - 6 \\ -36 &= y \end{aligned}$$

7. $-\frac{1}{3}(z - 12) = -2$

$$\begin{aligned} -\frac{1}{3}(z - 12) \cdot -3 &= -2 \cdot -3 \\ z - 12 &= 6 \\ z - 12 + 12 &= 6 + 12 \\ z &= 18 \end{aligned}$$

Problems 8–9: Matthew and Alice each solved the equation $-\frac{1}{3}(x + 6) = 12$ using different methods. The first steps of their methods are shown below.

8. Continue to solve the equation following each student's first steps. Show your thinking.

Matthew's Method	Alice's Method
$-\frac{1}{3}(x + 6) = 12$ $-3 \cdot -\frac{1}{3}(x + 6) = 12 \cdot -3$ $x + 6 = -36$ $x + 6 - 6 = -36 - 6$ $x = -42$	$-\frac{1}{3}(x + 6) = 12$ $-\frac{1}{3}x + -\frac{1}{3}(6) = 12$ $-\frac{1}{3}x + -2 = 12$ $-\frac{1}{3}x + -2 + 2 = 12 + 2$ $-\frac{1}{3}x = 14$ $-3 \cdot -\frac{1}{3}x = 14 \cdot -3$ $x = -42$

9. What is different about each method? What is the same?

Responses vary. Matthew chose to eliminate the fraction $\frac{1}{3}$ first by multiplying both sides by 3. Alice chose to first distribute the $\frac{1}{3}$ to the terms x and 6. Both methods resulted in the same answer for x , -42 .

10. Which method do you prefer? Explain.

Responses vary. I prefer Matthew's method because it is easier to solve equations when they don't contain fractions.

Name: _____ Date: _____ Period: _____

Additional Practice

6.07

Problems 1–3: Solve each equation by filling in the blanks.

1. $12x - 6 = 54$
 $12x = \underline{60}$
 $x = \underline{5}$

2. $5(x + 3) = -25$
 $x + 3 = \underline{-5}$
 $x = \underline{-8}$

3. $-75x + 150 = 0$
 $-75x = \underline{-150}$
 $x = \underline{2}$

Problems 4–7: Solve each equation. Draw a hanger diagram to help with your thinking, if needed. Show your thinking.

4. $-10(x - 3) = 50$
 $-10(x - 3) \div -10 = 50 \div -10$
 $x - 3 = -5$
 $x - 3 + 3 = -5 + 3$
 $x = -2$

5. $18 = \frac{2}{3}(w + 4)$
 $18 \cdot \frac{3}{2} = \frac{2}{2} \cdot \frac{3}{3} (w + 4)$
 $27 = w + 4$
 $27 - 4 = w + 4 - 4$
 $23 = w$

6. $15 = -0.5(y + 6)$
 $15 \div -0.5 = -0.5(y + 6) \div -0.5$
 $-30 = y + 6$
 $-30 - 6 = y + 6 - 6$
 $-36 = y$

7. $-\frac{1}{3}(z - 12) = -2$
 $-\frac{1}{3}(z - 12) \cdot -3 = -2 \cdot -3$
 $z - 12 = 6$
 $z - 12 + 12 = 6 + 12$
 $z = 18$

Unit 6 Lesson 7

133

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 8–9: Matthew and Alice each solved the equation $-\frac{1}{3}(x + 6) = 12$ using different methods. The first steps of their methods are shown below.

8. Continue to solve the equation following each student's first steps. Show your thinking.

Matthew's Method	Alice's Method
$-\frac{1}{3}(x + 6) = 12$	$-\frac{1}{3}(x + 6) = 12$
$-3 \cdot -\frac{1}{3}(x + 6) = 12 \cdot -3$	$-\frac{1}{3}x + -\frac{1}{3}(6) = 12$
$x + 6 = -36$	$-\frac{1}{3}x + -2 = 12$
$x + 6 - 6 = -36 - 6$	$-\frac{1}{3}x + -2 + 2 = 12 + 2$
$x = -42$	$-\frac{1}{3}x = 14$
	$-3 \cdot -\frac{1}{3}x = 14 \cdot -3$
	$x = -42$

9. What is different about each method? What is the same?

Responses vary. Matthew chose to eliminate the fraction $\frac{1}{3}$ first by multiplying both sides by 3. Alice chose to first distribute the $\frac{1}{3}$ to the terms x and 6. Both methods resulted in the same answer for x , -42 .

10. Which method do you prefer? Explain.

Responses vary. I prefer Matthew's method because it is easier to solve equations when they don't contain fractions.

Unit 6 Lesson 7

134

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4.A
2	1	7.EE.B.4.A
3	1	7.EE.B.4.A
4	2	7.EE.B.4.A
5	1	7.EE.B.4.A
6	1	7.EE.B.4.A
7	1	7.EE.B.4.A
8	2	7.EE.B.4.A
9	2	7.EE.B.4.A
10	2	7.EE.B.4.A

Notes:

Additional Practice

6.08

Problems 1–3: Write each expression in expanded form.

1. $-3(-2)$
6

2. $-9(1 - y)$
 $-9 + 9y$

3. $-14(-2y)$
 $28y$

Problems 4–6: Complete the missing information in the puzzle and complete the table.

4.

	w	-8
2	$2w$	-16

Factored	Expanded
$2(w - 8)$	$2w - 16$

5.

	a	-4
6	$12a$	-24

Factored	Expanded
$6(a - 4)$	$12a - 24$

6.

	$2y$	-5
4	$8y$	-20

Factored	Expanded
$4(2y - 5)$	$8y - 20$

Responses vary.

Problems 7–10: Solve each equation. Show your thinking. *Methods vary.*

7. $-3(x - 5) = 12$

$$\begin{aligned}x - 5 &= -4 \\ x &= 1\end{aligned}$$

8. $-4(x + 2) = 32$

$$\begin{aligned}x + 2 &= -8 \\ x &= -10\end{aligned}$$

9. $\frac{2}{3}(x + 3) = -18$

$$\begin{aligned}x + 3 &= -27 \\ x &= -30\end{aligned}$$

10. $-\frac{1}{4}(x - 7) = -10$

$$\begin{aligned}x - 7 &= 40 \\ x &= 47\end{aligned}$$

Name: _____ Date: _____ Period: _____

Additional Practice

6.08

Problems 1–3: Write each expression in expanded form.

1. $-3(-2)$
6

2. $-9(1 - y)$
 $-9 + 9y$

3. $-14(-2y)$
28y

Problems 4–6: Complete the missing information in the puzzle and complete the table.

4.

	w	-8
2	2w	-16

Factored	Expanded
$2(w - 8)$	$2w - 16$

5.

	a	-4
6	12a	-24

Factored	Expanded
$6(a - 4)$	$12a - 24$

6.

	2y	-5
4	8y	-20

Factored	Expanded
$4(2y - 5)$	$8y - 20$

Responses vary.

Unit 6 Lesson 8

135

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 7–10: Solve each equation. Show your thinking. *Methods vary.*

7. $-3(x - 5) = 12$
 $x - 5 = -4$
 $x = 1$

8. $-4(x + 2) = 32$
 $x + 2 = -8$
 $x = -10$

9. $\frac{2}{3}(x + 3) = -18$
 $x + 3 = -27$
 $x = -30$

10. $-\frac{1}{4}(x - 7) = -10$
 $x - 7 = 40$
 $x = 47$

Unit 6 Lesson 8

136

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.A.1
2	1	7.EE.A.1
3	1	7.EE.A.1
4	2	7.EE.A.1, 7.EE.A.2
5	2	7.EE.A.1, 7.EE.A.2
6	2	7.EE.A.1, 7.EE.A.2
7	1	7.EE.A.1, 7.EE.A.2, 7.EE.B.4.A
8	1	7.EE.A.1, 7.EE.A.2, 7.EE.B.4.A
9	1	7.EE.A.1, 7.EE.A.2, 7.EE.B.4.A
10	1	7.EE.A.1, 7.EE.A.2, 7.EE.B.4.A

Notes:

Additional Practice

6.09

1. Gina says that $4x - 8$ and $3x + 4$ are equivalent because they equal 40 when x is 12. Do you agree with Gina? Explain your thinking.

*Explanations vary. Although Gina is correct that $4x - 8$ and $3x + 4$ are equivalent when $x = 12$, this is the *only* value for x at which they are equivalent. For example, if I substitute 2 into each expression, I get $4(2) - 8 = 0$ and $3(2) + 4 = 10$. The expressions are not equal.*

2. Write at least three different expressions that are equivalent to $12w + 18$.

Responses vary. $6(2w + 3)$, $2(6w + 9)$, $-3(-4w - 6)$

3. Write at least three different expressions that are equivalent to $-1/4(16m - 40)$.

Responses vary. $-2(2m - 5)$, $-(4m - 10)$, $2(-2m + 5)$

Problems 4-7: Write an equivalent expression in expanded form.

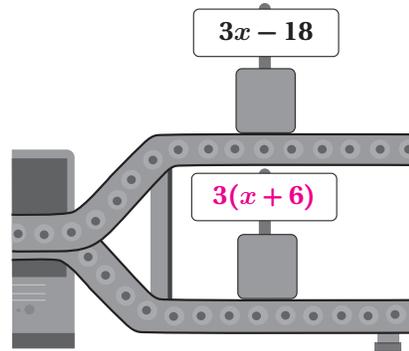
4. $-3(-a + 4) = 3a - 12$ or equivalent 5. $-12\left(z - \frac{1}{2}\right) = -12z + 6$ or equivalent

6. $\frac{1}{4}(20y - 10) = 5y - \frac{5}{2}$ or equivalent 7. $3(2x + 6y - 1) = 6x + 18y - 3$ or equivalent

Problems 8–9: A never-equal machine is given.

8. Write an expression that will always be equal to $3x - 18$ and an expression that will never be equal to $3x - 18$. Use x as the variable in each expression.

Explanations vary. $3(x - 6)$ will always be equal and $3(x + 6)$ will never be equal.



9. Explain how you know that your two expressions will never be equal.

Explanations vary. These are never equal because the $3(x + 6)$ machine will always output a value that is 36 greater than the $3(x - 6)$ machine.

Name: _____ Date: _____ Period: _____

Additional Practice

6.09

1. Gina says that $4x - 8$ and $3x + 4$ are equivalent because they equal 40 when x is 12. Do you agree with Gina? Explain your thinking.

Explanations vary. Although Gina is correct that $4x - 8$ and $3x + 4$ are equivalent when $x = 12$, this is the only value for x at which they are equivalent. For example, if I substitute 2 into each expression, I get $4(2) - 8 = 0$ and $3(2) + 4 = 10$. The expressions are not equal.

2. Write at least three different expressions that are equivalent to $12w + 18$.

Responses vary. $6(2w + 3)$, $2(6w + 9)$, $-3(-4w - 6)$

3. Write at least three different expressions that are equivalent to $-1/4(16m - 40)$.

Responses vary. $-2(2m - 5)$, $-(4m - 10)$, $2(-2m + 5)$

Problems 4-7: Write an equivalent expression in expanded form.

4. $-3(-a + 4) = 3a - 12$ or equivalent 5. $-12\left(z - \frac{1}{2}\right) = -12z + 6$ or equivalent ...

6. $\frac{1}{4}(20y - 10) = 5y - \frac{5}{2}$ or equivalent 7. $3(2x + 6y - 1) = 6x + 18y - 3$ or equivalent

Unit 6 Lesson 9

137

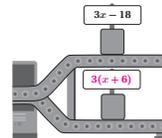
© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 8-9: A never-equal machine is given.

8. Write an expression that will always be equal to $3x - 18$ and an expression that will never be equal to $3x - 18$. Use x as the variable in each expression.

Explanations vary. $3(x - 6)$ will always be equal and $3(x + 6)$ will never be equal.



9. Explain how you know that your two expressions will never be equal.

Explanations vary. These are never equal because the $3(x + 6)$ machine will always output a value that is 36 greater than the $3(x - 6)$ machine.

Unit 6 Lesson 9

138

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.EE.A.1, 7.EE.A.2
2	1	7.EE.A.1, 7.EE.A.2
3	1	7.EE.A.1, 7.EE.A.2
4	1	7.EE.A.1, 7.EE.A.2
5	1	7.EE.A.1, 7.EE.A.2
6	1	7.EE.A.1, 7.EE.A.2
7	1	7.EE.A.1, 7.EE.A.2
8	2	7.EE.A.1, 7.EE.A.2
9	2	7.EE.A.1, 7.EE.A.2

Notes:

Additional Practice

6.10

1. Select *all* of the expressions that are equivalent to $12x + 7 - 2x$.

A. $17x$

B. $10x + 7$

C. $14x + 7$

D. $12x + 7 + (-2x)$

E. $12x - 2x + 7$

2. Fill in the blanks to make each equation true.

a $4x + \underline{3x} = 7x$

b $4x + \underline{-3x} = x$

c $4x + \underline{-10x} = -6x$

d $4x + \underline{(3x - 2)} = 7x - 2$

e $4x - \underline{3x} = x$

f $4x - \underline{10x} = -6x$

g $4x + \underline{(-4x + 8)} = 8$

h $4x - (\underline{2x + 6}) = 2x - 6$

Problems 3–6: Collect all the squares by choosing two or more expressions to combine using appropriate operations. Then, write an equivalent expression using the fewest number of terms.

All squares must be used.

$-3x$	$6 - x$	$3(x - 2)$
$2(x - 1)$	$5 + x$	$10x$
$9x + 4$	$4x$	$\frac{1}{2}x + 6$

Responses vary depending on the expressions students choose.

	Original Expression	Equivalent Expression
3	$-3x + 4x$	x
4	$5 + x + 9x + 4$	$10x + 9$
5	$3(x - 2) - (6 - x)$	$4x - 12$
6	$2(x - 1) + 10x + \frac{1}{2}x + 6$	$12\frac{1}{2}x + 14$

Name: _____ Date: _____ Period: _____

Additional Practice

6.10

1. Select *all* of the expressions that are equivalent to $12x + 7 - 2x$.

- A. $17x$
- B. $10x + 7$
- C. $14x + 7$
- D. $12x + 7 + (-2x)$
- E. $12x - 2x + 7$

2. Fill in the blanks to make each equation true.

- a $4x + \underline{3x} = 7x$
- b $4x + \underline{-3x} = x$
- c $4x + \underline{-10x} = -6x$
- d $4x + \underline{(3x - 2)} = 7x - 2$
- e $4x - \underline{3x} = x$
- f $4x - \underline{10x} = -6x$
- g $4x + \underline{(-4x + 8)} = 8$
- h $4x - \underline{(2x + 6)} = 2x - 6$

Unit 6 Lesson 10

139

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 3–6: Collect all the squares by choosing two or more expressions to combine using appropriate operations. Then, write an equivalent expression using the fewest number of terms.

All squares must be used.

$-3x$	$6 - x$	$3(x - 2)$
$2(x - 1)$	$5 + x$	$10x$
$9x + 4$	$4x$	$\frac{1}{2}x + 6$

Responses vary depending on the expressions students choose.

	Original Expression	Equivalent Expression
3	$-3x + 4x$	x
4	$5 + x + 9x + 4$	$10x + 9$
5	$3(x - 2) - (6 - x)$	$4x - 12$
6	$2(x - 1) + 10x + \frac{1}{2}x + 6$	$12\frac{1}{2}x + 14$

Unit 6 Lesson 10

140

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	7.EE.A.1, 7.EE.A.2
2	2	7.EE.A.1, 7.EE.A.2
3	2	7.EE.A.1, 7.EE.A.2
4	1	7.EE.A.1, 7.EE.A.2
5	1	7.EE.A.1, 7.EE.A.2
6	1	7.EE.A.1, 7.EE.A.2

Notes:

Additional Practice

6.11

1. Which is the solution to the equation $3x + 7 = -11$?

A. 9

B. 6

C. -6

D. -9

2. Which is the solution to the equation $\frac{2}{3}(x + 8) = -4$?

A. 14

B. 2

C. -2

D. -14

3. Solve each equation. Show your thinking.

a $41 = 11 + 4z$

$z = 7\frac{1}{2}$; Sample response:

$41 - 11 = 11 + 4z - 11$

$30 = 4z$

$30 \div 4 = 4z \div 4$

$7\frac{1}{2} = z$

b $3w + 3.1 = 9.7$

$w = 2.2$; Sample response:

$3w + 3.1 - 3.1 = 9.7 - 3.1$

$3w = 6.6$

$3w \div 3 = 6.6 \div 3$

$w = 2.2$

4. Solve each equation. Show your thinking.

a $-\frac{5}{4}(x - 6) = \frac{10}{4}$

$x = 4$; Sample response:

$-584\left(\frac{x}{6}\right) \div \left(-\frac{5}{4}\right) = \frac{10}{4} \div \left(-\frac{5}{4}\right)$

$x - 6 = -2$

$x - 6 + 6 = -2 + 6$

$x = 4$

b $8000 = 4000(x - 0.06)$

$x = 2.06$; Sample response:

$8,000 \div 4,000 = 4,000(x - 0.06) \div 4,000$

$2 = x - 0.06$

$2 + 0.06 = x - 0.06 + 0.06$

$2.06 = x$

5. Select *all* expressions that represent a correct solution to the equation $4(x + 6) = 22$.

A. $22 - 4 - 6$

D. $\frac{1}{4}(22 - 6)$

B. $22 \div 4 - 6$

E. $(22 - 6) \div 4$

C. $\frac{1}{4}(22 - 24)$

F. $(22 - 24) \div 4$

6. Solve the equation $-\frac{3}{4}(x - 8) = -6$ using two different methods. Show your thinking.

Method 1:

$$-\frac{3}{4}(x - 8) \div \left(-\frac{3}{4}\right) = -6 \div \left(-\frac{3}{4}\right)$$

$$x - 8 = 8$$

$$x - 8 + 8 = 8 + 8$$

$$x = 16$$

Method 2:

$$-\frac{3}{4}x + 6 = -6$$

$$-\frac{3}{4}x + 6 - 6 = -6 - 6$$

$$-\frac{3}{4}x = -12$$

$$-\frac{3}{4}x \div \left(-\frac{3}{4}\right) = -12 \div \left(-\frac{3}{4}\right)$$

$$x = 16$$

7. Diego solved the equation $-\frac{3}{2}(x + 6) = \frac{21}{2}$. His response is shown. Diego made a mistake. Identify his mistake, and then correct his response. Show your thinking.

When solving the equation, Diego incorrectly found $2\frac{1}{2} \div \left(-\frac{3}{2}\right)$. He forgot that when dividing by a fraction, multiply by its reciprocal.

$$-\frac{3}{2}(x + 6) \div \left(-\frac{3}{2}\right) = \frac{21}{2} \div \left(-\frac{3}{2}\right)$$

$$x + 6 = -7$$

$$x + 6 - 6 = -7 - 6$$

$$x = -13$$

$$-\frac{3}{2}(x + 6) \div \left(-\frac{3}{2}\right) = \frac{21}{2} \div \left(-\frac{3}{2}\right)$$

$$x + 6 = -6\frac{3}{4}$$

$$x + 6 = -15\frac{3}{4}$$

$$x + 6 - 6 = -15\frac{3}{4} - 6$$

$$x = -21\frac{3}{4}$$

Name: _____ Date: _____ Period: _____

Additional Practice

6.11

1. Which is the solution to the equation $3x + 7 = -11$?

- A. 9
 B. 6
 C. -6
 D. -9

2. Which is the solution to the equation $\frac{2}{3}(x + 8) = -4$?

- A. 14
 B. 2
 C. -2
 D. -14

3. Solve each equation. Show your thinking.

a. $41 = 11 + 4z$
 $z = 7\frac{1}{2}$; Sample response:
 $41 - 11 = 11 + 4z - 11$
 $30 = 4z$
 $30 \div 4 = 4z \div 4$
 $7\frac{1}{2} = z$

b. $3w + 3.1 = 9.7$
 $w = 2.2$; Sample response:
 $3w + 3.1 - 3.1 = 9.7 - 3.1$
 $3w = 6.6$
 $3w \div 3 = 6.6 \div 3$
 $w = 2.2$

4. Solve each equation. Show your thinking.

a. $-\frac{3}{4}(x - 6) = \frac{10}{4}$
 $x = 4$; Sample response:
 $-584(\frac{3}{4}) \div (-\frac{3}{4}) = \frac{10}{4} \div (-\frac{3}{4})$
 $x - 6 = -2$
 $x - 6 + 6 = -2 + 6$
 $x = 4$

b. $8000 = 4000(x - 0.06)$
 $x = 2.06$; Sample response:
 $8,000 \div 4,000 = 4,000(x - 0.06) \div 4,000$
 $2 = x - 0.06$
 $2 + 0.06 = x - 0.06 + 0.06$
 $2.06 = x$

Unit 6 Lesson 11

141

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

5. Select *all* expressions that represent a correct solution to the equation $4(x + 6) = 22$.

- A. $22 - 4 - 6$
 B. $22 \div 4 - 6$
 C. $\frac{1}{4}(22 - 24)$
 D. $\frac{1}{4}(22 - 6)$
 E. $(22 - 6) \div 4$
 F. $(22 - 24) \div 4$

6. Solve the equation $-\frac{3}{4}(x - 8) = -6$ using two different methods. Show your thinking.

Method 1:
 $-\frac{3}{4}(x - 8) \div (-\frac{3}{4}) = -6 \div (-\frac{3}{4})$
 $x - 8 = 8$
 $x - 8 + 8 = 8 + 8$
 $x = 16$

Method 2:
 $-\frac{3}{4}x + 6 = -6$
 $-\frac{3}{4}x + 6 - 6 = -6 - 6$
 $-\frac{3}{4}x = -12$
 $-\frac{3}{4}x \div (-\frac{3}{4}) = -12 \div (-\frac{3}{4})$
 $x = 16$

7. Diego solved the equation $-\frac{3}{2}(x + 6) = \frac{21}{2}$.

His response is shown. Diego made a mistake. Identify his mistake, and then correct his response. Show your thinking.

When solving the equation, Diego incorrectly found $2\frac{1}{2} \div (-\frac{3}{2})$. He forgot that when dividing by a fraction, multiply by its reciprocal.
 $-\frac{3}{2}(x + 6) \div (-\frac{3}{2}) = \frac{21}{2} \div (-\frac{3}{2})$
 $x + 6 = -7$
 $x + 6 - 6 = -7 - 6$
 $x = -13$

$$-\frac{3}{2}(x + 6) \div (-\frac{3}{2}) = \frac{21}{2} \div (-\frac{3}{2})$$

$$x + 6 = -6\frac{3}{4}$$

$$x + 6 = -15\frac{3}{4}$$

$$x + 6 - 6 = -15\frac{3}{4} - 6$$

$$x = -21\frac{3}{4}$$

Unit 6 Lesson 11

142

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4.A
2	1	7.EE.B.4.A
3	2	7.EE.B.4.A
4	2	7.EE.B.4.A
5	2	7.EE.B.4.A
6	2	7.EE.B.4.A
7	2	7.EE.B.4.A

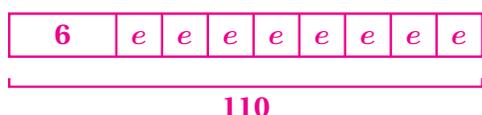
Notes:

For Problems 4–6: write and solve an equation, including identifying what the variable in each equation represents. After solving each equation, describe what the solution represents in the scenario. Draw a tape diagram to help if needed.

4. Andre tutored 8 times this past month and earned the same amount each time he tutored. To thank him, the family gave him an extra \$6 at the end of the month. Andre earned \$110 from tutoring.

a Equation:

$8e + 6 = 110$; e represents the amount Andre earned each time he tutored. Sample tape diagram (not required):



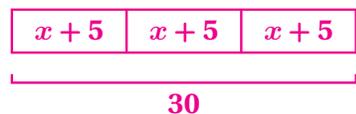
b Description: Andre earned \$13 each time he tutored.

$$\begin{aligned} 8e + 6 - 6 &= 110 - 6 \\ 8e &= 104 \\ 8e \div 8 &= 104 \div 8 \\ e &= 13 \end{aligned}$$

5. Mai spent 5 more minutes reading than Clare. Lin read 3 times as many minutes as Mai. If Lin read for 30 minutes, how many minutes did Clare spend reading?

a Equation:

$3(x + 5) = 30$; x represents the number of minutes Clare spent reading. Sample tape diagram (not required):



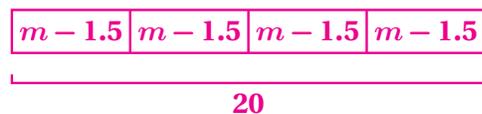
b Description: Clare read 5 minutes.

$$\begin{aligned} 3(x + 5) \div 3 &= 30 \div 3 \\ x + 5 &= 10 \\ x + 5 - 5 &= 10 - 5 \\ x &= 5 \end{aligned}$$

6. Priya and Tyler both run for 1 hour every day. In that time, Priya runs 1.5 miles less than Tyler. If after 4 days Priya has run a total of 20 miles, how far does Tyler run in 1 day?

a Equation:

$4(m - 1.5) = 20$; m represents the number of miles Tyler ran each day. Sample tape diagram (not required):



b Description: Tyler ran 6.5 miles each day.

$$\begin{aligned} 4(m - 1.5) \div 4 &= 20 \div 4 \\ m - 1.5 &= 5 \\ m - 1.5 + 1.5 &= 5 + 1.5 \\ m &= 6.5 \end{aligned}$$

7. Write a scenario that could be represented by each of the following equations.

a $3(x - 7) = 21$

Sample response: Bard scored 7 points less than Shawn in the basketball game. Andre scored three times as many points as Bard. If Andre scored 21 points, how many points did Shawn score?

b $2y - 20 = -5$

Sample response: Priya has an allowance balance of -\$20, due to overspending. In two weeks, she makes 2 equal payments to her mother and now has a balance of -\$5. How much did she pay her mom each time?

Name: _____ Date: _____ Period: _____

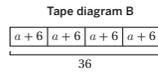
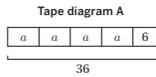
Additional Practice

6.12

1. Elena had 100 fliers to pass out. She gave an equal amount of fliers to 5 volunteers and she passed out 10 fliers. Which equation represents this situation?

- A. $100 = 5(x + 10)$ B. $10(x + 5) = 100$
 C. $10x + 5 = 100$ **D. $100 = 5x + 10$**

2. Which tape diagram represents the equation $4(a + 6) = 36$? **Tape diagram B**



3. Match each scenario with the equation that it could represent. Some scenarios may be represented by the same equation.

- | Equation | Scenario |
|--------------------|---|
| a. $4(x + 2) = 18$ | b Jada has 4 dimes and 2 times as many quarters as Han. She has 18 dimes and quarters altogether. How many quarters does Han have? |
| b. $2x + 4 = 18$ | a Lin's father spent \$18 and purchased each of his 4 children a \$2 yo-yo and a bottle of bubbles. How much does each bottle of bubbles cost? |
| c. $4x + 2 = 18$ | d Diego made two fruit baskets using 18 pieces of fruit. He placed an equal number of pieces in each basket and then added 4 more pieces to each basket. How many pieces of fruit did Diego originally put in each basket? |
| d. $2(x + 4) = 18$ | c Clare has 18 gel pens. She gives an equal amount of gel pens to 4 friends and keeps 2 for herself. How many gel pens did she give each friend? |
| | a A teacher had 18 copies of a class chapter book. She stacked an equal number of copies in 4 piles. Then she placed 2 more copies in each pile. How many copies of the book were first placed in each pile? |

Unit 6 Lesson 12

143

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

For Problems 4–6: write and solve an equation, including identifying what the variable in each equation represents. After solving each equation, describe what the solution represents in the scenario. Draw a tape diagram to help if needed.

4. Andre tutored 8 times this past month and earned the same amount each time he tutored. To thank him, the family gave him an extra \$6 at the end of the month. Andre earned \$110 from tutoring.

- a Equation:** $8e + 6 = 110$; e represents the amount Andre earned each time he tutored. **Sample tape diagram (not required):**
- | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 6 | e |
| 110 | | | | | | | |
- b Description:** Andre earned \$13 each time he tutored.
- $8e + 6 = 110$
 $8e = 104$
 $8e \div 8 = 104 \div 8$
 $e = 13$

5. Mai spent 5 more minutes reading than Clare. Lin read 3 times as many minutes as Mai. If Lin read for 30 minutes, how many minutes did Clare spend reading?

- a Equation:** $3(x + 5) = 30$; x represents the number of minutes Clare spent reading. **Sample tape diagram (not required):**
- | | | |
|---------|---------|---------|
| $x + 5$ | $x + 5$ | $x + 5$ |
| 30 | | |
- b Description:** Clare read 5 minutes.
- $3(x + 5) \div 3 = 30 \div 3$
 $x + 5 = 10$
 $x + 5 - 5 = 10 - 5$
 $x = 5$

6. Priya and Tyler both run for 1 hour every day. In that time, Priya runs 1.5 miles less than Tyler. If after 4 days Priya has run a total of 20 miles, how far does Tyler run in 1 day?

- a Equation:** $4(m - 1.5) = 20$; m represents the number of miles Tyler ran each day. **Sample tape diagram (not required):**
- | | | | |
|-----------|-----------|-----------|-----------|
| $m - 1.5$ | $m - 1.5$ | $m - 1.5$ | $m - 1.5$ |
| 20 | | | |
- b Description:** Tyler ran 6.5 miles each day.
- $4(m - 1.5) \div 4 = 20 \div 4$
 $m - 1.5 = 5$
 $m - 1.5 + 1.5 = 5 + 1.5$
 $m = 6.5$

7. Write a scenario that could be represented by each of the following equations.

- a** $3(x - 7) = 21$
Sample response: Bard scored 7 points less than Shawn in the basketball game. Andre scored three times as many points as Bard. If Andre scored 21 points, how many points did Shawn score?
- b** $2y - 20 = -5$
Sample response: Priya has an allowance balance of -\$20, due to overspending. In two weeks, she makes 2 equal payments to her mother and now has a balance of -\$5. How much did she pay her mom each time?

Unit 6 Lesson 12

144

Additional Practice

Practice Problem Analysis

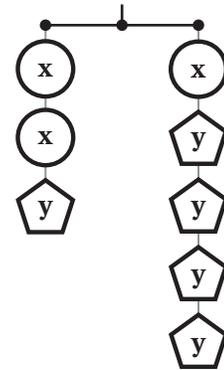
Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	1	7.EE.B.4
3	2	7.EE.B.4
4	2	7.EE.B.4.A
5	2	7.EE.B.4.A
6	2	7.EE.B.4.A
7	3	7.EE.B.4.A

Notes:

Additional Practice

4.03

Problems 1–2: In this balanced hanger diagram, the weight of the circle is x and the weight of the pentagon is y .



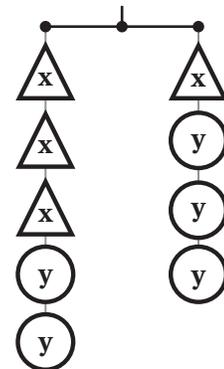
- Label the figures with x or y . Then, write an equation using x or y to represent the hanger diagram.

$x + x + y = x + y + y + y + y$, or equivalent

- If $x = 9$, what is the value of y ? Show or explain your thinking.

Methods vary: $9 + 9 + y = 9 + y + y + y + y$
 $18 + y = 9 + 4y$
 $9 = 3y$
 $3 = y$

- In this balanced hanger diagram, the weight of the triangle is x and the weight of the circle is y .



- Label the figures with x or y .
- Select *all* the equations that could represent a balanced hanger.

A. $3y + 2x = y + 3x$

B. $3x + 2y = x + 3y$

C. $2x + 2y = 3y$

D. $5xy = 4xy$

E. $2x = y$

4. Match each set of equations with a possible step that turns the first equation into the second equation.

Equation

Possible steps

a. $9x + 3 = 3x + 18$
 $3x + 1 = x + 6$

..... **a.** Multiply each side by -3

b. $-3(5x - 7) = -21$
 $5x - 7 = 7$

..... **b.** Divide each side by -3

c. $-\frac{4}{3}x = 5$
 $4x = -15$

..... **c.** Divide each side by 3

d. $7x + 5 = 3x - 6$
 $4x + 5 = -6$

..... **d.** Subtract 3 from each side

e. $10 - 5x = 8 + 4x$
 $7 - 5x = 5 + 4x$

..... **e.** Subtract $3x$ from each side

Problems 5–6: Jada and Tyler were each trying to solve $7x - 4 = 5x - 5$. Describe the first step they each made to the equation.

5. The result of Jada's first step was $7x = 5x - 1$.

Jada added 4 to each side.

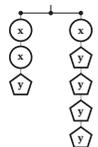
6. The result of Tyler's first step was $7x + 1 = 5x$.

Tyler added 5 to each side.

Name: _____ Date: _____ Period: _____

Additional Practice 4.03

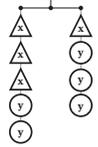
Problems 1–2: In this balanced hanger diagram, the weight of the circle is x and the weight of the pentagon is y .



1. Label the figures with x or y . Then, write an equation using x or y to represent the hanger diagram.
 $x + x + y = x + y + y + y$, or equivalent

2. If $x = 9$, what is the value of y ? Show or explain your thinking.
Methods vary: $9 + 9 + y = 9 + y + y + y + y$
 $18 + y = 9 + 4y$
 $9 = 3y$
 $3 = y$

3. In this balanced hanger diagram, the weight of the triangle is x and the weight of the circle is y .



a. Label the figures with x or y .

b. Select all the equations that could represent a balanced hanger.

A. $3y + 2x = y + 3x$

B. $3x + 2y = x + 3y$

C. $2x + 2y = 3y$

D. $5xy = 4xy$

E. $2x = y$

Unit 4 Lesson 3 77 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

4. Match each set of equations with a possible step that turns the first equation into the second equation.

Equation	Possible steps
a. $9x + 3 = 3x + 18$ $3x + 1 = x + 6$	<u> a. </u> Multiply each side by -3
b. $-3(5x - 7) = -21$ $5x - 7 = 7$	<u> b. </u> Divide each side by -3
c. $-\frac{4}{3}x = 5$ $4x = -15$	<u> c. </u> Divide each side by 3
d. $7x + 5 = 3x - 6$ $4x + 5 = -6$	<u> d. </u> Subtract 3 from each side
e. $10 - 5x = 8 + 4x$ $7 - 5x = 5 + 4x$	<u> e. </u> Subtract $3x$ from each side

Problems 5–6: Jada and Tyler were each trying to solve $7x - 4 = 5x - 5$. Describe the first step they each made to the equation.

5. The result of Jada's first step was $7x = 5x - 1$.
Jada added 4 to each side.

6. The result of Tyler's first step was $7x + 1 = 5x$.
Tyler added 5 to each side.

Unit 4 Lesson 3 78 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.EE.C.7
2	2	8.EE.C.7
3	2	8.EE.C.7
4	2	8.EE.C.7
5	2	8.EE.C.7
6	2	8.EE.C.7

Notes:

Additional Practice

4.04

1. Andre and Clare are each solving the equation $-4(x - 5) = 10x - 8$. Andre's solution is $x = -2$, and Clare's solution is $x = -\frac{7}{9}$. Their responses are shown.

Andre's solution:	Clare's solution:
$-4(x - 5) = 10x - 8$	$-4(x - 5) = 10x - 8$
$4x - 20 = 10x - 8$	$x - 5 = 10x + 2$
$-20 = 6x - 8$	$-5 = 9x + 2$
$-12 = 6x$	$-7 = 9x$
$-2 = x$	$-\frac{7}{9} = x$

Do you agree with either of their solutions? Show or explain your thinking.

Responses vary. Andre's solution is incorrect. He distributed incorrectly on the second line. Clare's response is also incorrect. When dividing both sides of the equation by -4 , she didn't divide 10 by -4 .

2. Solve the equation $-5(2x - 2) = 20x$ two different ways. Show your thinking.

Responses vary.

Method 1:

$$\begin{aligned}
 -5(2x - 2) &= 20x \\
 2x - 2 &= -4x \\
 6x &= 2 \\
 x &= \frac{1}{3}
 \end{aligned}$$

Method 2:

$$\begin{aligned}
 -5(2x - 2) &= 20x \\
 -10x + 10 &= 20x \\
 10 &= 30x \\
 \frac{1}{3} &= x
 \end{aligned}$$

3. Mia solved the equation $\frac{1}{2}(6x - 8) = 5x + 12$. Mia began with the original equation and her steps are shown. Complete the table by describing the steps Mai used to solve the equation.

Steps	Description
$\frac{1}{2}(6x - 8) = 5x + 12$	Original equation
$3x - 4 = 5x + 12$	Distribute $\frac{1}{2}$ into the expression on the left
$-4 = 2x + 12$	Subtract $3x$ from each side
$-16 = 2x$	Subtract 12 from each side
$-8 = x$	Divide both sides by 2

Problems 4–5: Determine whether $x = 2$ is a solution for each equation. Show your thinking.

4. $4(x - 5) = -12$

Methods vary:

$$4(2 - 5) = -12$$

$$4(-3) = -12$$

$$-12 = -12$$

Yes, $x = 2$ is a solution.

5. $-3(x + 2) = 2x + 16$

Methods vary:

$$-3(2 + 2) = 2(2) + 16$$

$$-3(4) = 4 + 16$$

$$-12 = 20$$

No, $x = 2$ is not a solution.

6. Solve each equation below. Show your thinking. Check your solution.

$$2.4(x + 3) = 4.2x + 2(x - 4)$$

Methods vary:

$$2.4x + 7.2 = 4.2x + 2x - 8$$

$$2.4x + 7.2 = 6.2x - 8$$

$$15.2 = 3.8x$$

$$4 = x$$

Check:

$$2.4(4 + 3) = 4.2(4) + 2(4 - 4)$$

$$2.4(7) = 16.8 + 2(0)$$

$$16.8 = 16.8 + 0$$

$$16.8 = 16.8$$

Name: _____ Date: _____ Period: _____

Additional Practice

4.04

1. Andre and Clare are each solving the equation $-4(x - 5) = 10x - 8$. Andre's solution is $x = -2$, and Clare's solution is $x = -\frac{7}{9}$. Their responses are shown.

Andre's solution:	Clare's solution:
$-4(x - 5) = 10x - 8$	$-4(x - 5) = 10x - 8$
$4x - 20 = 10x - 8$	$x - 5 = 10x + 2$
$-20 = 6x - 8$	$-5 = 9x + 2$
$-12 = 6x$	$-7 = 9x$
$-2 = x$	$-\frac{7}{9} = x$

Do you agree with either of their solutions? Show or explain your thinking.

Responses vary. Andre's solution is incorrect. He distributed incorrectly on the second line. Clare's response is also incorrect. When dividing both sides of the equation by -4 , she didn't divide 10 by -4 .

2. Solve the equation $-5(2x - 2) = 20$ two different ways. Show your thinking.

Responses vary.

Method 1:

$$\begin{aligned} -5(2x - 2) &= 20x \\ 2x - 2 &= -4x \\ 6x &= 2 \\ x &= \frac{1}{3} \end{aligned}$$

Method 2:

$$\begin{aligned} -5(2x - 2) &= 20x \\ -10x + 10 &= 20x \\ 10 &= 30x \\ \frac{1}{3} &= x \end{aligned}$$

Unit 4 Lesson 4

79

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

3. Mia solved the equation $\frac{1}{2}(6x - 8) = 5x + 12$. Mia began with the original equation and her steps are shown. Complete the table by describing the steps Mia used to solve the equation.

Steps	Description
$\frac{1}{2}(6x - 8) = 5x + 12$	Original equation
$3x - 4 = 5x + 12$	Distribute $\frac{1}{2}$ into the expression on the left
$-4 = 2x + 12$	Subtract $3x$ from each side
$-16 = 2x$	Subtract 12 from each side
$-8 = x$	Divide both sides by 2

Problems 4–5: Determine whether $x = 2$ is a solution for each equation. Show your thinking.

4. $4(x - 5) = -12$

Methods vary:

$$4(2 - 5) = -12$$

$$4(-3) = -12$$

$$-12 = -12$$

Yes, $x = 2$ is a solution.

5. $-3(x + 2) = 2x + 16$

Methods vary:

$$-3(2 + 2) = 2(2) + 16$$

$$-3(4) = 4 + 16$$

$$-12 = 20$$

No, $x = 2$ is not a solution.

6. Solve each equation below. Show your thinking. Check your solution.

$$2.4(x + 3) = 4.2x + 2(x - 4)$$

Methods vary:

$$2.4x + 7.2 = 4.2x + 2x - 8$$

$$2.4x + 7.2 = 6.2x - 8$$

$$15.2 = 3.8x$$

$$4 = x$$

Check:

$$2.4(4 + 3) = 4.2(4) + 2(4 - 4)$$

$$2.4(7) = 16.8 + 2(0)$$

$$16.8 = 16.8 + 0$$

$$16.8 = 16.8$$

Unit 4 Lesson 4

80

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	8.EE.C.7.B
2	2	8.EE.C.7.B
3	2	8.EE.C.7.B
4	1	8.EE.C.7.B
5	1	8.EE.C.7.B
6	1	8.EE.C.7.B

Notes:

Additional Practice

4.06

1. For each equation, determine whether it has *one solution*, *no solution*, or *infinitely many solutions* by placing a check mark in the appropriate box.

Equation	One solution	No solution	Infinitely many solutions
$x + 2 = x + 4$		X	
$2x + 4 = 2x + 1 + 3$			X
$3(x - 1) = 2x + 1$	X		
$-(4x - 5) = -x + 5 - 3x$			X

2. If an equation is never true for any value of x , which is true about the equation?

- A. It has no solution.
- B. It has one solution.
- C. It has infinitely many solutions.
- D. Zero is its only solution.

Problems 3–4: For each equation, decide whether it has *one solution*, *no solution*, or *infinitely many solutions*. Show or explain your thinking.

3. $3x - 7x + 1 = -4x + 5$

Explanations vary. No solution. The x -values cancel each other out, leaving a false statement.

4. $4(x + 3) = -2(2x + 6)$

Explanations vary. One solution. The x -values do not cancel each other out.

5. Elena said $4x - 6 = 4(x - 6)$ has infinitely many solutions. Do you agree with Elena's answer? Explain your thinking.

Explanations vary. Elena is incorrect. The x -values will cancel out but they will leave a false statement, such as $-6 = -24$. This means that there is no value of x that will make this a true statement.

6. Noah and Lin solved the equation $-(3x + 2) - 1 = -2x - (x + 3)$. Their responses are shown below.

Noah's work:	Lin's work:
$-(3x + 2) - 1 = -2x - (x + 3)$	$-(3x + 2) - 1 = -2x - (x + 3)$
$-3x - 2 - 1 = -2x - x - 3$	$-3x - 2 - 1 = -2x - x - 3$
$-3x - 3 = -3x - 3$	$-3x - 3 = -3x - 3$
$-3 = -3$	$-3x = -3x$
	$x = x$

Noah says that one of them is incorrect because you cannot get different results for the same equation. Is Noah correct? Explain your thinking.

Explanations vary. Noah's statement is not correct. In fact, both Noah and Lin ended up with a true statement, which means that there are infinitely many solutions for x .

7. Write the other side of this equation so that it is true for all values of x .

$$-\frac{1}{2}(4x + 12) + 5x = \dots\dots\dots$$

Solutions vary. Answer can be any equivalent form of $3x - 6$.

8. Write the other side of this equation so that it is true for no values of x .

$$-\frac{1}{2}(4x + 12) + 5x = \dots\dots\dots$$

Solutions vary. Answer can be any equivalent form of $3x + n$, where $n \neq -6$.

9. Write the other side of this equation so that it is true when $x = 0$.

$$-\frac{1}{2}(4x + 12) + 5x = \dots\dots\dots$$

Solutions vary. Answer can be any equivalent form of $4x - 6$.

Name: _____ Date: _____ Period: _____

Additional Practice

4.06

1. For each equation, determine whether it has *one solution*, *no solution*, or *infinitely many solutions* by placing a check mark in the appropriate box.

Equation	One solution	No solution	Infinitely many solutions
$x + 2 = x + 4$		X	
$2x + 4 = 2x + 1 + 3$			X
$3(x - 1) = 2x + 1$	X		
$-(4x - 5) = -x + 5 - 3x$			X

2. If an equation is never true for any value of x , which is true about the equation?

- A. It has no solution.
 B. It has one solution.
 C. It has infinitely many solutions.
 D. Zero is its only solution.

Problems 3–4: For each equation, decide whether it has *one solution*, *no solution*, or *infinitely many solutions*. Show or explain your thinking.

3. $3x - 7x + 1 = -4x + 5$

Explanations vary. No solution. The x -values cancel each other out, leaving a false statement.

4. $4(x + 3) = -2(2x + 6)$

Explanations vary. One solution. The x -values do not cancel each other out.

5. Elena said $4x - 6 = 4(x - 6)$ has infinitely many solutions. Do you agree with Elena's answer? Explain your thinking.

Explanations vary. Elena is incorrect. The x -values will cancel out but they will leave a false statement, such as $-6 = -24$. This means that there is no value of x that will make this a true statement.

Unit 4 Lesson 6

83

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

6. Noah and Lin solved the equation $-(3x + 2) - 1 = -2x - (x + 3)$. Their responses are shown below.

Noah's work:

$$\begin{aligned} -(3x + 2) - 1 &= -2x - (x + 3) \\ -3x - 2 - 1 &= -2x - x - 3 \\ -3x - 3 &= -3x - 3 \\ -3 &= -3 \end{aligned}$$

Lin's work:

$$\begin{aligned} -(3x + 2) - 1 &= -2x - (x + 3) \\ -3x - 2 - 1 &= -2x - x - 3 \\ -3x - 3 &= -3x - 3 \\ -3x &= -3x \\ x &= x \end{aligned}$$

Noah says that one of them is incorrect because you cannot get different results for the same equation. Is Noah correct? Explain your thinking.

Explanations vary. Noah's statement is not correct. In fact, both Noah and Lin ended up with a true statement, which means that there are infinitely many solutions for x .

7. Write the other side of this equation so that it is true for all values of x .

$$-\frac{1}{2}(4x + 12) + 5x = \underline{\hspace{2cm}}$$

Solutions vary. Answer can be any equivalent form of $3x - 6$.

8. Write the other side of this equation so that it is true for no values of x .

$$-\frac{1}{2}(4x + 12) + 5x = \underline{\hspace{2cm}}$$

Solutions vary. Answer can be any equivalent form of $3x + n$, where $n \neq -6$.

9. Write the other side of this equation so that it is true when $x = 0$.

$$-\frac{1}{2}(4x + 12) + 5x = \underline{\hspace{2cm}}$$

Solutions vary. Answer can be any equivalent form of $4x - 6$.

Unit 4 Lesson 6

84

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.EE.C.7.A
2	1	8.EE.C.7.A
3	2	8.EE.C.7.A
4	2	8.EE.C.7.A
5	1	8.EE.C.7.A
6	2	8.EE.C.7.A
7	2	8.EE.C.7.A
8	2	8.EE.C.7.A
9	2	8.EE.C.7.A

Notes:

Additional Practice

4.07

1. Without solving them, identify whether each equation has a solution that is *positive*, *negative*, or *zero* by placing a check mark in the appropriate box.

Equation	Positive Solution	Negative Solution	Solution of zero
$12x = -36.24$		X	
$2x = 14.6$	X		
$6x - 10 = -10$			X
$-\frac{2}{3}x = -64$	X		

Problems 2–5: Solve each equation. Show your thinking.

2. $5x + 7x - 12 = 6(2x - 2)$

Infinitely many solutions

3. $\frac{1}{2}(6y - 12) = 2(y - \frac{3}{2})$

$$\begin{aligned} 3y - 6 &= 2y - 6 \\ y - 6 &= -6 \\ y &= 0 \end{aligned}$$

4. $4(6 - 2m) = 3(m + 1) + 10$

$$\begin{aligned} 24 - 8m &= 3m + 3 + 10 \\ 24 - 11m &= 13 \\ -11m &= -11 \\ m &= 1 \end{aligned}$$

5. $6b + 8 - 10b + 4 = -16 - 4b - 2$

No solution

6. Andre studied the equation $3(3x - 6) = -9(x - 2)$. He said, "I can tell right away there is no solution because, on the left side, you will have $9x$, and then, on the right side, you will have $-9x$. They will cancel each other out."

Do you agree with Andre's statement? Explain your thinking.

Explanations vary. Andre is incorrect. The $9x$ and $-9x$ will not cancel each other out but will add up to either $-18x$ or $18x$, depending on which side of the equation you collect them. There will be one solution to this equation.

7. Jada wrote the equation $8x + 2 = 8x + 4$. She wants to change only one term so that the equation has exactly one solution.

- a What is an example of a change that would result in exactly *one solution*?

Solutions vary. If you change one of the $8x$'s to anything but positive $8x$, this will result in an equation with one solution.

- b What is an example of a change that would result in an infinite number of *solutions*?

Solutions vary. If you change the constant terms of 2 and 4 the same number, this will result in an equation with an infinite number of solutions.

Name: _____ Date: _____ Period: _____

Additional Practice

4.07

1. Without solving them, identify whether each equation has a solution that is positive, negative, or zero by placing a check mark in the appropriate box.

Equation	Positive Solution	Negative Solution	Solution of zero
$12x = -36.24$		X	
$2x = 14.6$	X		
$6x - 10 = -10$			X
$\frac{2}{3}x = -64$	X		

Problems 2–5: Solve each equation. Show your thinking.

2. $5x + 7x - 12 = 6(2x - 2)$
 Infinitely many solutions

3. $\frac{1}{2}(6y - 12) = 2(y - \frac{3}{2})$
 $3y - 6 = 2y - 6$
 $y - 6 = -6$
 $y = 0$

4. $4(6 - 2m) = 3(m + 1) + 10$
 $24 - 8m = 3m + 3 + 10$
 $24 - 11m = 13$
 $-11m = -11$
 $m = 1$

5. $6b + 8 - 10b + 4 = -16 - 4b - 2$
 No solution

Unit 4 Lesson 7

85

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

6. Andre studied the equation $3(3x - 6) = -9(x - 2)$. He said, "I can tell right away there is no solution because, on the left side, you will have $9x$, and then, on the right side, you will have $-9x$. They will cancel each other out."

Do you agree with Andre's statement? Explain your thinking.

Explanations vary. Andre is incorrect. The $9x$ and $-9x$ will not cancel each other out but will add up to either $-18x$ or $18x$, depending on which side of the equation you collect them. There will be one solution to this equation.

7. Jada wrote the equation $8x + 2 = 8x + 4$. She wants to change only one term so that the equation has exactly one solution.

a. What is an example of a change that would result in exactly one solution?

Solutions vary. If you change one of the $8x$'s to anything but positive $8x$, this will result in an equation with one solution.

b. What is an example of a change that would result in an infinite number of solutions?

Solutions vary. If you change the constant terms of 2 and 4 the same number, this will result in an equation with an infinite number of solutions.

Unit 4 Lesson 7

86

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.EE.C.7.A
2	1	8.EE.C.7.A
3	1	8.EE.C.7.A
4	1	8.EE.C.7.A
5	1	8.EE.C.7.A
6	2	8.EE.C.7.A
7	2	8.EE.C.7.A

Notes:

Additional Practice

4.08

1. For what value of x do the expressions $\frac{3}{4}x + 12$ and $\frac{1}{4}x - 8$ have the same value? Show or explain your thinking.

Methods vary. When $x = -40$, both expressions will have the same value.

$$\begin{aligned} \frac{3}{4}x + 12 &= \frac{1}{4}x - 8 \\ 4\left(\frac{3}{4}x + 12\right) &= 4\left(\frac{1}{4}x - 8\right) \\ 3x + 48 &= x - 32 \\ 2x + 48 &= -32 \\ 2x &= -80 \\ x &= -40 \end{aligned}$$

2. Which story could the equation $4x + 4 = 5x - 6$ represent?

- A. Han and his brother get a weekly allowance of x dollars. At one point, Han had an allowance balance of $-\$6.00$ and his brother had an allowance balance of $\$4.00$. After 5 weeks of allowance for Han and 4 weeks of allowance for his brother, they have the same allowance balance.
- B. The Huskies and the Cardinals are playing a trivia game. Each correct question is worth x points. At one point in the game, the Huskies have -6 points and the Cardinals have 4 points. After the Huskies answer 4 correct questions and the Cardinals answer 5 correct questions, they have the same number of points.

3. At Lin's fitness center, a membership costs $\$40$ a month and there is a one-time registration fee of $\$20$. At Kiran's fitness center, a membership costs $\$50$ a month and there is a one-time registration fee of $\$10$.

Which equation represents when the costs of the membership would be equal if m represents the number of months?

- A. $40m + 10 = 50m + 20$
- B. $40m = 50m + 10$
- C. $40m + 20 = 50m$
- D. $40m + 20 = 50m + 10$

Problems 4–7: Clare and Mai are running in the same direction on the same running trail.

4. Clare runs at a constant speed of 4 miles per hour. Write an expression that shows how many miles Clare has run after t hours.

$$4t$$

5. Mai started running $\frac{1}{4}$ of an hour after Clare. If Clare has been running for t hours, how long has Mai been running?

$$t - \frac{1}{4}$$

6. Mai runs at a constant speed of 6 miles per hour. Write an expression that shows how many miles Mai has run after Clare has been running for t hours.

$$6\left(t - \frac{1}{4}\right)$$

7. Use your expressions to determine when Clare and Mai will meet each other on the running trail. Show or explain your thinking.

Methods vary:

$$4t = 6\left(t - \frac{1}{4}\right)$$

$$4t = 6t - \frac{3}{2}$$

$$-2t = -\frac{3}{2}$$

$$-2(-2t) = -2\left(-\frac{3}{2}\right)$$

$$4t = 3$$

$$t = \frac{3}{4}$$

Claire and Mai will meet on the trail after $\frac{3}{4}$ of an hour.

8. Shawn wants to take photography lessons. The instructor offers two options. Option 1 costs \$60 per lesson and comes with a camera. Option 2 costs \$40 per lesson but you have to purchase your own camera. Suppose Shawn buys the \$200 camera and chooses Option 2. After how many lessons, x , is Shawn's total cost the same as it would have been if Shawn had chosen Option 1? Show your thinking.

Methods vary:

$$60x = 200 + 40x$$

$$20x = 200$$

$$x = 10$$

After 10 lessons, the cost of Option 1 and Option 2 will be the same.

Name: _____ Date: _____ Period: _____

Additional Practice

4.08

1. For what value of x do the expressions $\frac{3}{4}x + 12$ and $\frac{1}{4}x - 8$ have the same value? Show or explain your thinking.

Methods vary. When $x = -40$, both expressions will have the same value.

$$\begin{aligned} \frac{3}{4}x + 12 &= \frac{1}{4}x - 8 \\ 4\left(\frac{3}{4}x + 12\right) &= 4\left(\frac{1}{4}x - 8\right) \\ 3x + 48 &= x - 32 \\ 2x + 48 &= -32 \\ 2x &= -80 \\ x &= -40 \end{aligned}$$

2. Which story could the equation $4x + 4 = 5x - 6$ represent?

- A.** Han and his brother get a weekly allowance of x dollars. At one point, Han had an allowance balance of $-\$6.00$ and his brother had an allowance balance of $\$4.00$. After 5 weeks of allowance for Han and 4 weeks of allowance for his brother, they have the same allowance balance.
- B.** The Huskies and the Cardinals are playing a trivia game. Each correct question is worth x points. At one point in the game, the Huskies have -6 points and the Cardinals have 4 points. After the Huskies answer 4 correct questions and the Cardinals answer 5 correct questions, they have the same number of points.

3. At Lin's fitness center, a membership costs $\$40$ a month and there is a one-time registration fee of $\$20$. At Kiran's fitness center, a membership costs $\$50$ a month and there is a one-time registration fee of $\$10$.

Which equation represents when the costs of the membership would be equal if m represents the number of months?

- A. $40m + 10 = 50m + 20$
 B. $40m = 50m + 10$
 C. $40m + 20 = 50m$
D. $40m + 20 = 50m + 10$

Unit 4 Lesson 8

87

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 4–7: Clare and Mai are running in the same direction on the same running trail.

4. Clare runs at a constant speed of 4 miles per hour. Write an expression that shows how many miles Clare has run after t hours.

$$4t$$

5. Mai started running $\frac{1}{4}$ of an hour after Clare. If Clare has been running for t hours, how long has Mai been running?

$$t - \frac{1}{4}$$

6. Mai runs at a constant speed of 6 miles per hour. Write an expression that shows how many miles Mai has run after Clare has been running for t hours.

$$6\left(t - \frac{1}{4}\right)$$

7. Use your expressions to determine when Clare and Mai will meet each other on the running trail. Show or explain your thinking.

Methods vary:

$$\begin{aligned} 4t &= 6\left(t - \frac{1}{4}\right) \\ 4t &= 6t - \frac{3}{2} \\ -2t &= -\frac{3}{2} \\ -2(-2t) &= -2\left(-\frac{3}{2}\right) \\ 4t &= 3 \\ t &= \frac{3}{4} \end{aligned}$$

Claire and Mai will meet on the trail after $\frac{3}{4}$ of an hour.

8. Shawn wants to take photography lessons. The instructor offers two options. Option 1 costs $\$60$ per lesson and comes with a camera. Option 2 costs $\$40$ per lesson but you have to purchase your own camera. Suppose Shawn buys the $\$200$ camera and chooses Option 2. After how many lessons, x , is Shawn's total cost the same as it would have been if Shawn had chosen Option 1? Show your thinking.

Methods vary:

$$\begin{aligned} 60x &= 200 + 40x \\ 20x &= 200 \\ x &= 10 \end{aligned}$$

After 10 lessons, the cost of Option 1 and Option 2 will be the same.

Unit 4 Lesson 8

88

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	8.EE.C.7.B
2	1	8.EE.C.7.B
3	1	8.EE.C.7.B
4	1	8.EE.C.7.B
5	2	8.EE.C.7.B
6	1	8.EE.C.7.B
7	2	8.EE.C.7.B
8	2	8.EE.C.7.B

Notes:

Additional Practice

7.07

1. At a restaurant, a minimum of 2 people in each party need to be present in order to be seated at their table. Write an inequality that represents the possible number of people p that need to be present in order to be seated.

$p \geq 2$ (or equivalent)

2. Clare is younger than Bard. Bard is 13 years old. Write an inequality that compares Clare's age in years c to Bard's age.

$c < 13$ (or equivalent)

3. Diego started cooking dinner before 5:00 p.m. and finished cooking dinner at 6:00 p.m. Let d represent the number of hours Diego spent cooking dinner. Determine whether each statement is *definitely true*, *definitely not true*, or *possibly true*.

a $d < 1$

Definitely not true

c $d < 2$

Possibly true

e $d < 0.5$

Definitely not true

b $d > 1$

Definitely true

d $d > 2$

Possibly true

f $d > 0.5$

Definitely true

4. Noah started a run at 6:30 a.m. and finished sometime after 9:00 a.m. Let r represent the number of hours Noah spent running. Determine whether each statement is *definitely true*, *definitely not true*, or *possibly true*.

a $r > 2$

Definitely true

c $r > 3$

Possibly true

e $r < 2.5$

Definitely not true

b $r > 2.5$

Definitely true

d $r < 3$

Possibly true

f $r < 2$

Definitely not true

5. At the grocery store, all apples cost less than \$2.00 per pound.

- a What is the most expensive price one pound of apples could cost?

\$1.99

- b Write an inequality to represent the possible costs, in dollars, for any number of pounds of apples.

Sample response: $x < 2$, where x represents the cost, in dollars, for any number of pounds of apples

6. At the clothing store, all t -shirts cost more than \$9.99.

- a What is the least expensive price a t -shirt could be?

\$10.00

- b Write an inequality to represent the possible costs of t -shirts, in dollars.

Sample response: $x > 9.99$, where x represents the cost of t -shirts, in dollars

7. Priya looks at a container of cherries and says, "I think there are more than 55 cherries in the container."

Jada looks at the same container of cherries and says, "I think there are less than 125 cherries in the container."

- a Write an inequality to show Priya's statement, using c to represent the number of cherries.

$c > 55$ (or equivalent)

- b Write another inequality to show Jada's statement, also using c to represent the number of cherries.

$c < 125$ (or equivalent)

- c Can Priya and Jada both be correct? Explain your thinking and provide a possible number of cherries that supports your argument.

Yes; Sample response: Priya and Jada can both be correct because there are many numbers that are greater than 55, but less than 125. Some examples are 56, 100, 124.

8. Priya and Jada are each analyzing a container of blueberries. Study their statements.

Did Priya and Jada each represent their statements with correct inequalities?

Explain your thinking.

Priya

I think there are less than 150 blueberries in the container. The inequality that represents this is $b > 150$, where b represents the number of blueberries.

Jada

I think there are more than 65 blueberries in the container. The inequality that represents this is $b < 65$, where b represents the number of blueberries.

No; Sample response: Neither inequality statement is correct. Priya thinks there are less than 150 blueberries, so the correct inequality would be $b < 150$. Jada thinks there are more than 65 blueberries, so the correct inequality would be $b > 65$.

Name: _____ Date: _____ Period: _____

Additional Practice 7.07

- At a restaurant, a minimum of 2 people in each party need to be present in order to be seated at their table. Write an inequality that represents the possible number of people p that need to be present in order to be seated.
 $p \geq 2$ (or equivalent)
- Clare is younger than Bard. Bard is 13 years old. Write an inequality that compares Clare's age in years c to Bard's age.
 $c < 13$ (or equivalent)
- Diego started cooking dinner before 5:00 p.m. and finished cooking dinner at 6:00 p.m. Let d represent the number of hours Diego spent cooking dinner. Determine whether each statement is *definitely true*, *definitely not true*, or *possibly true*.

<p>a $d < 1$ Definitely not true</p> <p>c $d < 2$ Possibly true</p> <p>e $d < 0.5$ Definitely not true</p>	<p>b $d > 1$ Definitely true</p> <p>d $d > 2$ Possibly true</p> <p>f $d > 0.5$ Definitely true</p>
---	---
- Noah started a run at 6:30 a.m. and finished sometime after 9:00 a.m. Let r represent the number of hours Noah spent running. Determine whether each statement is *definitely true*, *definitely not true*, or *possibly true*.

<p>a $r > 2$ Definitely true</p> <p>c $r > 3$ Possibly true</p> <p>e $r < 2.5$ Definitely not true</p>	<p>b $r > 2.5$ Definitely true</p> <p>d $r < 3$ Possibly true</p> <p>f $r < 2$ Definitely not true</p>
---	---

Unit 7 Lesson 7 193 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- At the grocery store, all apples cost less than \$2.00 per pound.
 - What is the most expensive price one pound of apples could cost?
\$1.99
 - Write an inequality to represent the possible costs, in dollars, for any number of pounds of apples.
Sample response: $x < 2$, where x represents the cost, in dollars, for any number of pounds of apples
- At the clothing store, all t -shirts cost more than \$9.99.
 - What is the least expensive price a t -shirt could be?
\$10.00
 - Write an inequality to represent the possible costs of t -shirts, in dollars.
Sample response: $x > 9.99$, where x represents the cost of t -shirts, in dollars
- Priya looks at a container of cherries and says, "I think there are more than 55 cherries in the container." Jada looks at the same container of cherries and says, "I think there are less than 125 cherries in the container."
 - Write an inequality to show Priya's statement, using c to represent the number of cherries.
 $c > 55$ (or equivalent)
 - Write another inequality to show Jada's statement, also using c to represent the number of cherries.
 $c < 125$ (or equivalent)
 - Can Priya and Jada both be correct? Explain your thinking and provide a possible number of cherries that supports your argument.
Yes; Sample response: Priya and Jada can both be correct because there are many numbers that are greater than 55, but less than 125. Some examples are 56, 100, 124.
- Priya and Jada are each analyzing a container of blueberries. Study their statements. Did Priya and Jada each represent their statements with correct inequalities? Explain your thinking.

<p style="text-align: center; font-weight: bold; font-size: small;">Priya</p> <p style="font-size: x-small;">I think there are less than 150 blueberries in the container. The inequality that represents this is $b > 150$, where b represents the number of blueberries.</p>	<p style="text-align: center; font-weight: bold; font-size: small;">Jada</p> <p style="font-size: x-small;">I think there are more than 65 blueberries in the container. The inequality that represents this is $b < 65$, where b represents the number of blueberries.</p>
---	--

No; Sample response: Neither inequality statement is correct. Priya thinks there are less than 150 blueberries, so the correct inequality would be $b < 150$. Jada thinks there are more than 65 blueberries, so the correct inequality would be $b > 65$.

Unit 7 Lesson 7 194 Additional Practice

Practice Problem Analysis

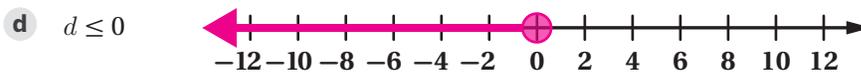
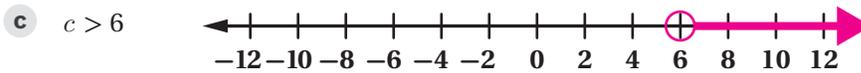
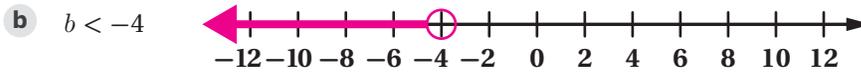
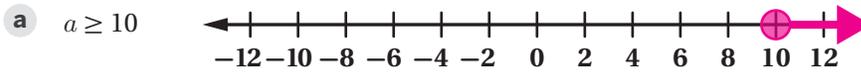
Problem	DOK	Standard(s)
1	1	6.EE.B.8
2	1	6.EE.B.8
3	2	6.EE.B.8
4	2	6.EE.B.8
5	2	6.EE.B.8
6	2	6.EE.B.8
7	3	6.EE.B.8
8	3	6.EE.B.8

Notes:

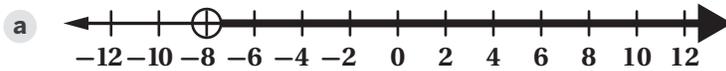
Additional Practice

7.08

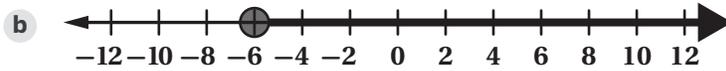
1. Graph each inequality statement on the number line.



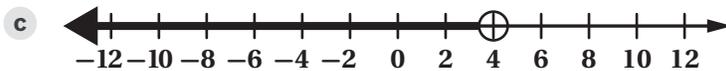
2. Use the variable x to write an inequality statement that represents each graph.



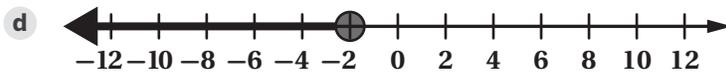
$x > -8$ (or equivalent)



$x \geq -6$ (or equivalent)



$x < 4$ (or equivalent)



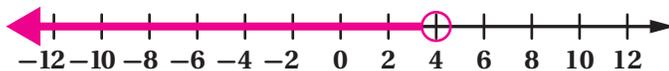
$x \leq -2$ (or equivalent)

3. Consider the inequality $m < 4$.

a Which of these numbers are solutions to the inequality: 4, -3.1, -1, 4.6, 1.5, -8, 5?
List *all* that apply.

-3.1, -1, 1.5, -8

b Graph the inequality statement on the number line.

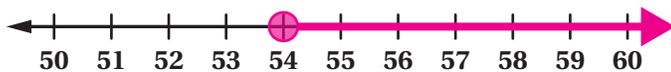


4. A sign at an amusement park reads, “You must be 54 in. or taller to ride.”

- a Using the variable h , write an inequality that represents the information on the sign.

$h \geq 54$

- b Graph the inequality statement on the number line.



5. There are less than 12 people in line to ride the roller coaster.

- a Using the variable n , write an inequality that represents the number of people in line to ride the roller coaster.

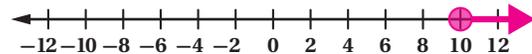
$n < 12$

- b Graph the inequality statement on the number line.



6. Represent each inequality scenario on the number line.

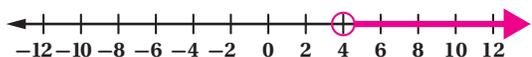
- a The amusement park sells at least 10 flavors of ice cream.



- b Andre spends less than \$6 at the arcade.



- c It costs more than 4 tokens for the ride.



7. Andre counts more than 3 hot dog stands at the fair. He said, “To graph this scenario on a number line, I would draw a closed circle at 3 with an arrow pointing to the right.” Did Andre correctly describe how to graph this scenario? Explain your thinking.

No; Sample response: Andre should have used an open circle at 3 because he saw more than 3 hot dog stands. The boundary value 3 is not included in the solution.

8. Priya and Jada each wrote a statement to describe a container of blueberries. Did Priya and Jada each correctly describe how to graph their inequality statements? Explain your thinking.

Priya

I think there are less than 150 blueberries in the container. To graph this inequality statement, I would draw an open circle at 150 with an arrow pointing to the right.

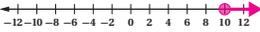
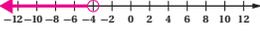
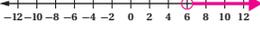
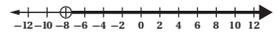
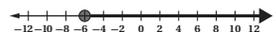
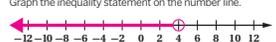
Jada

I think there are more than 65 blueberries in the container. To graph this inequality statement, I would draw a closed circle at 65 with an arrow pointing to the right.

No; Sample response: Priya said there are less than 150 blueberries, so her arrow should point to the left, not to the right. Jada said there are more than 65 blueberries, which does not include 65, so she should use an open circle at 65.

Name: _____ Date: _____ Period: _____

Additional Practice 7.08

- Graph each inequality statement on the number line.
 - a $a \geq 10$ 
 - b $b < -4$ 
 - c $c > 6$ 
 - d $d \leq 0$ 
- Use the variable x to write an inequality statement that represents each graph.
 - a  $x > -8$ (or equivalent)
 - b  $x \geq -6$ (or equivalent)
 - c  $x < 4$ (or equivalent)
 - d  $x \leq -2$ (or equivalent)
- Consider the inequality $m < 4$.
 - a Which of these numbers are solutions to the inequality: 4, -3.1, -1, 4.6, 1.5, -8, 5? List all that apply.
-3.1, -1, 1.5, -8
 - b Graph the inequality statement on the number line.


Unit 7 Lesson 8 195 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

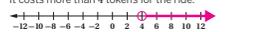
Name: _____ Date: _____ Period: _____

- A sign at an amusement park reads, "You must be 54 in. or taller to ride."
 - a Using the variable h , write an inequality that represents the information on the sign.
 $h \geq 54$
 - b Graph the inequality statement on the number line.

- There are less than 12 people in line to ride the roller coaster.
 - a Using the variable n , write an inequality that represents the number of people in line to ride the roller coaster.
 $n < 12$
 - b Graph the inequality statement on the number line.

- Represent each inequality scenario on the number line.
 - a The amusement park sells at least 10 flavors of ice cream.

 - b Andre spends less than \$6 at the arcade.

 - c It costs more than 4 tokens for the ride.

- Andre counts more than 3 hot dog stands at the fair. He said, "To graph this scenario on a number line, I would draw a closed circle at 3 with an arrow pointing to the right." Did Andre correctly describe how to graph this scenario? Explain your thinking.
No; Sample response: Andre should have used an open circle at 3 because he saw more than 3 hot dog stands. The boundary value 3 is not included in the solution.
- Priya and Jada each wrote a statement to describe a container of blueberries. Did Priya and Jada each correctly describe how to graph their inequality statements? Explain your thinking.

	Priya	Jada
I think there are less than 150 blueberries in the container. To graph this inequality statement, I would draw an open circle at 150 with an arrow pointing to the right.	I think there are less than 150 blueberries, so her arrow should point to the left, not to the right. Jada said there are more than 65 blueberries, which does not include 65, so she should use an open circle at 65.	I think there are more than 65 blueberries in the container. To graph this inequality statement, I would draw a closed circle at 65 with an arrow pointing to the right.

Unit 7 Lesson 8 196 Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	6.EE.B.8
2	1	6.EE.B.8
3	1	6.NS.C.7.B, 6.EE.B.8
4	2	6.EE.B.8
5	2	6.EE.B.8
6	2	6.NS.C.7.B, 6.EE.B.8
7	3	6.NS.C.7.B, 6.EE.B.8
8	3	6.NS.C.7.B, 6.EE.B.8

Notes:

Additional Practice

6.13

1. For each scenario, circle the inequality that represents it.

a The temperature is above 32° .

$x > 32$ $x < 32$ $x \geq 32$ $x \leq 32$

b Kiran has no more \$20 to spend.

$x > 20$ $x < 20$ $x \geq 20$ $x \leq 20$

2. Consider the inequality $c \leq 9$. Circle *all* the solutions to the inequality.

7 8 9 10

3. Express each statement as an inequality, and write two values which will make the inequality true.

a x is greater than 2.

$x > 2$; Responses should include any two values which satisfy $x > 2$.

b b is less than or equal 4.5.

$b \leq 4.5$; Responses should include any two values which satisfy $b \leq 4.5$.

c 5 is at least w .

$5 \geq w$ or $w \leq 5$; Responses should include any two values which satisfy $5 \geq w$.

d d is no less than 16.

$d \geq 16$; Responses should include any two values which satisfy $d \geq 16$.

e t is at most 8.

$t \leq 8$; Responses should include any two values which satisfy $t \leq 8$.

4. Write an inequality that represents each scenario.

a A student must have at least 5 hours of community service completed.

$x \geq 5$

b Practice will be no more than 50 minutes.

$x \leq 50$

c Children under the age of 3 are free.

$x < 3$

d During hibernation, an arctic ground squirrel's body temperature never goes below -2.9°C .

$x \geq -2.9$

5. Consider the inequality $-2x < 14$.

a List four values for x that would make this inequality true.
Responses may vary, but should satisfy $x > -7$.

b How are the solutions to the inequality $-2x < 14$ different from the solutions to the inequality $-2x \leq 14$?
Solutions to the inequality $-2x \leq 14$ now include -7 .

6. Noah and Elena each wrote an inequality to represent the following situation.
 Jada wants to take, at minimum, \$15 to the store.

Noah's inequality: $x \geq 15$

Elena's inequality: $15 \leq x$

Who is correct? Explain your thinking.

Both are correct. Sample response: The inequalities have the same solution.

7. Refer to the following situations.

a The Art Club spent \$249 on supplies last year. This is at most \$75 more than the Spanish club spent. Write an inequality that represents the amount of money that the Spanish Club spent.
 $x \leq 174$

b In the first week of a canned food drive 480 cans were collected. In the last week of the canned food drive, at least twice that amount was collected. Write an inequality that represents the amount of cans that were collected in the last week of the canned food drive.
 $x \geq 960$

8. The number line shows a solution to an inequality. Write a real-world scenario that the inequality could represent.



Responses may vary, but the scenario should satisfy the inequality $x \geq 10$.

Name: _____ Date: _____ Period: _____

Additional Practice 6.13

- For each scenario, circle the inequality that represents it.
 - The temperature is above 32°.

$x > 32$ $x < 32$ $x \geq 32$ $x \leq 32$
 - Kiran has no more \$20 to spend.

$x > 20$ $x < 20$ $x \geq 20$ $x \leq 20$
- Consider the inequality $c \leq 9$. Circle *all* the solutions to the inequality.

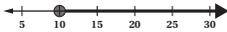
7 8 9 10
- Express each statement as an inequality, and write two values which will make the inequality true.
 - x is greater than 2.
 $x > 2$; Responses should include any two values which satisfy $x > 2$.
 - b is less than or equal 4.5.
 $b \leq 4.5$; Responses should include any two values which satisfy $b \leq 4.5$.
 - 5 is at least w .
 $5 \geq w$ or $w \leq 5$; Responses should include any two values which satisfy $5 \geq w$.
 - d is no less than 16.
 $d \geq 16$; Responses should include any two values which satisfy $d \geq 16$.
 - t is at most 8.
 $t \leq 8$; Responses should include any two values which satisfy $t \leq 8$.
- Write an inequality that represents each scenario.
 - A student must have at least 5 hours of community service completed.
 $x \geq 5$
 - Practice will be no more than 50 minutes.
 $x \leq 50$
 - Children under the age of 3 are free.
 $x < 3$
 - During hibernation, an arctic ground squirrel's body temperature never goes below -2.9°C .
 $x \geq -2.9$

Unit 6 Lesson 13 145 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Consider the inequality $-2x < 14$.
 - List four values for x that would make this inequality true.
Responses may vary, but should satisfy $x > -7$.
 - How are the solutions to the inequality $-2x < 14$ different from the solutions to the inequality $-2x \leq 14$?
Solutions to the inequality $-2x \leq 14$ now include -7 .
- Noah and Elena each wrote an inequality to represent the following situation. Jada wants to take, at minimum, \$15 to the store.

Noah's inequality: $x \geq 15$ Elena's inequality: $15 \leq x$

Who is correct? Explain your thinking.
Both are correct. Sample response: The inequalities have the same solution.
- Refer to the following situations.
 - The Art Club spent \$249 on supplies last year. This is at most \$75 more than the Spanish club spent. Write an inequality that represents the amount of money that the Spanish Club spent.
 $x \leq 174$
 - In the first week of a canned food drive 480 cans were collected. In the last week of the canned food drive, at least twice that amount was collected. Write an inequality that represents the amount of cans that were collected in the last week of the canned food drive.
 $x \geq 960$
- The number line shows a solution to an inequality. Write a real-world scenario that the inequality could represent.
 

Responses may vary, but the scenario should satisfy the inequality $x \geq 10$.

Unit 6 Lesson 13 146 Additional Practice

Practice Problem Analysis

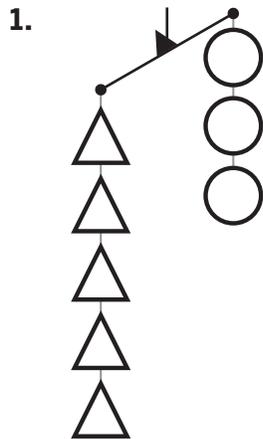
Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	1	7.EE.B.4
3	2	7.EE.B.4
4	2	7.EE.B.4
5	2	7.EE.B.4
6	2	7.EE.B.4
7	3	7.EE.B.4
8	3	7.EE.B.4

Notes:

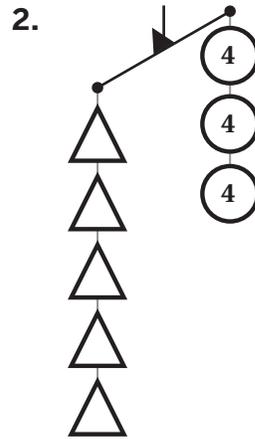
Additional Practice

6.14

Problems 1–2: Here are two unbalanced hangers. Write an inequality to represent the relationship between the weights on each hanger. Use t to represent the weight of the triangle in grams. Use c to represent the weight of the circle in grams.



$5x > 3c$



$t > 1\frac{2}{5}$, or equivalent

3. Select all values of x that make the inequality $x - 7 \geq -3$ true.

A. 3.9

E. 5

B. 0

F. -1

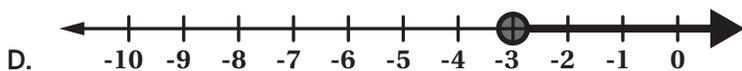
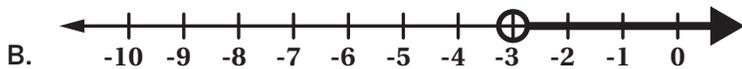
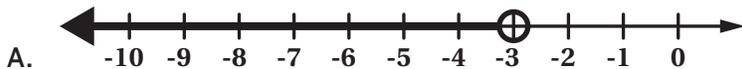
C. 4

G. -4

D. 4.1

H. 8

4. Which number line shows the solution to $-3x > 9$?



5. Melanie is asked to solve the inequality $-5x \leq -40$. She solves the equation $-5x = -40$ and determines $x = 8$. What is the solution to the inequality?

A. $x \leq 8$

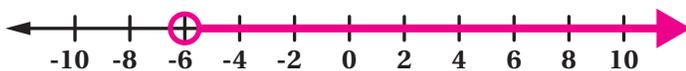
B. $x \geq 8$

C. $x < 8$

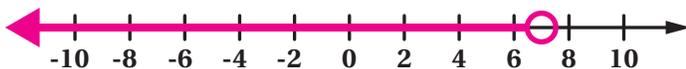
D. $x > 8$

Problems 6–7: Solve each inequality. Show your solution as a graph on the number line and write an inequality to represent it.

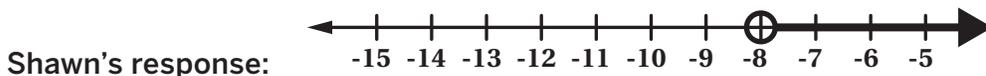
6. $-3x < 18$



7. $\frac{2}{3}x \leq \frac{14}{3}$



8. Shawn solved the inequality $-\frac{1}{2}x > 4$. Shawn's solution is shown.



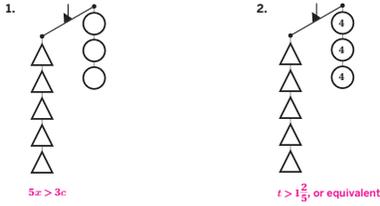
Is Shawn correct? Explain your thinking.

Shawn is incorrect. Explanations vary. Shawn is correct when solving the equation $-\frac{1}{2}x = 4$ and getting the solution $x = 8$. However, when testing a value, such as $x = 2$, in the inequality $-\frac{1}{2}x > 4$, he would have got a false statement: $-\frac{1}{2}(2) > 4(2) \rightarrow -2 > 8$. Therefore, the solution would be values less than 8.

Name: _____ Date: _____ Period: _____

Additional Practice 6.14

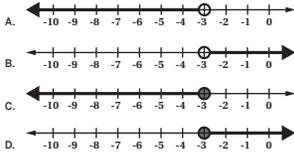
Problems 1–2: Here are two unbalanced hangers. Write an inequality to represent the relationship between the weights on each hanger. Use t to represent the weight of the triangle in grams. Use c to represent the weight of the circle in grams.



3. Select all values of x that make the inequality $x - 7 \geq -3$ true.

- A. 3.9
- B. 0
- C. 4
- D. 4.1
- E. 5
- F. -1
- G. -4
- H. 8

4. Which number line shows the solution to $-3x > 9$?

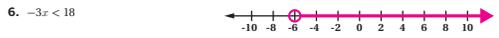


Name: _____ Date: _____ Period: _____

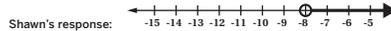
5. Melanie is asked to solve the inequality $-5x \leq -40$. She solves the equation $-5x = -40$ and determines $x = 8$. What is the solution to the inequality?

- A. $x \leq 8$
- B. $x \geq 8$
- C. $x < 8$
- D. $x > 8$

Problems 6–7: Solve each inequality. Show your solution as a graph on the number line and write an inequality to represent it.



8. Shawn solved the inequality $-\frac{1}{2}x > 4$. Shawn's solution is shown.



Is Shawn correct? Explain your thinking.

Shawn is incorrect. Explanations vary. Shawn is correct when solving the equation $-\frac{1}{2}x = 4$ and getting the solution $x = 8$. However, when testing a value, such as $x = 2$, in the inequality $-\frac{1}{2}x > 4$, he would have got a false statement: $-\frac{1}{2}(2) > 4(2) \rightarrow -2 > 8$. Therefore, the solution would be values less than 8.

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4.B
2	1	7.EE.B.4.B
3	1	7.EE.B.4.B
4	1	7.EE.B.4.B
5	1	7.EE.B.4.B
6	1	7.EE.B.4.B
7	1	7.EE.B.4.B
8	2	7.EE.B.4.B

Notes:

Additional Practice

6.15

1. Priya has \$30 to spend at the school festival. Admission is \$4 and each ride ticket is \$2. Which inequality represents the greatest number of ride tickets she can buy?

A. $2n + 4 < 30$ B. $2n + 4 > 30$ **C. $2n + 4 \leq 30$** D. $2n + 4 \geq 30$

2. It is currently 8 degrees outside, and the temperature will drop 2 degrees every hour. When the temperature falls below zero degrees, it can be represented by the inequality $8 - 2h < 0$, where h represents the number hours the temperature has been dropping. Does $h < 4$ or $h > 4$ represent the solution of the inequality?

$h > 4$

3. Clare currently has a \$0 allowance balance. She has been borrowing \$5 each day from her father. Her allowance balance after d days is $-5d$.
 - a Explain what the equation $-5d = -25$ represents.
It represents when Clare's allowance balance will be $-\$25$.
 - b What value of d makes the equation true?
 **$-5d \div (-5) = -25 \div (-5)$
 $d = 5$**
 - c Explain what the inequality $-5d < -25$ represents.
It represents when Clare's account balance will be less than $-\$25$.
 - d What values of d make the inequality true?
Responses may vary, but must be greater than 5.

4. The 20 members of the photography club are trying to raise at least \$1,400 for new photography equipment. They have already raised \$540.
 - a Let m represent the amount of money each member must raise, on average, to meet their goal. Write an expression for the total amount of money going to be raised.
 $540 + 20m$
 - b Write an equation that represents the club raising all the money.
 $540 + 20m = 1,400$
 - c Solve the equation. What does the solution mean in context of the scenario?
 **$540 + 20m - 540 = 1,400 - 540$
 $20m = 860$
 $20m \div 20 = 860 \div 20$
 $m = 43$
Each member needs to raise \$43.**
 - d Write an inequality representing the amount of money each member must raise, on average, to meet or exceed their goal.
 $540 + 20m \geq 1,400$
 - e Write an inequality showing the possible average amount of money each club member needs to raise.
 $m \geq 43$

5. Andre's dog weighs 84 lb. The vet put Andre's dog on a diet for 6 months. The dog's weight after losing p pounds monthly is $84 - 6p$.

- a Explain what the equation $84 - 6p = 76$ represents.

It represents when Andre's dog will weigh 76 lb.

- b What value of p makes the equation true?

$$\begin{aligned} 84 - 6p - 84 &= 76 - 84 \\ -6p &= -8 \\ -6p \div (-6) &= -8 \div (-6) \\ p &= 1\frac{1}{3} \end{aligned}$$

- c Explain what the inequality $84 - 6p \leq 76$ represents.

It represents when Andre's dog will weigh 76 or less lb.

- d What values of p make the inequality true?

Responses may vary, but must be greater than or equal to $1\frac{1}{3}$.

6. Noah spent \$40 on supplies for making 25 birdhouses. Noah wants to make a profit of more than \$300.

- a What inequality can you write to find the price p Noah should charge per birdhouse if he wants to meet his goal?

$$25p - 40 > 300$$

- b What values of p make the inequality true?

$$p > 13.60$$

7. Elena scored 95, 91, 90 on 3 tests. She wants her average test score for 5 tests to be least 92.

- a What inequality represents the average score she can get on her next two tests to meet her goal? Identify and define a variable.

$$\text{Let } x \text{ represent her average test score; } 276 + 2x \geq 460$$

- b What values make the inequality true?

$$x \geq 92$$

Name: _____ Date: _____ Period: _____

Additional Practice

6.15

- Priya has \$30 to spend at the school festival. Admission is \$4 and each ride ticket is \$2. Which inequality represents the greatest number of ride tickets she can buy?
 - $2n + 4 < 30$
 - $2n + 4 > 30$
 - $2n + 4 \leq 30$
 - $2n + 4 \geq 30$
- It is currently 8 degrees outside, and the temperature will drop 2 degrees every hour. When the temperature falls below zero degrees, it can be represented by the inequality $8 - 2h < 0$, where h represents the number hours the temperature has been dropping. Does $h < 4$ or $h > 4$ represent the solution of the inequality?

$h > 4$
- Clare currently has a \$0 allowance balance. She has been borrowing \$5 each day from her father. Her allowance balance after d days is $-5d$.
 - Explain what the equation $-5d = -25$ represents.
It represents when Clare's allowance balance will be $-\$25$.
 - What value of d makes the equation true?
 $-5d \div (-5) = -25 \div (-5)$
 $d = 5$
 - Explain what the inequality $-5d < -25$ represents.
It represents when Clare's account balance will be less than $-\$25$.
 - What values of d make the inequality true?
Responses may vary, but must be greater than 5.
- The 20 members of the photography club are trying to raise at least \$1,400 for new photography equipment. They have already raised \$540.
 - Let m represent the amount of money each member must raise, on average, to meet their goal. Write an expression for the total amount of money going to be raised.
 $540 + 20m$
 - Write an equation that represents the club raising all the money.
 $540 + 20m = 1,400$
 - Solve the equation. What does the solution mean in context of the scenario?
 $540 + 20m - 540 = 1,400 - 540$
 $20m = 860$
 $20m \div 20 = 860 \div 20$
 $m = 43$
Each member needs to raise \$43.
 - Write an inequality representing the amount of money each member must raise, on average, to meet or exceed their goal.
 $540 + 20m \geq 1,400$
 - Write an inequality showing the possible average amount of money each club member needs to raise.
 $m \geq 43$

Unit 6 Lesson 15

149

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Andre's dog weighs 84 lb. The vet put Andre's dog on a diet for 6 months. The dog's weight after losing p pounds monthly is $84 - 6p$.
 - Explain what the equation $84 - 6p = 76$ represents.
It represents when Andre's dog will weigh 76 lb.
 - What value of p makes the equation true?
 $84 - 6p - 84 = 76 - 84$
 $-6p = -8$
 $-6p \div (-6) = -8 \div (-6)$
 $p = 1\frac{1}{3}$
 - Explain what the inequality $84 - 6p \leq 76$ represents.
It represents when Andre's dog will weigh 76 or less lb.
 - What values of p make the inequality true?
Responses may vary, but must be greater than or equal to $1\frac{1}{3}$.
- Noah spent \$40 on supplies for making 25 birdhouses. Noah wants to make a profit of more than \$300.
 - What inequality can you write to find the price p Noah should charge per birdhouse if he wants to meet his goal?
 $25p - 40 > 300$
 - What values of p make the inequality true?
 $p > 13.60$
- Elena scored 95, 91, 90 on 3 tests. She wants her average test score for 5 tests to be at least 92.
 - What inequality represents the average score she can get on her next two tests to meet her goal? Identify and define a variable.
Let x represent her average test score; $276 + 2x \geq 460$
 - What values make the inequality true?
 $x \geq 92$

Unit 6 Lesson 15

150

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.4.B
2	1	7.EE.B.4.B
3	2	7.EE.B.4.B
4	2	7.EE.B.4.B
5	2	7.EE.B.4.B
6	2	7.EE.B.4.B
7	3	7.EE.B.4.B

Notes:

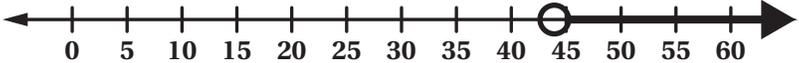
Additional Practice

6.16

1. Select *all* values of x that make the inequality $-x + 6 < 8$ true.

- | | |
|---|---|
| <input type="checkbox"/> A. 1.9 | <input type="checkbox"/> E. -2 |
| <input type="checkbox"/> B. 2 | <input type="checkbox"/> F. -1.9 |
| <input checked="" type="checkbox"/> C. 2.01 | <input checked="" type="checkbox"/> G. 15 |
| <input type="checkbox"/> D. -2.01 | <input type="checkbox"/> H. -15 |

2. To ride on the Space *Mountain* rollercoaster at Disney World, guests must be at least 44 inches tall. Match each situation or number line graph with an inequality.

Situation/Graph	Inequality
a. Kira is x inches tall and cannot ride the rollercoaster.d..... $x > 4$
b. Jake is x inches tall and can ride the rollercoaster.c..... $x \leq 4$
c. a..... $x < 44$
d. b..... $x \geq 44$

Problems 3–4: Use the inequality $60 - 2x \geq -10$.

3. Select *all* values of x that make the inequality $60 - 2x \geq -10$ true.

- | | |
|-------------------|---------------------|
|X..... A. 0 |X..... D. 35.1 |
|X..... B. 35 | E. 34.9 |
| C. -35 | |

4. In order to solve the inequality $60 - 2x \geq -10$, Soorya solved the equation $60 - 2x = -10$ and got $x = 35$. What is the solution to the inequality? Show or explain your thinking.

$x \geq 35$ Explanations vary. If you substitute the value $x = 1$ into the inequality $60 - 2x \geq -10$, you get $60 - 2 \geq -10$ or $58 \geq -10$, which is a true statement. Therefore, the solution is all values greater or equal to 35.

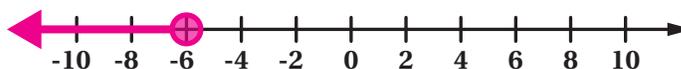
5. Jasmine is solving the inequality $12x < -48$. She solves the equation $12x = -48$ to determine $x = -4$. What is the solution to the inequality?

- A. $x < -4$
- B. $x > -4$
- C. $x \leq -4$
- D. $x \geq -4$

Problems 6–7: Complete the table to determine the solutions to each inequality. Write the solutions as an inequality and graph them on the number line.

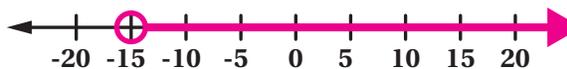
6. $-5x \geq 30$

x	-9	-8	-7	-6	-5	-4	-3
$-5x$	45	40	35	30	25	20	15



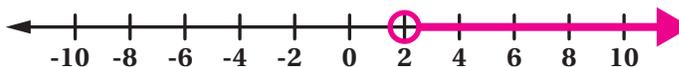
7. $\frac{4}{5}x > -12$

x	-20	-15	-10	-5	0	5	10
$\frac{4}{5}x$	-16	-12	-8	-4	0	4	8



8. Solve the inequality $2x + 8 > 12$ and graph the solution on the number line. Show your thinking.

$x > 2$



Name: _____ Date: _____ Period: _____

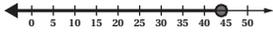
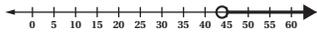
Additional Practice

6.16

1. Select all values of x that make the inequality $-x + 6 < 8$ true.

- A. 1.9 E. -2
 B. 2 F. -1.9
 C. 2.01 G. 15
 D. -2.01 H. -15

2. To ride on the Space Mountain rollercoaster at Disney World, guests must be at least 44 inches tall. Match each situation or number line graph with an inequality.

- | Situation/Graph | Inequality |
|--|-------------------------|
| a. Kira is x inches tall and cannot ride the rollercoaster. |d..... $x > 4$ |
| b. Jake is x inches tall and can ride the rollercoaster. |c..... $x \leq 4$ |
| c.  |a..... $x < 44$ |
| d.  |b..... $x \geq 44$ |

Problems 3–4: Use the inequality $60 - 2x \geq -10$.

3. Select all values of x that make the inequality $60 - 2x \geq -10$ true.

- A. 0 D. 35.1
 B. 35 E. 34.9
 C. -35

4. In order to solve the inequality $60 - 2x \geq -10$, Soorya solved the equation $60 - 2x = -10$ and got $x = 35$. What is the solution to the inequality? Show or explain your thinking.

$x \geq 35$ *Explanations vary. If you substitute the value $x = 1$ into the inequality $60 - 2x \geq -10$, you get $60 - 2 \geq -10$ or $58 \geq -10$, which is a true statement. Therefore, the solution is all values greater or equal to 35.*

Unit 6 Lesson 16

151

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

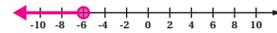
5. Jasmine is solving the inequality $12x < -48$. She solves the equation $12x = -48$ to determine $x = -4$. What is the solution to the inequality?

- A. $x < -4$
 B. $x > -4$
 C. $x \leq -4$
 D. $x \geq -4$

Problems 6–7: Complete the table to determine the solutions to each inequality. Write the solutions as an inequality and graph them on the number line.

6. $-5x \geq 30$

x	-9	-8	-7	-6	-5	-4	-3
$-5x$	45	40	35	30	25	20	15



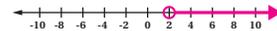
7. $\frac{4}{5}x > -12$

x	-20	-15	-10	-5	0	5	10
$\frac{4}{5}x$	-16	-12	-8	-4	0	4	8



8. Solve the inequality $2x + 8 > 12$ and graph the solution on the number line. Show your thinking.

$x > 2$



Unit 6 Lesson 16

152

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.EE.B.3
2	2	7.EE.B.4.B
3	1	7.EE.B.3
4	1	7.EE.B.4.B
5	1	7.EE.B.4.B
6	1	7.EE.B.3, 7.EE.B.4.B
7	1	7.EE.B.3, 7.EE.B.4.B
8	1	7.EE.B.3, 7.EE.B.4.B

Notes:

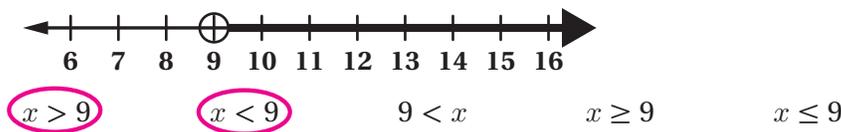
Additional Practice

6.17

1. Here is an inequality: Which numbers are solutions to the inequality $-2(x - 4) < 20$?

- A. -0.5 B. -8 C. -1 D. 0
 E. -6 F. 6 G. -5.9 H. -6.1

2. Which inequalities does the following graph represent? Circle *all* that apply.



3. Bard is solving the inequality $-80 - 5x \leq -20$. Bard first solves the equation $-80 - 5x = -20$ and obtain $x = -12$. What is the solution to the inequality?

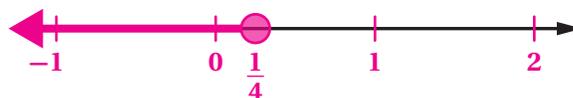
- A. $x < -12$ B. $x > -12$
 C. $x \geq -12$ D. $x \leq -12$

4. Solve each inequality. Show your solution as a graph on the number line.

a $7(x + 11) > -91$ $x > -24$



b $-8x - 4 \geq -6$ $x \leq \frac{1}{4}$



5. Priya solved both inequalities below, but she mixed up her solutions. Help her by deciding if the solution to each inequality is represented by $x \leq 1\frac{1}{2}$ or $x \geq 1\frac{1}{2}$. Explain your thinking.

a $-2x - 3 \geq -6$

Solution:

Solution: $x \leq 1\frac{1}{2}$

Explanation: Responses may vary, but should mention testing values greater and less than $1\frac{1}{2}$ to determine which makes the inequality true.

Explanation:

b $-24 \geq -6(x + 2.5)$

Solution:

Solution: $x \geq 1\frac{1}{2}$

Explanation: Responses may vary, but should mention testing values greater and less than $1\frac{1}{2}$ to determine which makes the inequality true.

Explanation:

6. Solve the inequality $-3.8 > -1.2b + 2.2$.

a Solve the related equation and test values less than and greater than the solution.

$$\begin{aligned} -3.8 &= -1.2b + 2.2 \\ -3.8 - 2.2 &= -1.2b + 2.2 - 2.2 \\ -6 &= -1.2b \\ -6 \div (-1.2) &= -1.2b \div (-1.2) \\ 5 &= b \end{aligned}$$

Check values less than and greater than 5:

$$\begin{aligned} b &= 6 \\ -3.8 &> -1.2(6) + 2.2 \\ -3.8 &> -5 \text{ is true.} \\ b &= 0 \\ -3.8 &> -1.2(0) + 2.2 \\ -3.8 &> 2.2 \text{ is not true.} \end{aligned}$$

b Graph the solution on the number line and write an inequality to represent the solution.

$b > 5$



7. Compare and contrast solving an equation and solving an inequality.

Responses may vary, but should mention that you follow the same steps in solving, inequalities have more than one solution, equations have one solution.

Name: _____ Date: _____ Period: _____

Additional Practice 6.17

1. Here is an inequality: Which numbers are solutions to the inequality $-2(x - 4) < 20$?

A. -0.5 B. -8 C. -1 D. 0
 E. -6 F. 6 G. -5.9 H. -6.1

2. Which inequalities does the following graph represent? Circle all that apply.

$x > 9$ $x < 9$ $9 < x$ $x \geq 9$ $x \leq 9$

3. Bard is solving the inequality $-80 - 5x \leq -20$. Bard first solves the equation $-80 - 5x = -20$ and obtains $x = -12$. What is the solution to the inequality?

A. $x < -12$ B. $x > -12$
 C. $x \geq -12$ D. $x \leq -12$

4. Solve each inequality. Show your solution as a graph on the number line.

a. $7(x + 11) > -91$ $x > -24$

b. $-8x - 4 \geq -6$ $x \leq \frac{1}{4}$

Unit 6 Lesson 17 153 © Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

5. Priya solved both inequalities below, but she mixed up her solutions. Help her by deciding if the solution to each inequality is represented by $x \leq 1\frac{1}{2}$ or $x \geq 1\frac{1}{2}$. Explain your thinking.

a. $-2x - 3 \geq -6$

Solution: $x \leq 1\frac{1}{2}$
Explanation: Responses may vary, but should mention testing values greater and less than $1\frac{1}{2}$ to determine which makes the inequality true.

Explanation:

b. $-24 \geq -6(x + 2.5)$

Solution: $x \geq 1\frac{1}{2}$
Explanation: Responses may vary, but should mention testing values greater and less than $1\frac{1}{2}$ to determine which makes the inequality true.

Explanation:

6. Solve the inequality $-3.8 > -1.2b + 2.2$.

a. Solve the related equation and test values less than and greater than the solution.

$-3.8 = -1.2b + 2.2$
 $-3.8 - 2.2 = -1.2b + 2.2 - 2.2$
 $-6 = -1.2b$
 $-6 \div (-1.2) = -1.2b \div (-1.2)$
 $5 = b$

Check values less than and greater than 5:
 $b = 6$
 $-3.8 > -1.2(6) + 2.2$
 $-3.8 > -5$ is true.
 $b = 0$
 $-3.8 > -1.2(0) + 2.2$
 $-3.8 > 2.2$ is not true.

b. Graph the solution on the number line and write an inequality to represent the solution.

$b > 5$

7. Compare and contrast solving an equation and solving an inequality.
 Responses may vary, but should mention that you follow the same steps in solving, inequalities have more than one solution, equations have one solution.

Unit 6 Lesson 17 154 Additional Practice

Practice Problem Analysis

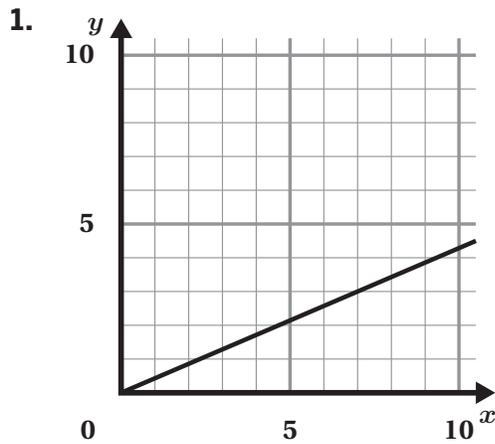
Problem	DOK	Standard(s)
1	1	7.EE.B.4
2	1	7.EE.B.4.B
3	2	7.EE.B.4.B
4	2	7.EE.B.4.B
5	2	7.EE.B.4.B
6	2	7.EE.B.4.B
7	3	7.EE.B.4.B

Notes:

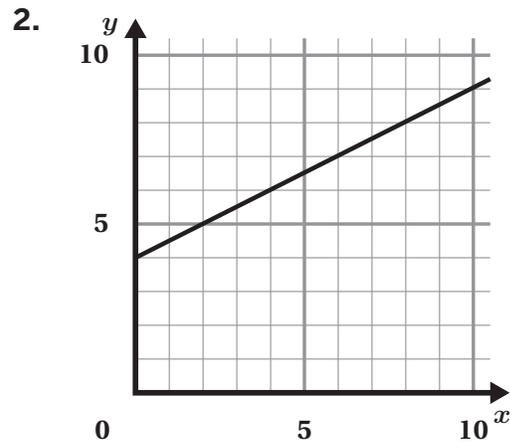
Additional Practice

3.01

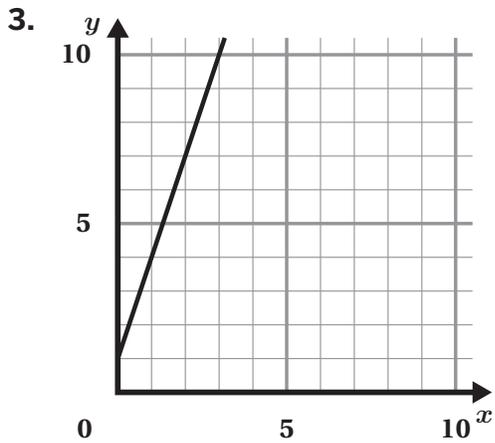
Problems 1–4: Determine whether each graph represents a proportional or non-proportional relationship (circle one). Then, determine the slope of each line.



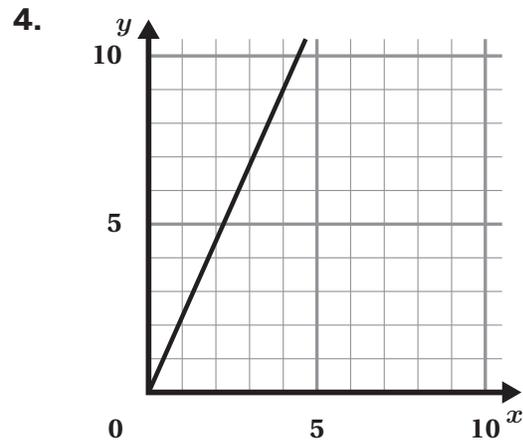
Proportional Non-Proportional
Slope = $\frac{3}{7}$



Proportional Non-Proportional
Slope = $\frac{1}{2}$



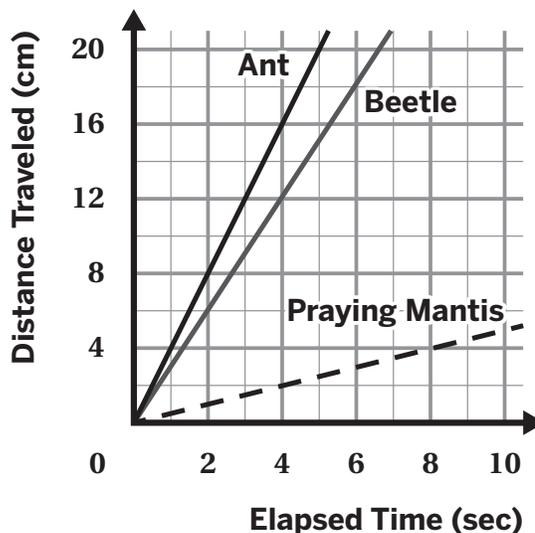
Proportional Non-Proportional
Slope = 3



Proportional Non-Proportional
Slope = $\frac{9}{4}$

5. An ant, a beetle, and a praying mantis compete in a 20-centimeter race. Write a story that represents the three lines on the graph.

Responses vary. The ant's rate was 4 cm/sec and finished the race in 4.5 seconds. The beetle moved at a rate of 3 cm/sec and finished the race after about 6.5 seconds. The praying mantis was the slowest at 0.5 cm/sec and stopped racing after 10 seconds and only got as far as 5 cm.

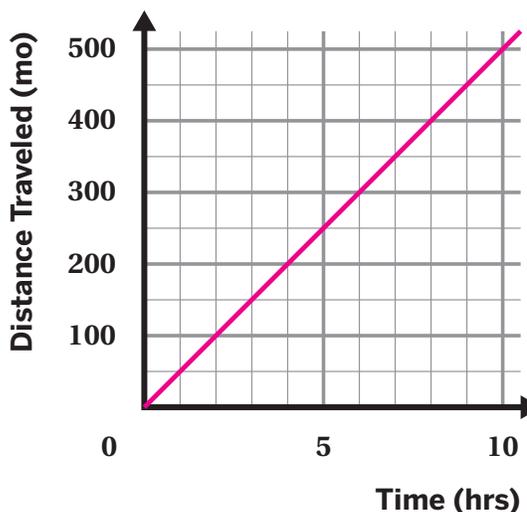


Problems 6–8: From rest, a bus travels at a constant rate. After 3 hours, the bus traveled 150 miles.

6. Graph the line showing the relationship between the car's distance traveled and time.
 7. What is the slope of the line?
 8. What does the slope represent in context?

50, or equivalent

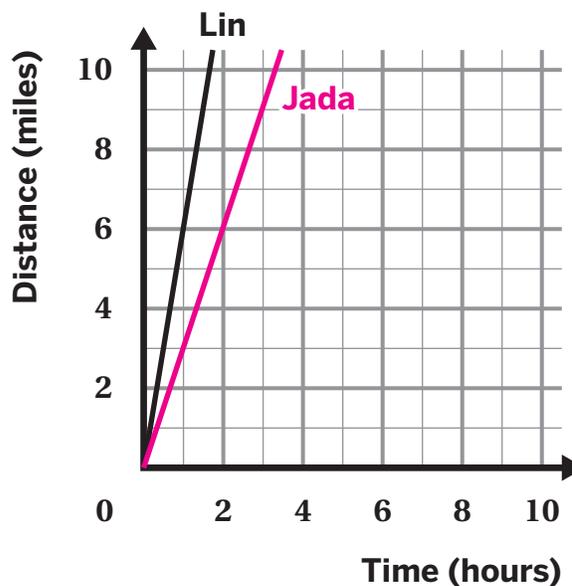
The bus is traveling at a constant rate of 50 miles per hour.



Problems 9–10: Lin bikes at a constant speed. The relationship between her distance and time is shown on the graph. Jada jogs at a constant speed that is half as fast as Lin.

9. Graph the relationship between Lin's distance and time on the same coordinate plane.
 10. Explain your reasoning.

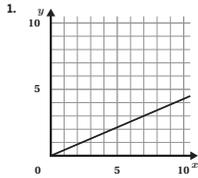
Explanations vary. The slope of Lin's line is $\frac{6}{1}$ so she is biking at a rate of 6 miles/hour. Half of that rate is 3 miles per hour. Therefore, the slope of Jada's line needed to be $\frac{3}{1}$.



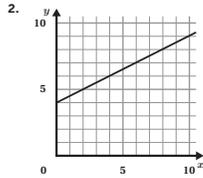
Name: _____ Date: _____ Period: _____

Additional Practice 3.01

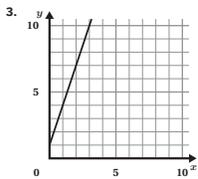
Problems 1–4: Determine whether each graph represents a proportional or non-proportional relationship (circle one). Then, determine the slope of each line.



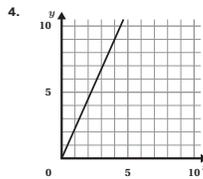
Proportional Non-Proportional
Slope = $\frac{3}{7}$



Proportional Non-Proportional
Slope = $\frac{1}{2}$



Proportional Non-Proportional
Slope = 3



Proportional Non-Proportional
Slope = $\frac{9}{4}$

Unit 3 Lesson 1

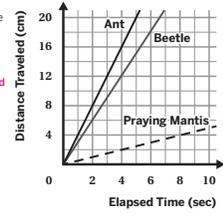
47

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

5. An ant, a beetle, and a praying mantis compete in a 20-centimeter race. Write a story that represents the three lines on the graph.

Responses vary. The ant's rate was 4 cm/sec and finished the race in 4.5 seconds. The beetle moved at a rate of 3 cm/sec and finished the race after about 6.5 seconds. The praying mantis was the slowest at 0.5 cm/sec and stopped racing after 10 seconds and only got as far as 5 cm.



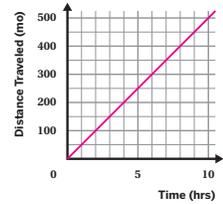
Problems 6–8: From rest, a bus travels at a constant rate. After 3 hours, the bus traveled 150 miles.

6. Graph the line showing the relationship between the car's distance traveled and time.

7. What is the slope of the line?
50, or equivalent

8. What does the slope represent in context?

The bus is traveling at a constant rate of 50 miles per hour.

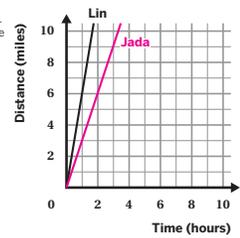


Problems 9–10: Lin bikes at a constant speed. The relationship between her distance and time is shown on the graph. Jada jogs at a constant speed that is half as fast as Lin.

9. Graph the relationship between Lin's distance and time on the same coordinate plane.

10. Explain your reasoning.

Explanations vary. The slope of Lin's line is $\frac{5}{1}$ so she is biking at a rate of 5 miles/hour. Half of that rate is 2.5 miles per hour. Therefore, the slope of Jada's line needed to be $\frac{5}{2}$.



Unit 3 Lesson 1

48

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	7.RP.A.2.A, 8.EE.B.6
2	1	7.RP.A.2.A, 8.EE.B.6
3	1	7.RP.A.2.A, 8.EE.B.6
4	1	7.RP.A.2.A, 8.EE.B.6
5	2	8.EE.B.5
6	1	8.EE.B.5
7	1	8.EE.B.6
8	2	8.F.A.3
9	1	8.EE.B.5
10	2	8.EE.B.6

Notes:

Additional Practice

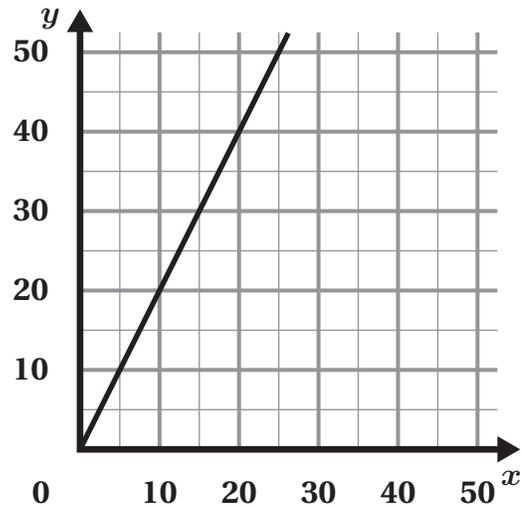
3.02

- Write an equation for a graph of a proportional relationship that passes through the point (16, 12). Explain your thinking.

Explanations vary. $y = \frac{3}{4}x$, or equivalent. I determined the slope of the line by dividing the y -value by the x -value.

- Write an equation of the line graphed. Use $y = mx$ form where m represents the slope of the line.

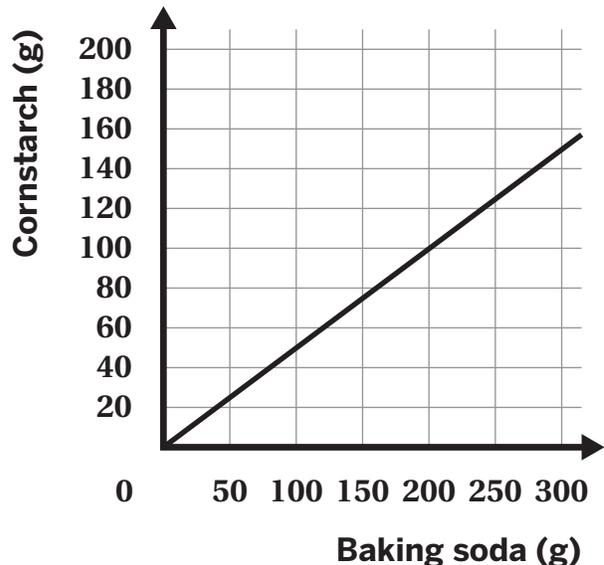
$y = 2x$, or equivalent



Problems 3–4: The graph shown represents the proportional relationship between the number of grams of baking soda and the number of grams of cornstarch in a recipe to make your own bath fizzies.

- Write an equation that represents this relationship. Let x represent the number of grams of baking soda and y represent the number of grams of cornstarch.

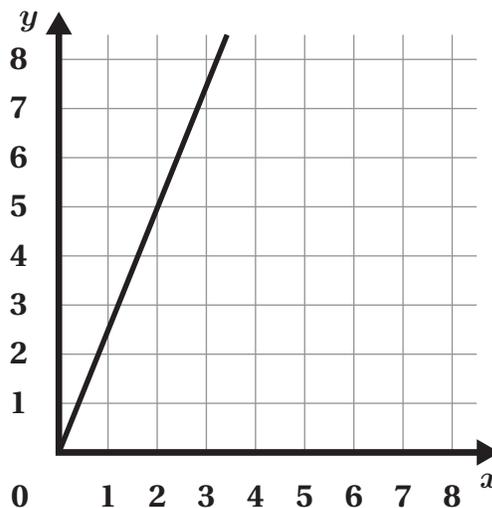
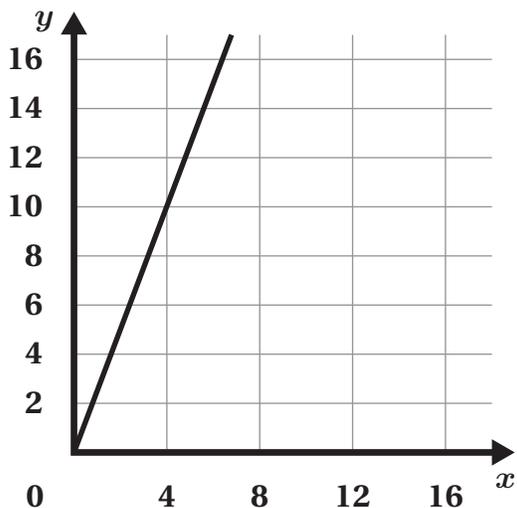
$y = \frac{1}{2}x$, or equivalent



4. Use your equation to complete the table.

Baking Soda (g)	Cornstarch (g)
650	325
2,500	1,250
1	$\frac{1}{2}$

Problems 5–6: A swimmer is swimming at a constant rate. The two graphs shown represent the same proportional relationship between the distance swam in feet, y , and the amount of time, x , that has passed in seconds.

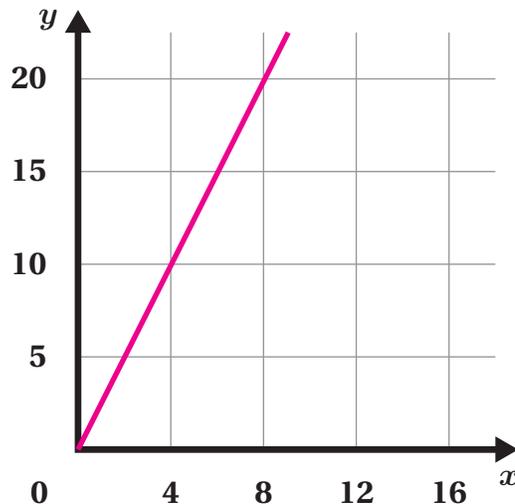


5. Write an equation that represents the relationship between distance y and time x .

$y = \frac{5}{2}x$, or equivalent

6. Draw a graph to show the same proportional relationship as Problem 5. Explain your reasoning.

Explanations vary. I saw that it would be less accurate to try to graph a line with a slope of $\frac{5}{2}$, so I changed it to its equivalent form of $\frac{10}{4}$ and used that slope to graph the line.



Name: _____ Date: _____ Period: _____

Additional Practice

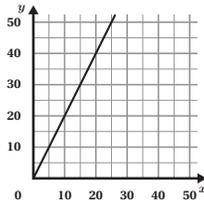
3.02

1. Write an equation for a graph of a proportional relationship that passes through the point (16, 12). Explain your thinking.

Explanations vary. $y = \frac{3}{4}x$, or equivalent. I determined the slope of the line by dividing the y -value by the x -value.

2. Write an equation of the line graphed. Use $y = mx$ form where m represents the slope of the line.

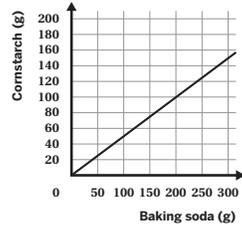
$y = 2x$, or equivalent



- Problems 3–4: The graph shown represents the proportional relationship between the number of grams of baking soda and the number of grams of cornstarch in a recipe to make your own bath fizzy.

3. Write an equation that represents this relationship. Let x represent the number of grams of baking soda and y represent the number of grams of cornstarch.

$y = \frac{1}{2}x$, or equivalent



Unit 3 Lesson 2

49

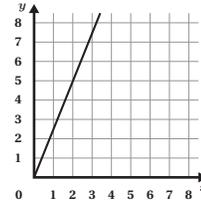
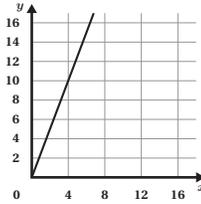
© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

4. Use your equation to complete the table.

Baking Soda (g)	Cornstarch (g)
650	325
2,500	1,250
1	$\frac{1}{2}$

- Problems 5–6: A swimmer is swimming at a constant rate. The two graphs shown represent the same proportional relationship between the distance swam in feet, y , and the amount of time, x , that has passed in seconds.

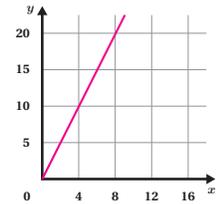


5. Write an equation that represents the relationship between distance y and time x .

$y = \frac{5}{2}x$, or equivalent

6. Draw a graph to show the same proportional relationship as Problem 5. Explain your reasoning.

Explanations vary. I saw that it would be less accurate to try to graph a line with a slope of $\frac{5}{2}$, so I changed it to its equivalent form of $\frac{15}{6}$ and used that slope to graph the line.



Unit 3 Lesson 2

50

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.F.B.4
2	1	8.F.B.4
3	2	8.F.B.4
4	1	6.RP.A.3.A
5	1	8.F.B.4
6	1	8.EE.B.5

Notes:

Additional Practice

3.03

1. In 200 grams of beef soup, there are 80 calories. Let x represent the amount of grams of beef soup and y represent the number of calories in the beef soup. Which equations represent the relationship between x and y ? Select *all* that apply.

A. $y = \frac{2}{5}x$

C. $x = \frac{2}{5}y$

B. $y = \frac{5}{2}x$

D. $x = \frac{5}{2}y$

Problems 2–4: The table shows the ratios of paprika, onion powder, and cayenne pepper in a rub recipe.

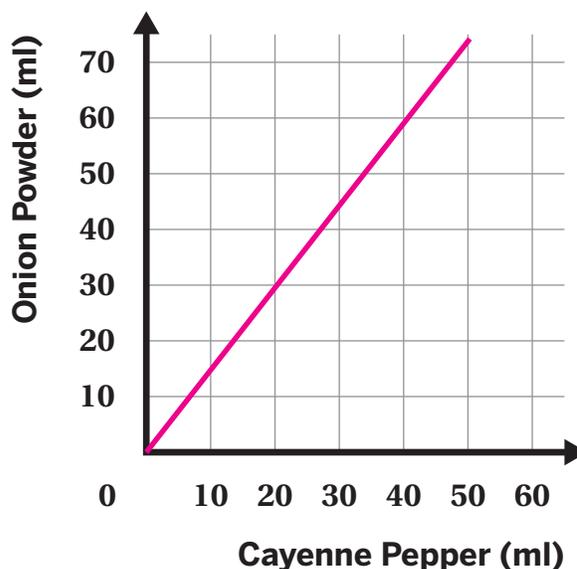
Paprika (ml)	Onion Powder (ml)	Cayenne Pepper (ml)
60	24	16
90	36	24

2. Write an equation that represents the relationship between x milliliters of cayenne pepper and y milliliters of onion powder. Show or explain your thinking.

Explanations vary. $y = \frac{3}{2}x$, or equivalent. I determined the slope of the line by finding the ratio of onion powder to cayenne pepper and reducing the fraction.

3. Graph the relationship on the coordinate plane.
4. How much onion powder is needed for 64 ml of cayenne pepper? Show or explain your thinking.

Methods vary. $y = \frac{3}{2}(64) = 96$ ml of onion powder.



Problems 5–7: Han and Priya are at swim practice. While both were swimming at a constant rate, they noticed they each took a different number of strokes to swim the same distance. For every 3 strokes Priya takes, Han takes 5 strokes. Suppose x represents the number of strokes Priya takes and y represents the number of strokes Han takes.

5. Complete the table.

Number of Priya's Strokes (x)	Number of Han's Strokes (y)
24	40
36	60
75	125

6. Write an equation that reflects the relationship between x and y . Show or explain your thinking.

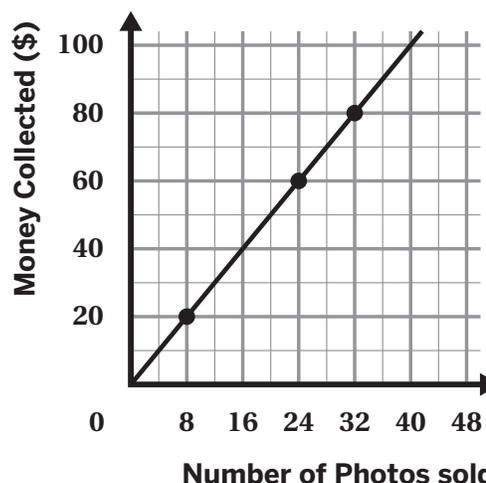
Explanations vary. $y = \frac{5}{3}x$, or equivalent. I determined the slope of the equation by finding the ratio of Han's strokes to Priya's strokes and reducing the fraction.

7. How many strokes has Han taken if Priya has taken 180 strokes? Show or explain your thinking.

$y = \frac{5}{3}(180) = 300$ strokes

8. At a middle school festival, they have a photo booth and are selling photos to raise money for the school. They collect \$40 for every 16 photos they sell. Which statement correctly identifies both the slope and the representation of slope for the situation?

- A. The slope is $\frac{2}{5}$, so the amount of money made for every photo is \$0.40.
- B.** The slope is $\frac{5}{2}$, so the amount of money made for every photo is \$2.50.
- C. The slope is $\frac{2}{5}$, so to make \$1, they have to sell 0.40 photos.
- D. The slope is $\frac{5}{2}$, so to make \$1, they have to sell 2.5 photos.



Name: _____ Date: _____ Period: _____

Additional Practice 3.03

1. In 200 grams of beef soup, there are 80 calories. Let x represent the amount of grams of beef soup and y represent the number of calories in the beef soup. Which equations represent the relationship between y and x ? Select all that apply.

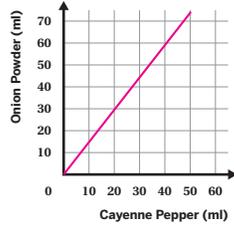
- A. $y = \frac{2}{5}x$
 B. $y = \frac{5}{2}x$
 C. $x = \frac{2}{5}y$
 D. $x = \frac{5}{2}y$

Problems 2–4: The table shows the ratios of paprika, onion powder, and cayenne pepper in a rub recipe.

Paprika (ml)	Onion Powder (ml)	Cayenne Pepper (ml)
60	24	16
90	36	24

2. Write an equation that represents the relationship between x milliliters of cayenne pepper and y milliliters of onion powder. Show or explain your thinking.

Explanations vary. $y = \frac{2}{3}x$, or equivalent. I determined the slope of the line by finding the ratio of onion powder to cayenne pepper and reducing the fraction.



3. Graph the relationship on the coordinate plane.

4. How much onion powder is needed for 64 ml of cayenne pepper? Show or explain your thinking.

Methods vary. $y = \frac{2}{3}(64) = 96$ ml of onion powder.

Unit 3 Lesson 3

51

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 5–7: Han and Priya are at swim practice. While both were swimming at a constant rate, they noticed they each took a different number of strokes to swim the same distance. For every 3 strokes Priya takes, Han takes 5 strokes. Suppose x represents the number of strokes Priya takes and y represents the number of strokes Han takes.

5. Complete the table.

Number of Priya's Strokes (x)	Number of Han's Strokes (y)
24	40
36	60
75	125

6. Write an equation that reflects the relationship between x and y . Show or explain your thinking.

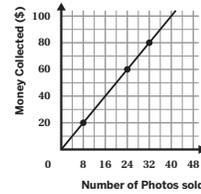
Explanations vary. $y = \frac{5}{3}x$, or equivalent. I determined the slope of the equation by finding the ratio of Han's strokes to Priya's strokes and reducing the fraction.

7. How many strokes has Han taken if Priya has taken 180 strokes? Show or explain your thinking.

$y = \frac{5}{3}(180) = 300$ strokes

8. At a middle school festival, they have a photo booth and are selling photos to raise money for the school. They collect \$40 for every 16 photos they sell. Which statement correctly identifies both the slope and the representation of slope for the situation?

- A. The slope is $\frac{5}{2}$, so the amount of money made for every photo is \$0.40.
 B. The slope is $\frac{5}{2}$, so the amount of money made for every photo is \$2.50.
 C. The slope is $\frac{2}{5}$, so to make \$1, they have to sell 0.40 photos.
 D. The slope is $\frac{2}{5}$, so to make \$1, they have to sell 2.5 photos.



Unit 3 Lesson 3

52

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.F.B.4
2	2	8.F.B.4
3	1	8.EE.B.5
4	1	8.EE.B.6
5	1	8.EE.B.6
6	2	8.F.B.4
7	1	8.EE.B.6
8	2	8.F.A.3

Notes:

Additional Practice

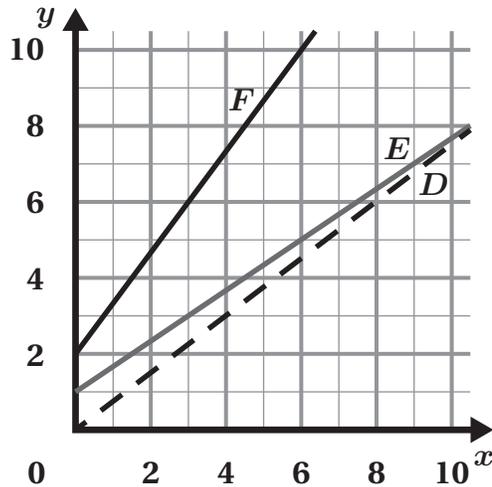
3.04

1. Match each equation with the graph of its line.

a. $y = \frac{2}{3}x + 1$ **E**

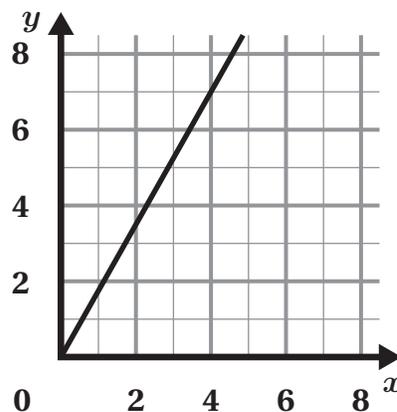
b. $y = \frac{3}{4}x$ **F**

c. $y = \frac{4}{3}x + 2$ **D**



2. Select *all* statements that are true about the graph.

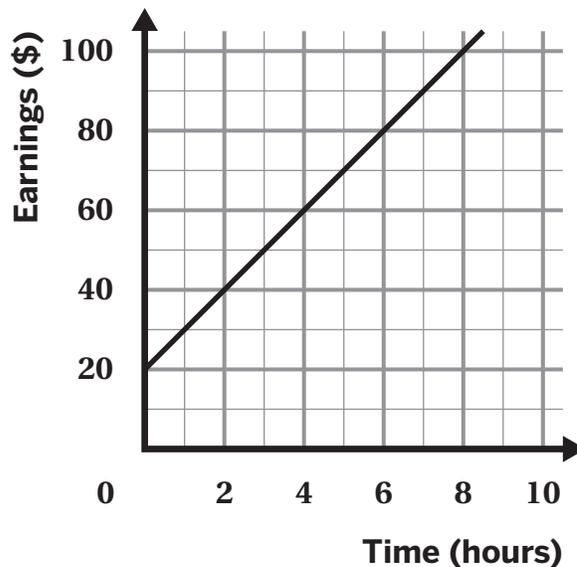
- A. The graph represents a linear relationship.
- B. The graph represents a proportional relationship.
- C. The constant of proportionality is $\frac{3}{2}$.
- D. The slope of the line is $\frac{2}{3}$.
- E. The slope of the line is $\frac{2}{3}$.



3. Jada charges a one-time supply fee plus an hourly rate to do yard work. The graph shows the money she earned, based on the number of hours worked for a recent all-day job.

Is the relationship a linear relationship?
Is the relationship proportional? Explain your thinking.

This graph represents a linear and non-proportional relationship because it is a line but doesn't pass through the origin.



Problems 4–9: Determine whether these linear relationships are proportional or non-proportional (Circle one).

4. From rest, Noah bikes at a constant speed of 12 miles per hour.

Proportional Non-Proportional

5.

x	y
3	7
4	9
6	13

Proportional Non-Proportional

6. $y = 4x$

Proportional Non-Proportional

7. At birth, a kitten weighs 3.5 ounces and doubles its weight in the first week.

Proportional Non-Proportional

8. $y = \frac{1}{2}x + 3$

Proportional Non-Proportional

9.

x	y
2	5
4	10
8	20

Proportional Non-Proportional

Name: _____ Date: _____ Period: _____

Additional Practice

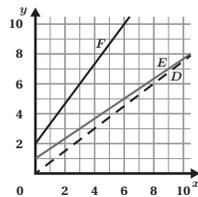
3.04

1. Match each equation with the graph of its line.

a. $y = \frac{2}{3}x + 1$ **E**

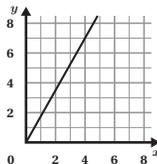
b. $y = \frac{3}{4}x$ **F**

c. $y = \frac{4}{3}x + 2$ **D**



2. Select *all* statements that are true about the graph.

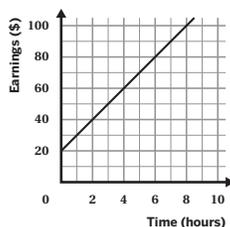
- A. The graph represents a linear relationship.
- B. The graph represents a proportional relationship.
- C. The constant of proportionality is $\frac{3}{2}$.
- D. The slope of the line is $\frac{3}{2}$.
- E. The slope of the line is $\frac{2}{3}$.



3. Jada charges a one-time supply fee plus an hourly rate to do yard work. The graph shows the money she earned, based on the number of hours worked for a recent all-day job.

Is the relationship a linear relationship? Is the relationship proportional? Explain your thinking.

This graph represents a linear and non-proportional relationship because it is a line but doesn't pass through the origin.



Unit 3 Lesson 4

53

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 4–9: Determine whether these linear relationships are proportional or non-proportional (Circle one).

4. From rest, Noah bikes at a constant speed of 12 miles per hour.

Proportional Non-Proportional

x	y
3	7
4	9
6	13

Proportional **Non-Proportional**

6. $y = 4x$

Proportional Non-Proportional

7. At birth, a kitten weighs 3.5 ounces and doubles its weight in the first week.

Proportional **Non-Proportional**

8. $y = \frac{1}{2}x + 3$

Proportional **Non-Proportional**

x	y
2	5
4	10
8	20

Proportional Non-Proportional

Unit 3 Lesson 4

54

Additional Practice

Practice Problem Analysis

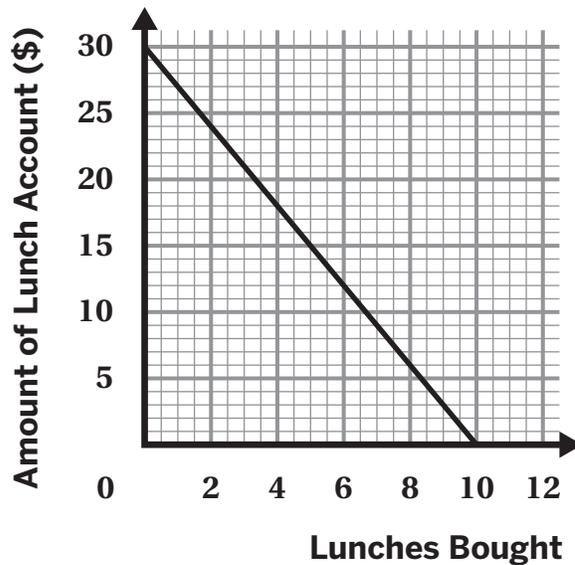
Problem	DOK	Standard(s)
1	1	8.F.B.4
2	1	8.EE.B.6
3	1	8.F.A.2
4	1	8.F.A.2
5	1	8.F.A.2
6	1	8.F.A.2
7	1	8.F.A.2
8	1	8.F.A.2
9	1	8.F.A.2

Notes:

Additional Practice

3.05

Problems 1–4: Clara has an account to pay for her school lunches. Each time Clara buys lunch, \$3.00 is subtracted from the amount available in her account. This graph shows the amount of money available in her account, y , after buying x lunches.



- How much money was initially in Clara's account? Explain how you know.

\$30. The vertical intercept represents the starting amount.

- Complete the table.

Number of Lunches bought (x)	0	1	2	...	8
Amount of Money in Account	30	27	24	...	6

- Write an equation that represents the amount of money remaining in Clara's account, y , after buying x lunches.

$y = 30 - 3x$

- After how many lunches will Clara's account run out of money? Show or explain your thinking.

Explanations vary. 10 lunches. The horizontal intercept represents how many lunches can be purchased before the account runs out of money.

Problems 5–7: Mai’s family is planning a trip and staying at a hotel. Mai estimates their average speed and graphed her expected progress on the trip. The graph shows the remaining distance d in miles to the hotel after driving h hours.

5. How far does Mai’s family live from the hotel? Explain how you know.

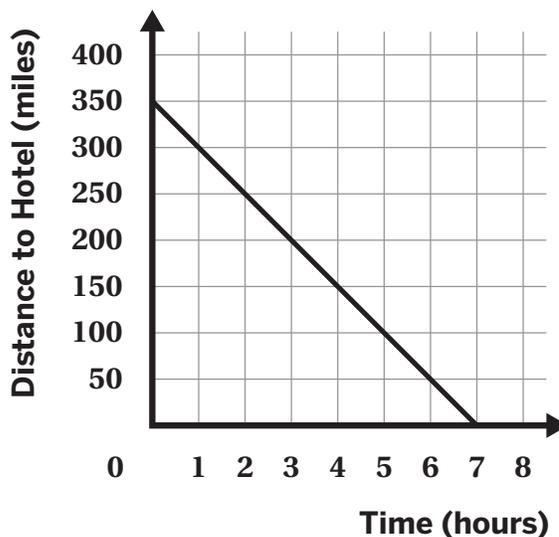
350 miles. The vertical intercept represents the starting amount.

6. Write an equation that describes the relationship between d and h . Show or explain your thinking.

$y = 350 - 50x$; The slope of the line is -50 and the y -intercept is 350 .

7. Approximately how long will it take Mai’s family to arrive at the hotel? Explain or show your thinking.

7 hours; The horizontal intercept represents how many hours it will take until the distance of 350 has been reached.



8. Which graph has a horizontal intercept of $(-4, 0)$?

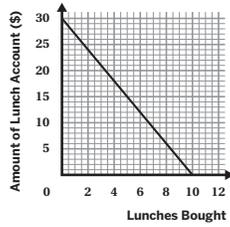
<p>A.</p>	<p>B.</p>
<p>C.</p>	<p>D.</p>

Name: _____ Date: _____ Period: _____

Additional Practice

3.05

Problems 1–4: Clara has an account to pay for her school lunches. Each time Clara buys lunch, \$3.00 is subtracted from the amount available in her account. This graph shows the amount of money available in her account, y , after buying x lunches.



- How much money was initially in Clara's account? Explain how you know.
\$30. The vertical intercept represents the starting amount.

- Complete the table.

Number of Lunches bought (x)	0	1	2	...	8
Amount of Money in Account	30	27	24	...	6

- Write an equation that represents the amount of money remaining in Clara's account, y , after buying x lunches.

$y = 30 - 3x$

- After how many lunches will Clara's account run out of money? Show or explain your thinking.

Explanations vary. 10 lunches. The horizontal intercept represents how many lunches can be purchased before the account runs out of money.

Unit 3 Lesson 5

55

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 5–7: Mai's family is planning a trip and staying at a hotel. Mai estimates their average speed and graphed her expected progress on the trip. The graph shows the remaining distance d in miles to the hotel after driving h hours.

- How far does Mai's family live from the hotel? Explain how you know.

350 miles. The vertical intercept represents the starting amount.

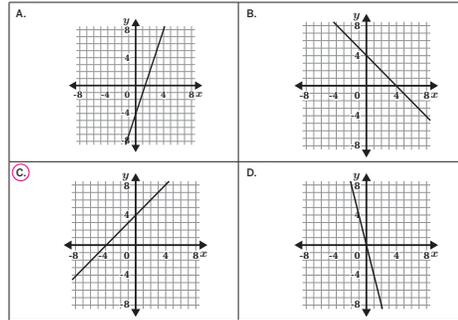
- Write an equation that describes the relationship between d and h . Show or explain your thinking.

$y = 350 - 50x$; The slope of the line is -50 and the y -intercept is 350.

- Approximately how long will it take Mai's family to arrive at the hotel? Explain or show your thinking.

7 hours: The horizontal intercept represents how many hours it will take until the distance of 350 has been reached.

- Which graph has a horizontal intercept of $(-4, 0)$?



Unit 3 Lesson 5

56

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	8.F.A.3
2	1	8.F.1
3	1	8.F.A.4
4	2	8.F.A.3
5	2	8.F.A.3
6	1	8.F.A.4
7	2	8.F.A.3
8	1	8.

Notes:

Additional Practice

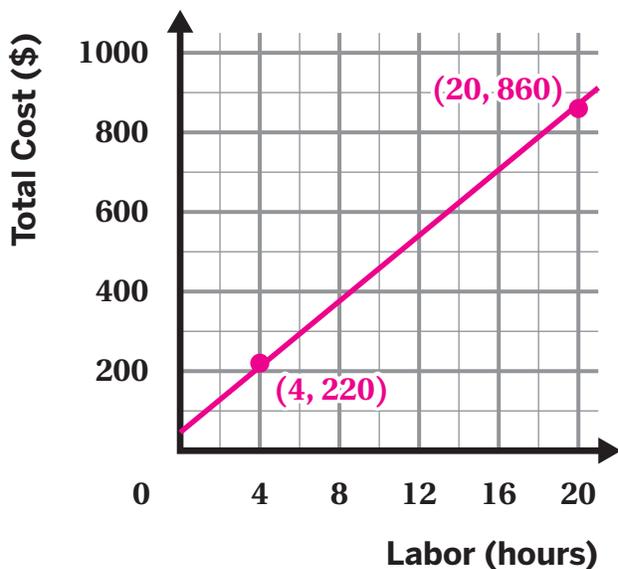
3.07

Problems 1–4: For any service call, an electrician charges \$60, plus \$40 for each hour of labor.

- How much would the electrician charge for a service call that needs 4 hours of labor? 20 hours of labor? Write your answers in the table.

Labor (hours)	Total cost (\$)
4	220
20	860

- Draw a line representing the relationship between the number of hours of labor for a service call and the total cost of the electrician's visit.



- Plot and label two points on the graph from Problem 1.

- What is the slope of the line? What does it represent?

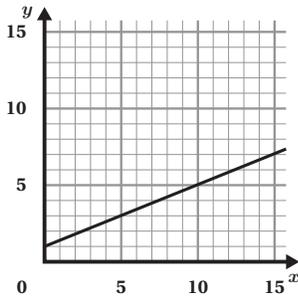
40; The slope represents the rate for 1 hour of labor.

- A flower shop allows you to purchase additional flowers, x , to add to the total cost of your arrangement, y . The line representing the relationship between x and y has a slope of 2.75 and a y -intercept of 25.25. Explain what the slope and y -intercept represent in this situation.

The slope represents the cost of \$2.75 for each additional flower added to the arrangement. The y -intercept of \$25.25 represents the cost of the initial flower arrangement before any additional flowers are added.

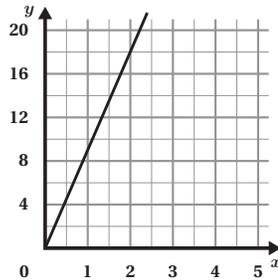
Problems 6–9: For each real-world situation, choose the graph that best represents it.

Graph A



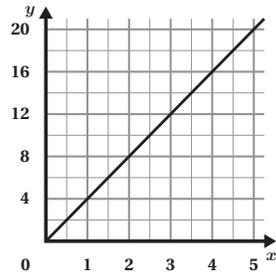
7

Graph B



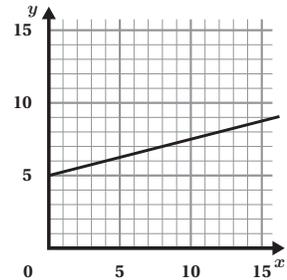
9

Graph C



6

Graph D



8

6. y represents the total amount earned and x represents the number of hours worked. The slope of the line representing the relationship between x and y is 9.

7. y represents the cost of a scoop of ice cream and x represents the cost of each topping. The slope of the line representing the relationship between y and x is 4.

8. y represents the perimeter of a square and x represents its side length. The slope of the line representing the relationship between x and y is 0.25.

9. y represents the cost of mailing a 1-ounce package and x represents the cost added for each additional ounce. The slope of the line representing the relationship between x and y is 0.40.

Name: _____ Date: _____ Period: _____

Additional Practice

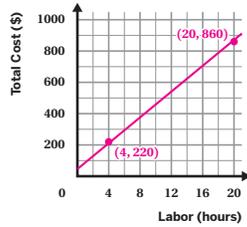
3.07

Problems 1–4: For any service call, an electrician charges \$60, plus \$40 for each hour of labor.

1. How much would the electrician charge for a service call that needs 4 hours of labor? 20 hours of labor? Write your answers in the table.

Labor (hours)	Total cost (\$)
4	220
20	860

2. Draw a line representing the relationship between the number of hours of labor for a service call and the total cost of the electrician's visit.



3. Plot and label two points on the graph from Problem 1.

4. What is the slope of the line? What does it represent?
40; The slope represents the rate for 1 hour of labor.

5. A flower shop allows you to purchase additional flowers, x , to add to the total cost of your arrangement, y . The line representing the relationship between x and y has a slope of 2.75 and a y -intercept of 25.25. Explain what the slope and y -intercept represent in this situation.

The slope represents the cost of \$2.75 for each additional flower added to the arrangement. The y -intercept of \$25.25 represents the cost of the initial flower arrangement before any additional flowers are added.

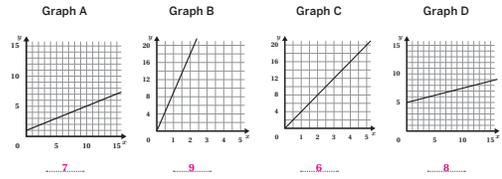
Unit 3 Lesson 7

59

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

Problems 6–9: For each real-world situation, choose the graph that best represents it.



6. y represents the total amount earned and x represents the number of hours worked. The slope of the line representing the relationship between x and y is 9.
7. y represents the cost of a scoop of ice cream and x represents the cost of each topping. The slope of the line representing the relationship between y and x is 4.
8. y represents the perimeter of a square and x represents its side length. The slope of the line representing the relationship between x and y is 0.25.
9. y represents the cost of mailing a 1-ounce package and x represents the cost added for each additional ounce. The slope of the line representing the relationship between x and y is 0.40.

Unit 3 Lesson 7

60

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.F.B.4
2	1	8.F.B.4
3	1	8.F.B.4
4	2	8.F.B.4
5	2	8.F.B.4
6	2	8.F.B.4
7	2	8.F.B.4
8	2	8.F.B.4
9	2	8.F.B.4

Notes:

Additional Practice

3.08

1. Select all the equations whose graphs have the same y -intercept.

A. $y = \frac{1}{2}x + 4$

D. $y = -2x + \frac{1}{2}$

B. $y = \frac{1}{3}x - 2$

E. $y = \frac{1}{2}x - 2$

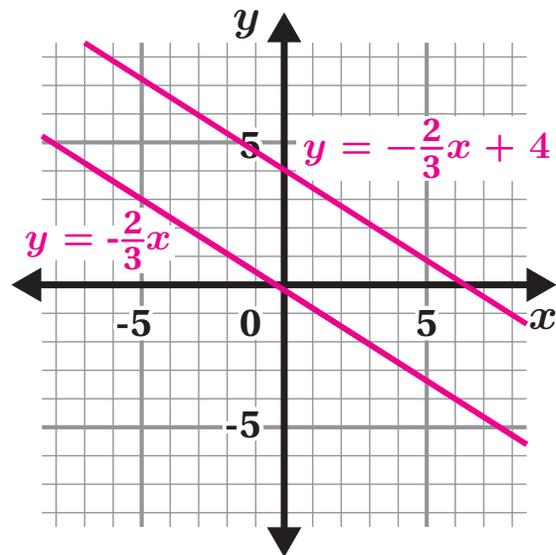
C. $y = 4x - 2$

Problems 2–3: Here is a coordinate plane.

2. Graph the equations $y = -\frac{2}{3}x$ and $y = -\frac{2}{3}x + 4$.

3. How are the graphs alike? How are they different?

Explanations vary. Both lines have the same slope but the line $y = -\frac{2}{3}x$ is translated 4 units up to produce line $y = -\frac{2}{3}x + 4$, so they have different y -intercepts.



Problems 4–5: A streaming music service service changes \$6 per month of service to existing customers. For new customers, there is an additional one-time sign-up fee of \$10.

4. Write a linear equation representing the relationship between x , the number of months of service, and y , the total amount paid in dollars by a customer.

Existing customer: $y = 6x$

New customer: $y = 6x + 10$

5. When the two equations are graphed on the coordinate plane, how are the graphs similar? How are they different?

Explanations vary. Both lines have the same slope but the line $y = 6x$ is translated 10 units up to produce line $y = 6x + 10$, so they have different y -intercepts.

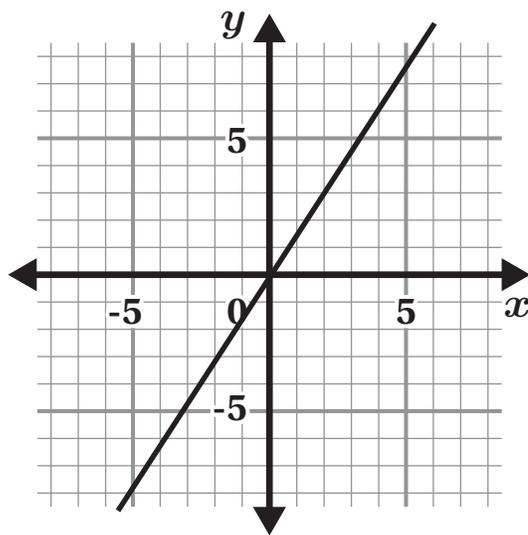
6. Here is the graph of line n . Which equation represents a line that is a translation of line n ?

A. $y = \frac{3}{2}x - 4$

B. $y = 4x - \frac{2}{3}$

C. $y = \frac{2}{3}x + 1$

D. $y = -\frac{2}{3}x - 6$

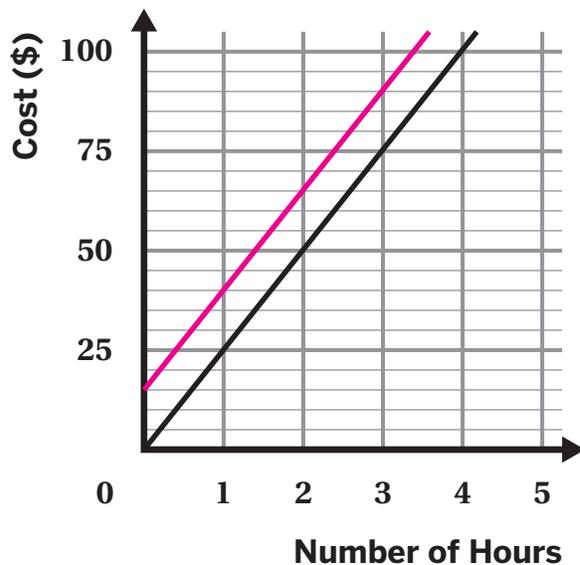


Problems 7–8: A driving range charges \$25 per hour for renting a space to hit golf balls. Here is a graph that represents the cost, y , of renting a space for x hours.

7. Write an equation that represents the cost, y , of bowling x games without renting any shoes.

$y = 25x$

8. Daniel went to the driving range and also rented a bucket of balls for \$15. On the same coordinate plane, graph the relationship that represents the amount of money, y , that Daniel would spend after spending x hours at the driving range.



9. Write an equation for the relationship you graphed in Problem 8.

$y = 25x + 15$

Name: _____ Date: _____ Period: _____

Additional Practice

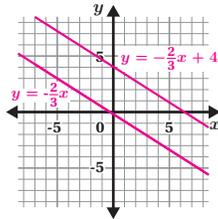
3.08

1. Select all the equations whose graphs have the same y -intercept.

- A. $y = \frac{1}{2}x + 4$ D. $y = -2x + \frac{1}{2}$
 B. $y = \frac{1}{3}x - 2$ E. $y = \frac{1}{2}x - 2$
 C. $y = 4x - 2$

Problems 2–3: Here is a coordinate plane.

2. Graph the equations $y = -\frac{2}{3}x$ and $y = -\frac{2}{3}x + 4$.



3. How are the graphs alike? How are they different?

Explanations vary. Both lines have the same slope but the line $y = -\frac{2}{3}x$ is translated 4 units up to produce line $y = -\frac{2}{3}x + 4$, so they have different y -intercepts.

Problems 4–5: A streaming music service service charges \$6 per month of service to existing customers. For new customers, there is an additional one-time sign-up fee of \$10.

4. Write a linear equation representing the relationship between x , the number of months of service, and y , the total amount paid in dollars by a customer.

Existing customer: $y = 6x$

New customer: $y = 6x + 10$

5. When the two equations are graphed on the coordinate plane, how are the graphs similar? How are they different?

Explanations vary. Both lines have the same slope but the line $y = 6x$ is translated 10 units up to produce line $y = 6x + 10$, so they have different y -intercepts.

Unit 3 Lesson 8

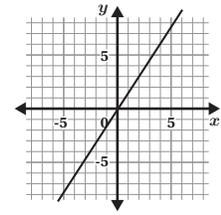
61

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

6. Here is the graph of line n . Which equation represents a line that is a translation of line n ?

- A. $y = \frac{3}{2}x - 4$
 B. $y = 4x - \frac{2}{3}$
 C. $y = \frac{2}{3}x + 1$
 D. $y = -\frac{2}{3}x - 6$

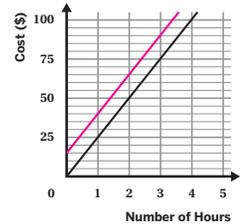


Problems 7–8: A driving range charges \$25 per hour for renting a space to hit golf balls. Here is a graph that represents the cost, y , of renting a space for x hours.

7. Write an equation that represents the cost, y , of bowling x games without renting any shoes.

$y = 25x$

8. Daniel went to the driving range and also rented a bucket of balls for \$15. On the same coordinate plane, graph the relationship that represents the amount of money, y , that Daniel would spend after spending x hours at the driving range.



9. Write an equation for the relationship you graphed in Problem 8.

$y = 25x + 15$

Unit 3 Lesson 8

62

Additional Practice

Practice Problem Analysis

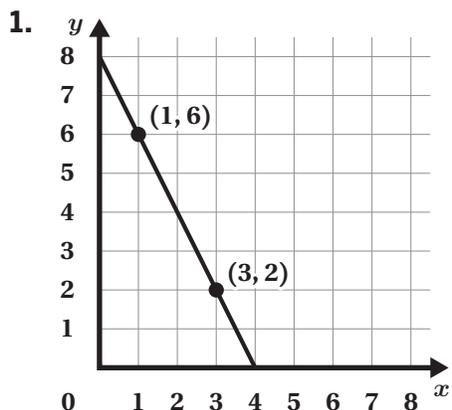
Problem	DOK	Standard(s)
1	1	8.EE.B.6
2	1	8.EE.B.6
3	2	8.G.A.1
4	1	8.F.B.4, 8.G.A.1
5	2	8.G.A.1
6	1	8.G.A.1
7	1	8.F.B.4
8	2	8.F.B.4, 8.G.A.1
9	1	8.F.B.4, 8.G.A.1

Notes:

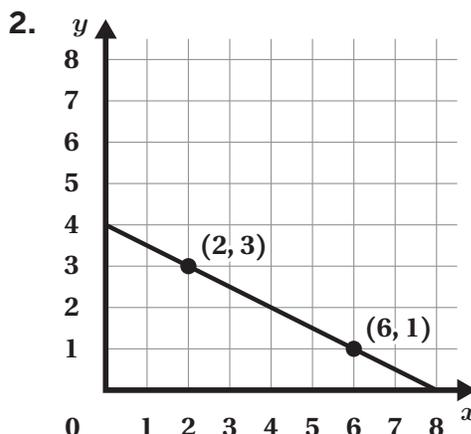
Additional Practice

3.09

Problems 1–2: Determine the slope of each line. Show your thinking.



Slope = -2 , or equivalent

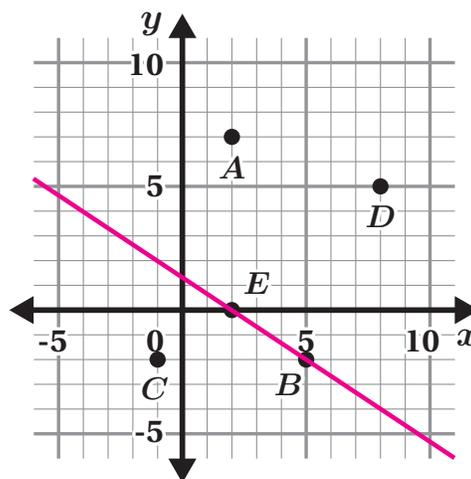


Slope = $-\frac{1}{2}$, or equivalent

3. Draw a line with a slope of $-\frac{2}{3}$ that passes through point B.

What other point lies on that line?

Point E



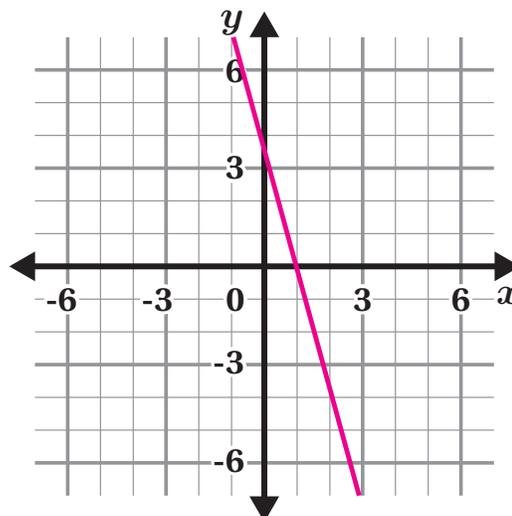
Problems 4–5: Here is a blank graph.

4. Draw a line with a slope of -3 and a positive y -intercept.

Answers will vary.

5. Explain how you know the slope of your line is -3 .

Explanations vary. The slope triangle has a negative vertical change and a positive horizontal change.



Problems 6–8: All the points in this graph are on the same line.

6. What is the slope of the line?

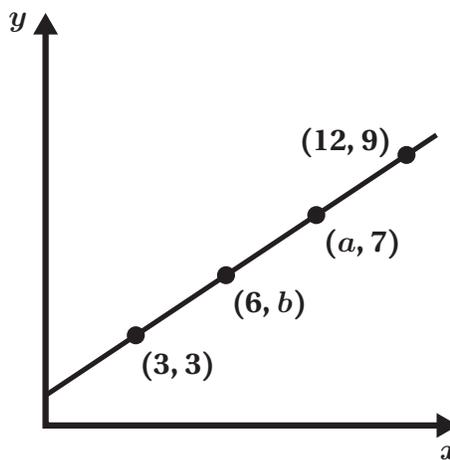
Explain your thinking.

Explanations vary. The slope is $\frac{2}{3}$. I found the slope of the line using points (12,9) and (3,3).

$$\text{slope} = \frac{9-3}{12-3} = \frac{6}{9} = \frac{2}{3}$$

7. What are the values for a and b ?

$$a = 9; b = 5$$



8. What is the x -value when $y = 0$?

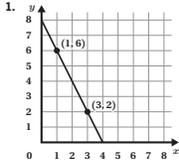
Show or explain your thinking.

Methods vary. $x = -\frac{3}{2}$. I use a table of values and the slope to determine the x -value when $y = 0$.

Name: _____ Date: _____ Period: _____

Additional Practice 3.09

Problems 1–2: Determine the slope of each line. Show your thinking.



Slope = -2 , or equivalent.

3. Draw a line with a slope of $-\frac{2}{3}$ that passes through point B.

What other point lies on that line?

Point E

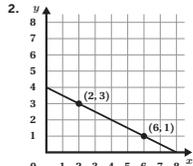
Problems 4–5: Here is a blank graph.

4. Draw a line with a slope of -3 and a positive y -intercept.

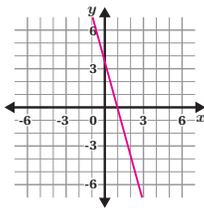
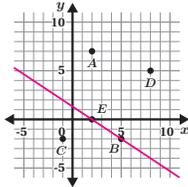
Answers will vary.

5. Explain how you know the slope of your line is -3 .

Explanations vary. The slope triangle has a negative vertical change and a positive horizontal change.



Slope = $-\frac{1}{2}$, or equivalent.



Unit 3 Lesson 9

63

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

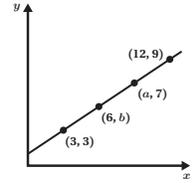
Name: _____ Date: _____ Period: _____

Problems 6–8: All the points in this graph are on the same line.

6. What is the slope of the line? Explain your thinking.

Explanations vary. The slope is $\frac{2}{3}$. I found the slope of the line using points $(12, 9)$ and $(3, 3)$.

$$\text{slope} = \frac{9-3}{12-3} = \frac{6}{9} = \frac{2}{3}$$



7. What are the values for a and b ?

$$a = 9; b = 5$$

8. What is the x -value when $y = 0$? Show or explain your thinking.

Methods vary. $x = -\frac{3}{2}$. I use a table of values and the slope to determine the x -value when $y = 0$.

Unit 3 Lesson 9

64

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	1	8.EE.B.6
2	1	8.EE.B.6
3	1	8.EE.B.6
4	1	8.EE.B.6
5	2	8.EE.B.6
6	1	8.EE.B.6
7	2	8.EE.B.6
8	2	8.EE.B.6

Notes:

Additional Practice

3.10

1. Diego is finding the slope of the line that passes through the points (10, 8) and (14, 10). His work is shown. Review his work. Find and fix any errors.

Diego's work:

$$\text{Slope} = \frac{10 - 8}{10 - 14} = \frac{2}{-4} = -\frac{1}{2}$$

Explanations vary. Diego is incorrect. He subtracted the x -values in the wrong order.

$$\text{Slope} = \frac{10 - 8}{14 - 10} = \frac{2}{4} = \frac{1}{2}$$

2. A cooler of water is draining. After 4 minutes, there are 16 quarts remaining. After 6 minutes, there are 8 quarts remaining.

Write an equation for the amount of water remaining, y , in the cooler after x minutes.

Methods vary.
 The slope of the line = $\frac{16 - 8}{4 - 6} = \frac{8}{-2} = -4$.
 $y = -4x + b$

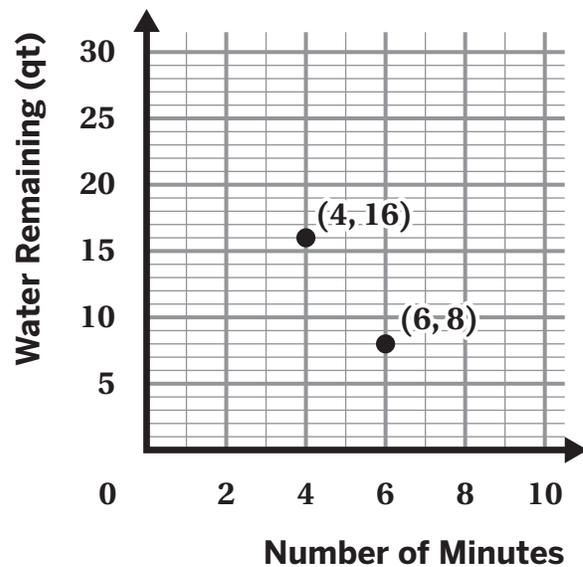
Substituting (6, 8) in for x and y

$$8 = -4(6) + b$$

$$8 = -24 + b$$

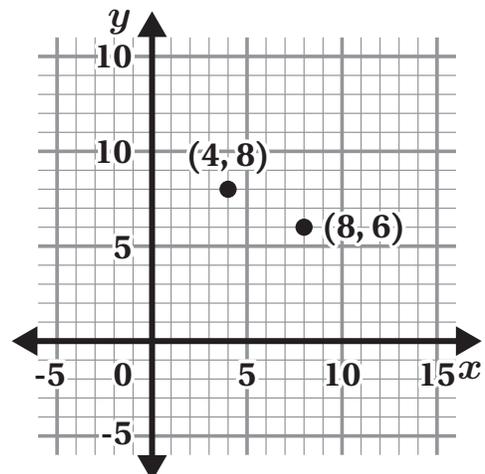
$$32 = b$$

The equation of the line is $y = -4x + 32$.

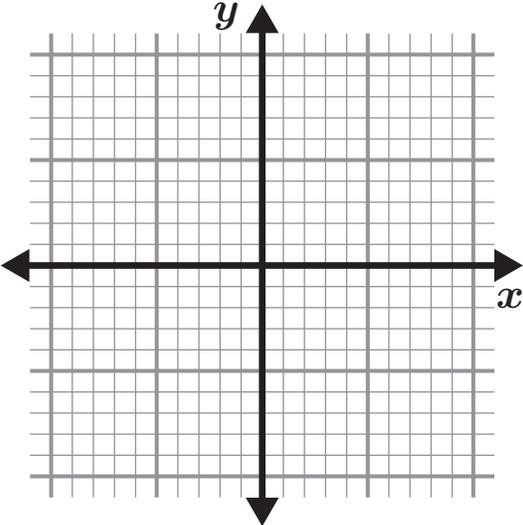
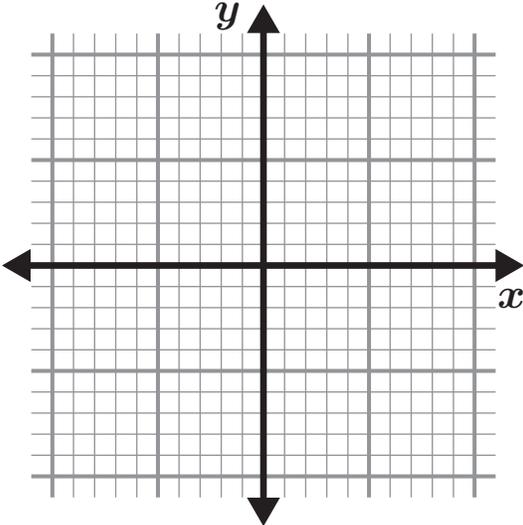


3. Here is a graph showing the points (4, 8) and (8, 6). What is the y -intercept of the line that passes through these points?

Methods vary. The y -intercept is 10.



Problems 4–5: Write the equation of the line that passes through each pair of points. Show your work, and use the coordinate plane if it helps with your thinking.

<p>4. (3, 6) and (4, 10)</p> <p><i>Methods vary.</i> The slope of the line = $\frac{10 - 6}{4 - 3} = \frac{4}{1} = 4$. $y = 4x + b$</p> <p>Substituting (3, 6) in for x and y.</p> $6 = 4(3) + b$ $6 = 12 + b$ $-6 = b$ <p>The equation of the line is $y = 4x - 6$.</p>	<p>5. (−5, 4) and (−1, 2)</p> <p><i>Methods vary.</i> The slope of the line = $\frac{2 - 4}{-1 + 5} = \frac{-2}{4} = -\frac{1}{2}$. $y = -\frac{1}{2}x + b$</p> <p>Substituting (−1, 2) in for x and y.</p> $2 = -\frac{1}{2}(-1) + b$ $2 = \frac{1}{2} + b$ $1\frac{1}{2} = b$ <p>The equation of the line is $y = -\frac{1}{2}x + 1\frac{1}{2}$.</p>
	

6. Which equation represents the line that passes through points (−8, 12) and (4, 6)?

A. $y = \frac{1}{2}x + 8$

B. $y = \frac{1}{2}x - 2$

C. $y = -\frac{1}{2}x + 8$

D. $y = -\frac{1}{2}x - 2$

Name: _____ Date: _____ Period: _____

Additional Practice

3.10

1. Diego is finding the slope of the line that passes through the points (10, 8) and (14, 10). His work is shown. Review his work. Find and fix any errors.

Diego's work:

$$\text{Slope} = \frac{10 - 8}{10 - 14} = \frac{2}{-4} = -\frac{1}{2}$$

Explanations vary. Diego is incorrect. He subtracted the x -values in the wrong order.
Slope = $\frac{10 - 8}{14 - 10} = \frac{2}{4} = \frac{1}{2}$

2. A cooler of water is draining. After 4 minutes, there are 16 quarts remaining. After 6 minutes, there are 8 quarts remaining. Write an equation for the amount of water remaining, y , in the cooler after x minutes.

Methods vary. The slope of the line = $\frac{16 - 8}{4 - 6} = \frac{8}{-2} = -4$.
 $y = -4x + b$

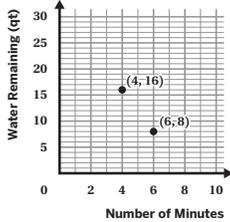
Substituting (6, 8) in for x and y

$$8 = -4(6) + b$$

$$8 = -24 + b$$

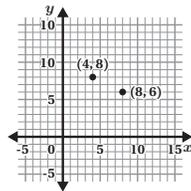
$$32 = b$$

The equation of the line is $y = -4x + 32$.



3. Here is a graph showing the points (4, 8) and (8, 6). What is the y -intercept of the line that passes through these points?

Methods vary. The y -intercept is 10.



Unit 3 Lesson 10

65

© Amplify Education, Inc. and its licensors. Amplify Desmos Math is based on curricula from Illustrative Mathematics (IM).

Name: _____ Date: _____ Period: _____

- Problems 4–5: Write the equation of the line that passes through each pair of points. Show your work, and use the coordinate plane if it helps with your thinking.

4. (3, 6) and (4, 10)

Methods vary. The slope of the line = $\frac{10 - 6}{4 - 3} = \frac{4}{1} = 4$.
 $y = 4x + b$

Substituting (3, 6) in for x and y .

$$6 = 4(3) + b$$

$$6 = 12 + b$$

$$-6 = b$$

The equation of the line is $y = 4x - 6$.

5. (-5, 4) and (-1, 2)

Methods vary. The slope of the line = $\frac{2 - 4}{-1 - 5} = \frac{-2}{-6} = \frac{1}{3}$.
 $y = \frac{1}{3}x + b$

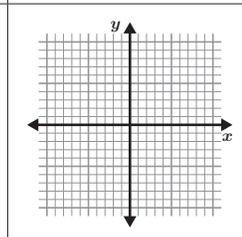
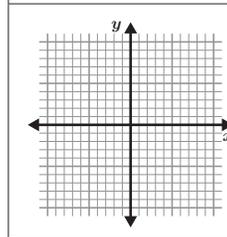
Substituting (-1, 2) in for x and y .

$$2 = \frac{1}{3}(-1) + b$$

$$2 = \frac{1}{3} + b$$

$$1\frac{2}{3} = b$$

The equation of the line is $y = \frac{1}{3}x + 1\frac{2}{3}$.



6. Which equation represents the line that passes through points (-8, 12) and (4, 6)?

A. $y = \frac{1}{2}x + 8$

B. $y = \frac{1}{2}x - 2$

C. $y = -\frac{1}{2}x + 8$

D. $y = -\frac{1}{2}x - 2$

Unit 3 Lesson 10

66

Additional Practice

Practice Problem Analysis

Problem	DOK	Standard(s)
1	2	8.EE.B.6
2	1	8.F.B.4
3	1	8.EE.B.6
4	1	8.F.B.4
5	1	8.F.B.4
6	1	8.F.B.4

Notes: