## Warm-Up

1.    Share three numbers that describe you. The top row is an example.

| Number | Explanation |
|--------|-------------|
| 4 | I've lived in 4 different places in my life. |
|  |  |
|  |  |
|  |  |

2.    Share a number that represents something that . . .

|  | Number | Explanation |
|--|--------|-------------|
| . . . is important to you. |  |  |
| . . . is important to your family, friends, or community. |  |  |
| . . . makes you smile. |  |  |

## Practice

Fill in the blanks to complete each pattern.

3.1    7, 18, 29, _____, _____, _____ …          4.1    360, 180, 90, _____, _____, _____ …
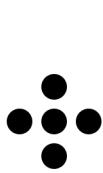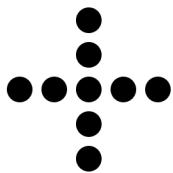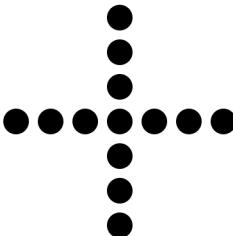
3.2    7, 14, 28, _____, _____, _____ …          4.2    6, 18, _____, 162, _____, _____ …

3.3    51, 47, 43, _____, _____, _____ …          4.3    _____, 202, _____, 166, 148, …

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**Unit A1.1, Lesson 2: Practice Problems**

5.1   Here is a visual pattern. Sketch figure 4.



Figure 1          Figure 2          Figure 3

5.2   Complete the table with the number of dots in each figure.

| Figure | 1 | 2 | 3 | 4 | 6 | 10 |
|--------|---|---|---|---|---|----|
| Dots   |   |   |   |   |   |    |

## Explore

6.1   Make your own pattern by creating figures 1 and 3.



Figure 1          Figure 2          Figure 3

| Figure | Dots |
|--------|------|
| 1      |      |
| 2      | 3    |
| 3      |      |

6.2   How many dots will figure 8 of your pattern have?

## Reflect

1.   Put a heart next to the problem you feel most confident about.
2.   Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Determine the value of each expression when $x = 3$.

$$7x - 8$$

$$5(x + 9)$$

$$\frac{x-6}{4x}$$

## Practice

Here is a visual pattern.

2.  Complete the table with the number of tiles in each figure.
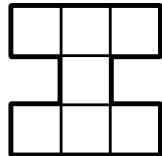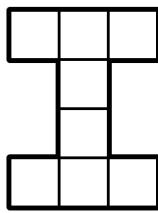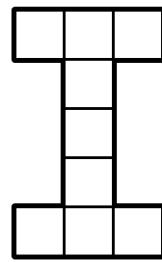


Figure 1      Figure 2      Figure 3

| Figure | Tiles |
|--------|-------|
| 1      |       |
| 2      |       |
| 3      |       |
| 4      |       |

3.  Anushka wrote the following expressions for the number of tiles in figures 1, 2, and 3.

| Figure 1 | Figure 2 | Figure 3 |
|----------|----------|----------|
| $3 + 1 + 3$ | $3 + 2 + 3$ | $3 + 3 + 3$ |

Show or explain where you see the $3 + 1 + 3$ in figure 1.

4.  Use Anushka's expressions to determine the number of tiles in figures 7, 15, and $n$.

| Figure | Tiles |
|--------|-------|
| 7      |       |
| 15     |       |
| $n$    |       |

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**Unit A1.1, Lesson 3: Practice Problems**

5. Select **all** of the expressions that could represent the number of tiles in figure $n$ of this pattern.

☐ $5 + n$
☐ $5n + 1$
☐ $6n - 1$
☐ $10n - 4$
☐ $5(n + 1) - 4$
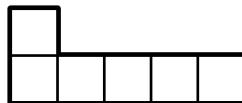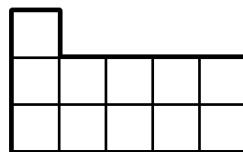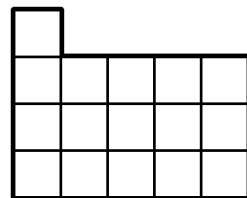
Figure 1          Figure 2          Figure 3

6. Select one of the expressions you chose above and use it to complete the table.

Expression: _____

| Figure, $n$ | 1 | 2 | 3 | 4 | 8 | 10 |
|---|---|---|---|---|---|---|
| **Number of Tiles** | | | | | | |

## Looking Back

DesTunes is a new music streaming service.

Write an equation to represent each scenario, where $x$ represents the number of months of DesTunes and $y$ represents the total charge.

| Scenario | | Equation |
|---|---|---|
| 7.1 | DesTunes charges adults $15 per month. | |
| 7.2 | DesTunes charges students a $20 sign-up fee and then $5 per month. | |

## Reflect

1. Put a question mark next to a problem you would like to compare with a classmate.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.   Calculate the value of each expression.

$$2^3 + 4^2$$

$$(10 - 7)^3$$
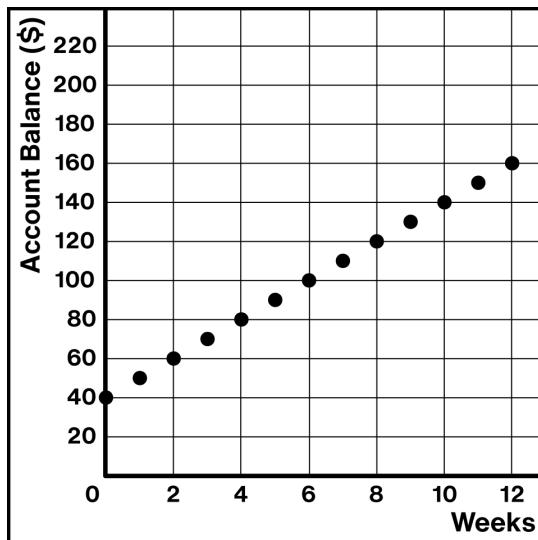
$$5^2 + 10(6)$$

## Practice

Chloe starts with $40 in her bank account and then deposits $10 each week.

This graph shows her account balance (the amount of money in the account) over time.

2.1   Circle the point on the graph that represents Chloe's balance after 4 weeks.

2.2   What is her balance after 4 weeks?

2.3   How many weeks does it take Chloe to have $140 in her bank account?
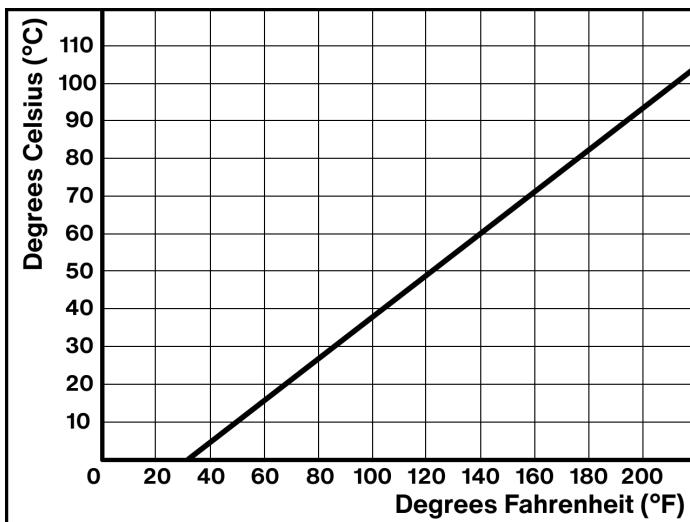


3.1   Complete the table.

3.2   Write an expression for Chloe's account balance after $w$ weeks.

| Weeks | Account Balance ($) |
|-------|---------------------|
| 0     |                     |
| 1     |                     |
| 3     |                     |
| 12    |                     |
| 20    |                     |

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**Unit A1.1, Lesson 4: Practice Problems**

4.   There are two common ways to measure temperature: degrees Celsius (°C) and degrees
     Fahrenheit (°F). Water boils at 100°C and freezes at 0°C.

     Use the graph to determine each temperature in degrees Fahrenheit (°F).



| | Degrees Fahrenheit (°F) |
|---|---|
| Boiling Water (100°C) | |
| Freezing Water (0°C) | |

5.   A thermometer shows the temperature outside is 90°. Which units is the thermometer more
     likely using? Explain your choice using information from the graph.

## Explore

6.1   The thickness of a piece of paper is $0.001$ cm. Imagine folding the paper in half many times.
      After 1 fold, the paper will be $0.002$ cm thick. After 2 folds, the paper will be $0.004$ cm thick.
      How thick will the paper be after 10 folds?

6.2   If it were physically possible, how many folds would it take to make the paper as tall as you
      are?

## Reflect

1.   Put a heart next to a question that you understand well.
2.   Use the space below to ask a question or share something you are proud of.

## Warm-Up

1. Determine the value of each expression when $n = 4$.

$$n^2 - 5$$          $$n(n + 6)$$          $$3n^2$$

## Practice

The tables show the number of red and yellow globs each day.

2. How many of each type of glob will there be on day 4?

| Day | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Red Globs | 50 | 70 | 90 | 110 | |

| Day | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Yellow Globs | 5 | 10 | 20 | 40 | |
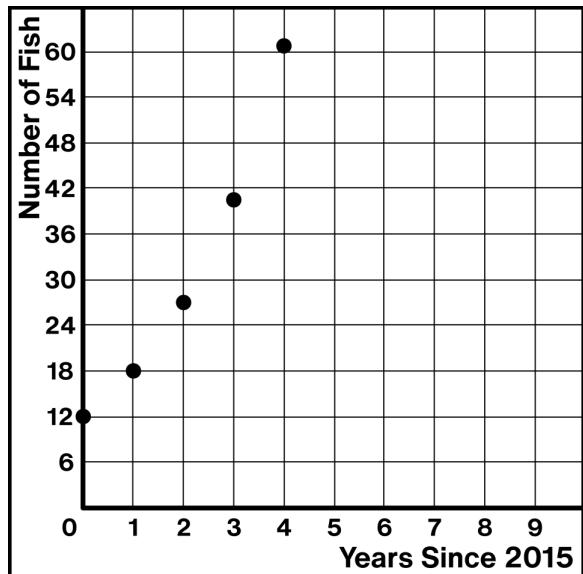
3. Will there be more red or yellow globs on day 10? Show or explain your thinking.

4. Which group of globs grows by a *constant ratio*? Show or explain how you know.

This graph shows the number of fish in a pond from 2015 to 2019.

5.1 How many fish are in the pond in 2015?

5.2 Does the number of fish grow by a *constant difference*? Show or explain how you know.

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**Unit A1.1, Lesson 5: Practice Problems**

Determine whether each table or graph shows a constant difference or a constant ratio.
Circle your choice.
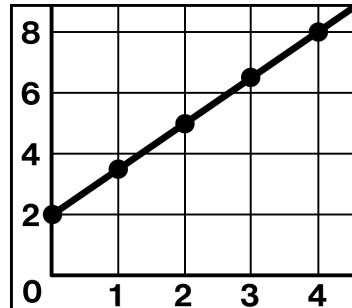
6.1

| $x$ | $y$ |
|-----|-----|
| 0 | 4 |
| 1 | 8 |
| 2 | 16 |
| 3 | 32 |
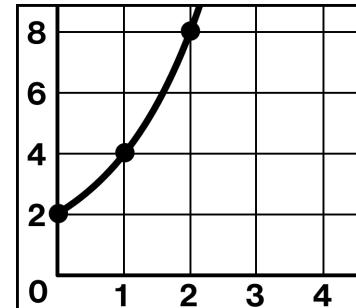
Constant difference

Constant ratio

6.2

| $x$ | $y$ |
|-----|-----|
| 0 | 4 |
| 1 | 8 |
| 2 | 12 |
| 3 | 16 |

Constant difference

Constant ratio

6.3



Constant difference

Constant ratio

6.4
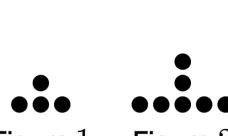


Constant difference

Constant ratio

## Looking Back
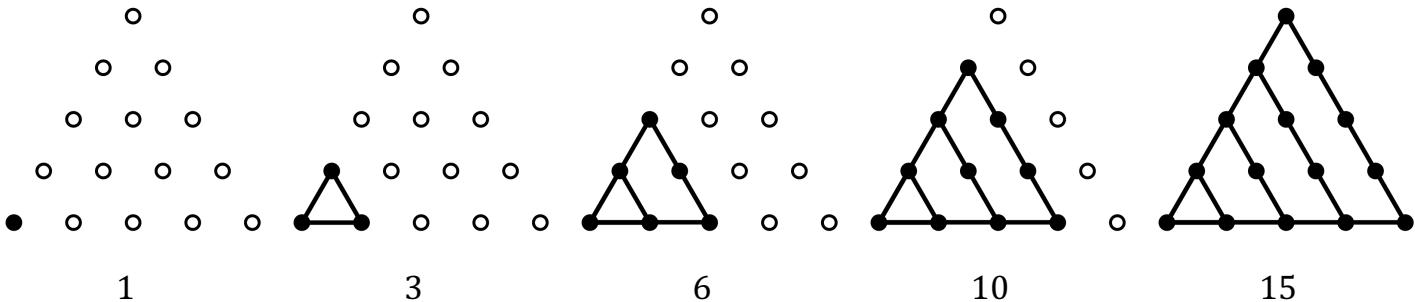
7.  Here are the first four figures in a pattern.

    Write an expression for the number of dots in figure $n$.



Figure 1    Figure 2    Figure 3    Figure 4

## Explore

8.  A triangular number is one that can be represented as all the dots in an equilateral triangle.



1          3          6          10          15

What patterns do you notice? What do you wonder?

## Warm-Up

1.  Write each expression using an exponent. An example is shown.

$3 \cdot 3 \cdot 3 \cdot 3 = 3^4$          $\left(\dfrac{4}{5}\right) \cdot \left(\dfrac{4}{5}\right) \cdot \left(\dfrac{4}{5}\right) = $ _____

$7 \cdot 7 \cdot 7 \cdot 7 \cdot 7 = $ _____          $9.3 \cdot 9.3 \cdot 9.3 \cdot 9.3 \cdot 9.3 \cdot 9.3 \cdot 9.3 = $ _____

## Practice

2.1  Circle the equation that matches the table.

| $x$ | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| $y$ | 5 | 10 | 20 | 40 | 80 |

$y = 5 + 2x$          $y = 5^x$

$y = 5 \cdot 2^x$          $y = 5 + 2^x$

2.2  Explain your choice.



3.  The population of a city was 100 000 in 1970. The population has **doubled** 3 times since 1970. Select **all** the expressions that represent the population of the town today.

☐  300 000

☐  800, 000

☐  100, 000 $\cdot$ 2 $\cdot$ 2 $\cdot$ 2

☐  100, 000 $\cdot$ $3^2$

☐  100, 000 $\cdot$ $2^3$

4.  Complete the table.

| Starting Value | Common Ratio | Equation |
|---|---|---|
| 2 | | $y = 2 \cdot 3^x$ |
| 10 | 4 | |
| | | $y = 8 \cdot 5^x$ |
| | | $y = 2^x$ |

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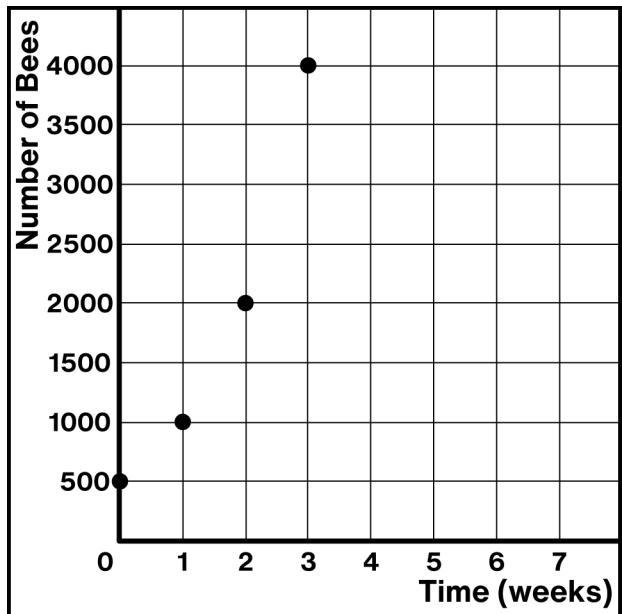
**Unit A1.1, Lesson 7: Practice Problems**

A group of scientists are tracking a population of bees. They count the number of bees each week in spring.
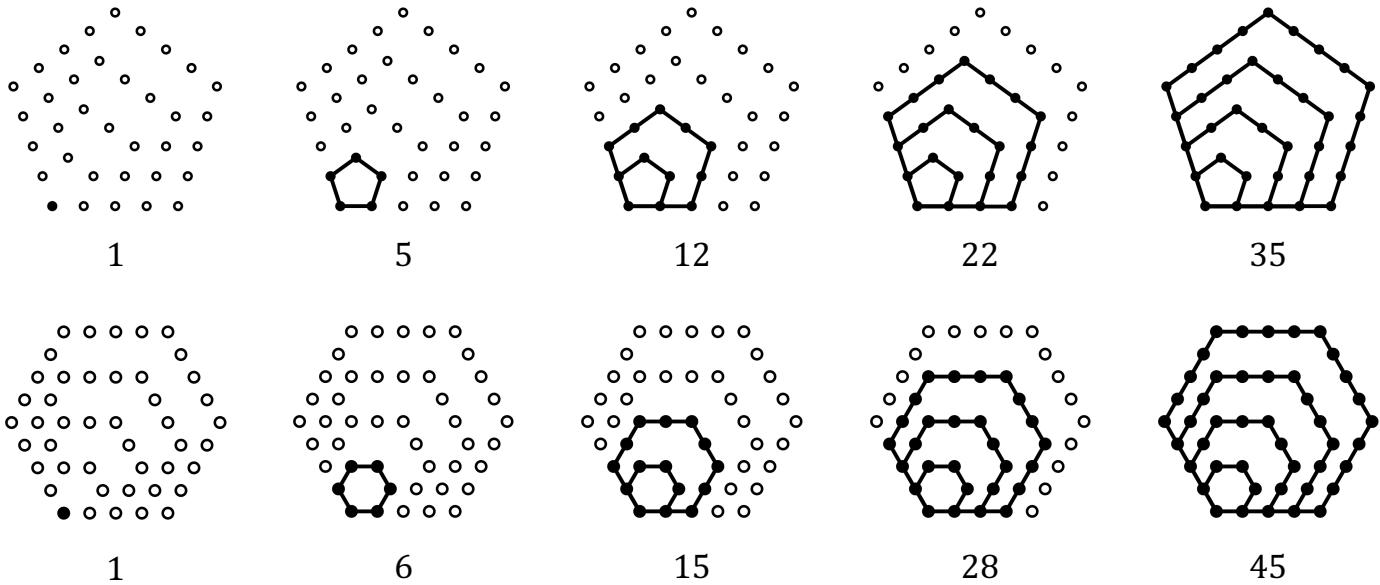
5.1 How many bees were there at the beginning of Spring?

5.2 How many weeks will it be until there are 4000 bees?



6. Does the number of bees represent a *linear relationship*, *exponential relationship*, or neither. Show or explain how you know.

## Explore

7. Here are some examples of pentagonal and hexagonal numbers.



| 1 | 5 | 12 | 22 | 35 |



| 1 | 6 | 15 | 28 | 45 |

What patterns do you notice? What do you wonder?

# desmos ✏ Science Mom Lesson 6

**Unit A1.1, Lesson 8: Practice Problems**  Name _____

## Warm-Up

1.  Determine the value of each expression.

$$3^3 \qquad\qquad 2(3^3) \qquad\qquad 3^3 + 4 \qquad\qquad 2 \cdot 3^3 + 4$$

## Practice

Carlos has a pack of toy fish whose mass **doubles** every hour when you add water.
This table shows the mass of a toy fish over time.

| Time (hours) | Mass (grams) |
|---|---|
| 0 | |
| 1 | 30 |
| 2 | 60 |
| 3 | 120 |
| 4 | 240 |

2.1.  What was the mass of the toy fish before it was in water?

2.2.  What will the mass of the toy fish be after 7 hours?

3.  Wohali buys another brand of toy fish that claims to grow faster than Carlos's fish.

Wohali wrote this equation: $m = 10 \cdot 3^t$. He used $m$ for mass and $t$ for time.

Explain what the 10 and the 3 mean in this situation.

10 means . . .

3 means . . .

4.  A baby octopus weighs $0.3$ grams. Once it hatches, the octopus's mass **doubles** each week for the first 12 weeks of its life.

Complete the table of the octopus's mass over time.

| Time (weeks) | 0 | 1 | 2 | 3 | 4 | 12 |
|---|---|---|---|---|---|---|
| Mass (grams) | | | | | | |

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**Unit A1.1, Lesson 8: Practice Problems**

A group of biologists tracked the number of squirrels in a town. They wrote $n = 40 \cdot 1.5^t$, where $n$ is the total number of squirrels and $t$ is the number of years since the biologists started counting.

5.1 Explain what the 40 and 1.5 mean in this situation.

5.2 How many squirrels do the biologists predict there will be 2 years after they started counting?

Jamar had 80 followers on social media. His number of followers **tripled** every month for 4 months.

6.1 Select **all** the expressions that represent Jamar's followers after 4 months.

☐ $80 \cdot 3 \cdot 3 \cdot 3 \cdot 3$  ☐ $80 + 4^3$  ☐ $80 \cdot 4 \cdot 4 \cdot 4$  ☐ $80 + 3 + 3 + 3 + 3$  ☐ $80 \cdot 3^4$

6.2 Complete the table.

| Time (months) | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Followers | | | | | |

## Explore

7. Using the digits 1 to 9, without repeating, fill in each blank such that the two equations' graphs intersect.

$$y = \boxed{\phantom{0}} \cdot \boxed{\phantom{0}}^x \qquad\qquad y = \boxed{\phantom{0}} \cdot \boxed{\phantom{0}}^x$$

**Are you ready for more?** Fill each blank such that they intersect at whole-number coordinates.

## Reflect

1. Circle a question you want to talk to a classmate about.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Determine the value of each expression when $x = 2$.

$$4^x$$

$$\left(\frac{1}{3}\right)^x$$

$$5(6^x)$$

## Practice

2.  Here is a graph of $y = 12 \cdot \left(\frac{1}{3}\right)^x$.

    Explain where you can see the 12 and the $\frac{1}{3}$ in the graph.

Match each equation to a graph that represents it.

| **Equation A** $y = 50 \cdot \left(\frac{1}{2}\right)^x$ | **Equation B** $y = 50 \cdot 2^x$ | **Equation C** $y = 50 - 25x$ |
|---|---|---|

| 3.1   Graph A | 3.2   Graph B | 3.3   Graph C |
|---|---|---|
| | | |
| **Equation** _____ | **Equation** _____ | **Equation** _____ |
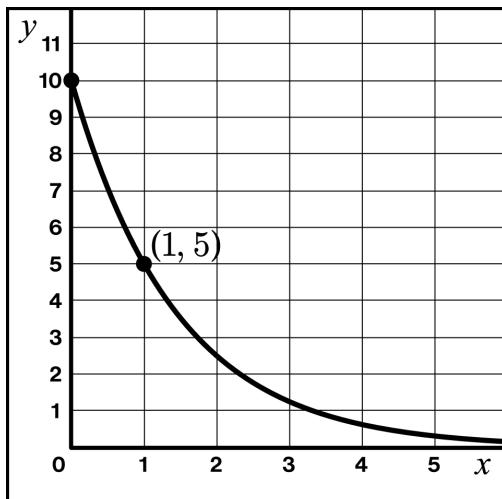
4.  Explain how you determined which equation to match with Graph A.

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**Unit A1.1, Lesson 10: Practice Problems**

Here are graphs of two different exponential relationships.
Write an equation to represent each graph.
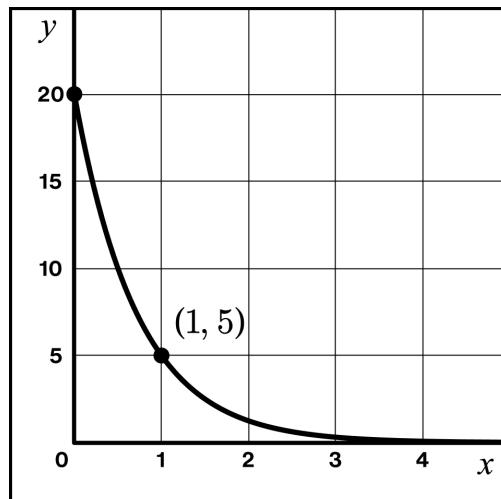
5.  Equation: _____



**Graph A**

6.  Equation: _____
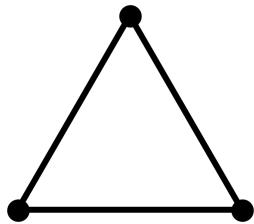


**Graph B**

7.  Pick one of the graphs and explain how you determined the starting value and the constant ratio.
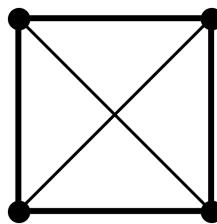
Graph _____     Equation: _____

## Explore
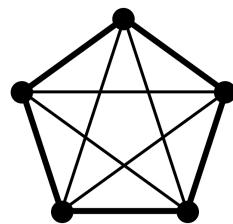
8.  Explore the relationship between the number of diagonals in different polygons.
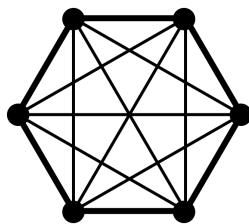


| **Sides:** 3 | **Sides:** 4 | **Sides:** 5 | **Sides:** 6 |
| **Diagonals:** 0 | **Diagonals:**___ | **Diagonals:**___ | **Diagonals:**___ |

How many diagonals does an 8-sided polygon have? Explain your thinking.

**Unit A1.1, Lesson 11: Practice Problems**  Name _____

## Warm-Up

1.  Order the expressions by value:  $25^2$, $\left(\dfrac{1}{8}\right)^2$, $5^5$, $10^3$, $\left(\dfrac{1}{4}\right)^2$
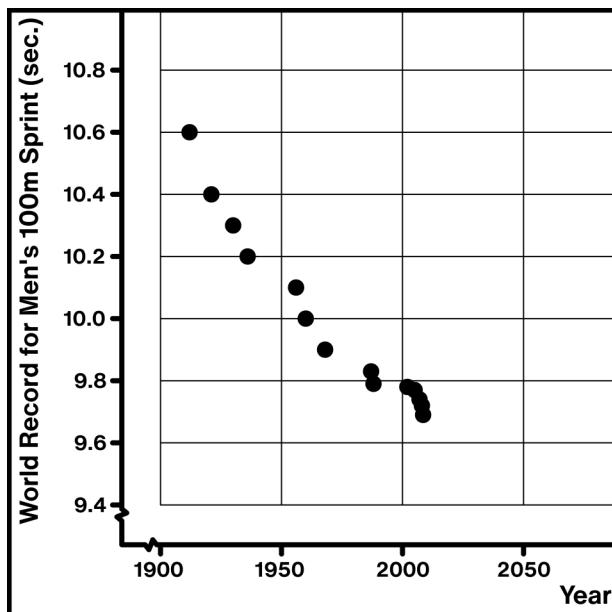
Least  _____ , _____ , _____ , _____ , _____  Greatest

## Practice

This graph shows the world record for the Men's 100m Sprint in the Olympics.
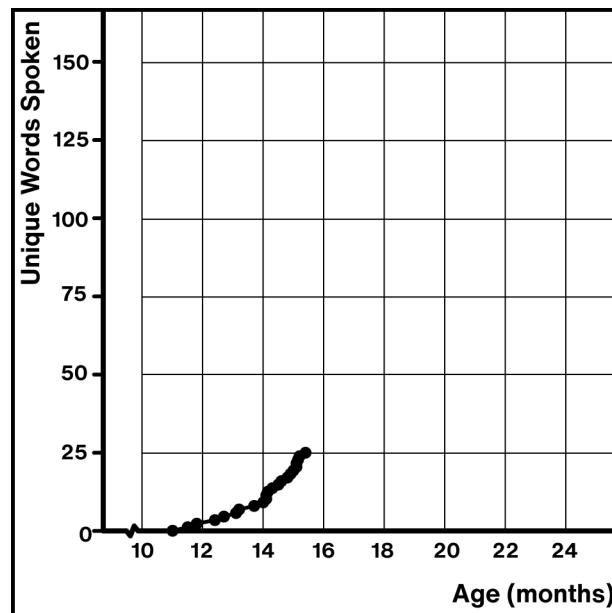
2.1  What does the point $(1960, 10)$ mean?

2.2  Sketch a linear or exponential model to fit the data.

2.3  Use your model to predict what the Men's 100m record will be in 2040.
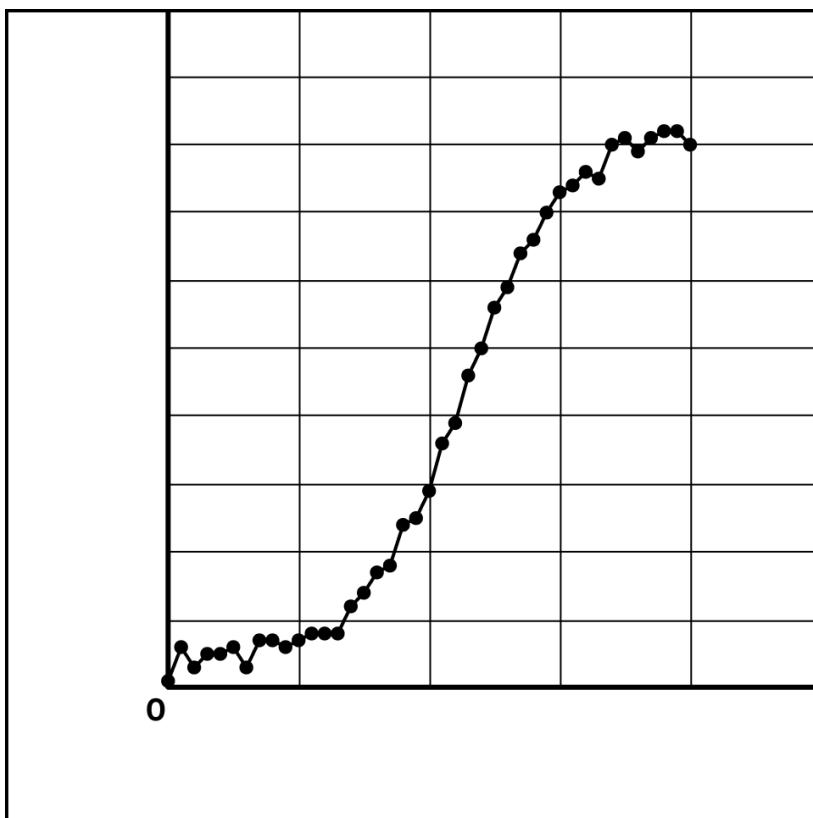


Ashley's sister spoke her first word at 11 months old. Ashley kept track of when she spoke new words and made this graph.

3.1  Sketch a linear or exponential model to fit the data.

3.2  How old do you think Ashley's sister will be when she speaks her 100th unique word?

3.3  Explain how the model you created is **wrong**.

3.4  Explain how the model you created is **useful**.

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## Explore

Here is a data set with missing labels.



4.1   Choose a situation that this data could represent. Label the axes accordingly.

4.2   Tell a story about the situation based on the data.

## Reflect

1.   Put a star next to the question you understood best.
2.   Use the space below to ask a question or share something you are proud of.
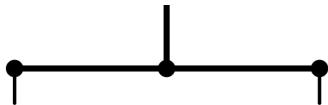
**Unit A1.2, Lesson 1: Practice Problems**     Name _____

## Warm-Up

1.  Draw a hanger that represents $3x + 5 = 4x + 1$.

## Practice

2.  Determine the solution to the equation from the warm-up: $3x + 5 = 4x + 1$.

3.  Determine the solution to this equation: $5 = x + 1 + 3x$.

    Draw a hanger if it helps with your thinking.

Solve each equation for $x$.

4.1   $3x + 19 = 40$                    4.2   $4x + 18 = 6x$

4.3   $2x + 11 = 8x + 5$               4.4   $3(x + 1) = 30$

# desmos ✏

## Looking Back
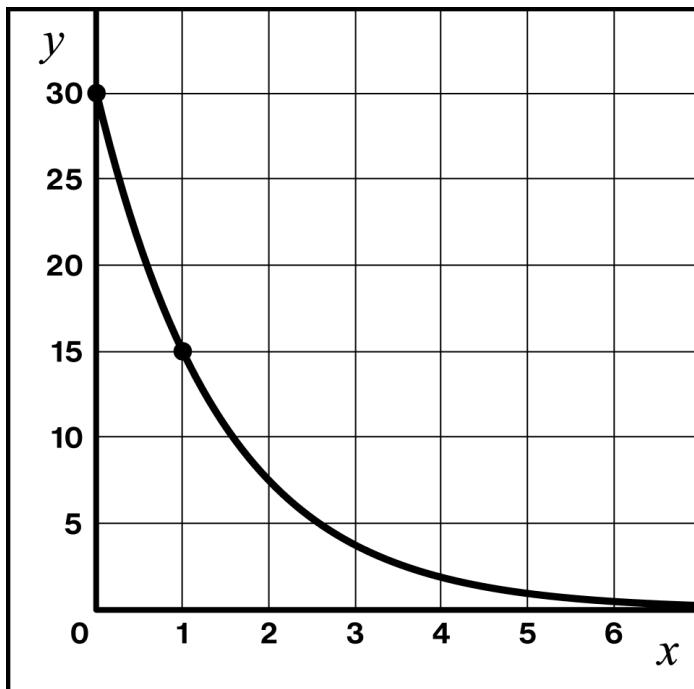
5. Which equation matches this graph?

    A. $y = 30 - 15x$

    B. $y = 30 \cdot \left(\dfrac{1}{2}\right)^{x}$
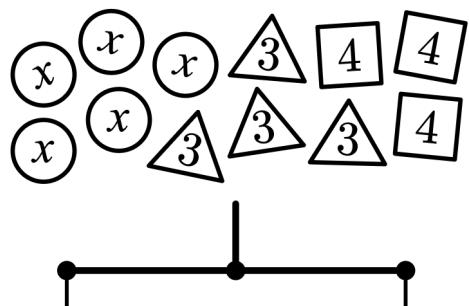
    C. $y = 30 \cdot 2^{x}$

    Explain how you decided which equation matched the graph.

## Explore

6.1 Create a hanger using **all** of these shapes:

- 5 circles

- 4 triangles

- 3 squares

6.2 Determine the value of $x$ that will balance it.

## Reflect

1. Star the problem you spent the most time on.
2. Use the space below to ask a question or share something you are proud of.

**Unit A1.2, Lesson 2: Practice Problems**      Name _____

## Warm-Up

1.  Select **all** of the equations where $x = 0.5$ is a solution.

    ☐ $8 = 10 + 4x$                    ☐ $13 + 7x = 20 - 7x$
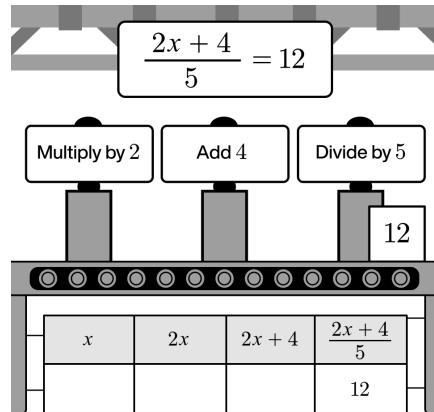
    ☐ $3x + 8 = 9.5$                   ☐ $4 = -2x + 6$

    ☐ $5x = -2 + x$

## Practice
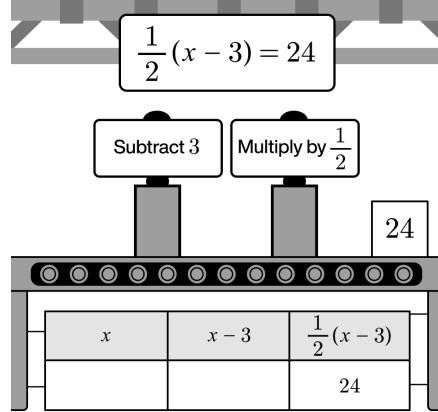
2.  Here is a machine for the equation $\dfrac{2x+4}{5} = 12.$

    Solve this equation for $x$.



3.  Here is a machine for the equation $\dfrac{1}{2}(x - 3) = 24.$

    Solve this equation for $x$.



4.  Solve for $x$: $5(3x - 2) = -55$

5.  Solve for $x$: $\dfrac{6x-2}{2} = x + 9$

# desmos ✏

**Unit A1.2, Lesson 2: Practice Problems**

Zwena made a mistake when solving $3(x - 4) = 5x$ for $x$.

6.1  Show or explain her mistake.
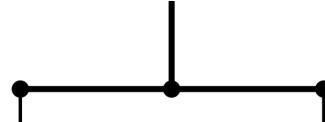
6.2  What is the correct solution to this equation?

| | |
|---|---|
| Step 1: | $3(x - 4) = 5x$ |
| Step 2: | $3x - 12 = 5x$ |
| Step 3: | $8x - 12 = 0$ |
| Step 4: | $8x = 12$ |
| Step 5: | $x = 1.5$ |

## Explore
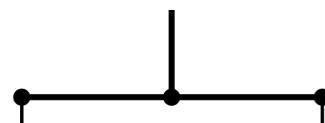
7.1  Create a hanger using all of these shapes so that the value of $x$ is positive and **as small as possible**.

- 5 circles
- 4 triangles
- 3 squares



7.2  Create a hanger using all of these shapes so that the value of $x$ is positive and **as large as possible**.

- 5 circles
- 4 triangles
- 3 squares



## Reflect

1.  Put a heart next to the problem you feel most confident about.
2.  Use the space below to ask a question or share something you are proud of.

## Warm-Up

1. Select **all** the equations where $x = 2$ is a solution.

   A. $\dfrac{x}{4} = 8$          B. $19 = 2(x + 6) + 3$          C. $2x + 10 = 2x + 8$
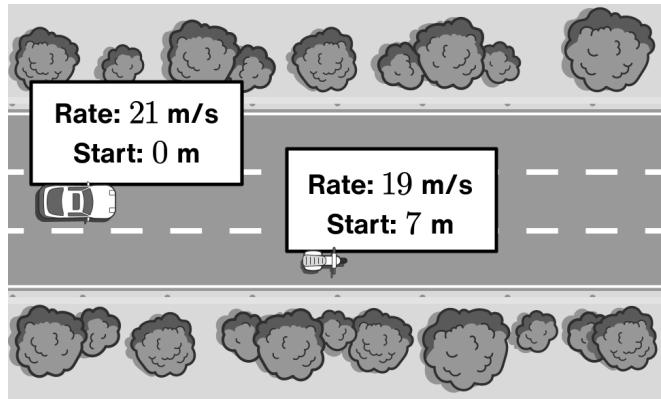
   D. $5 - 3x = -1$          E. $4 - x = x$

## Practice

2. The car and scooter are moving at constant speeds.

   The time, $t$, when they will be in the same position is represented by $21t = 19t + 7$.

   When will the car and scooter be in the same position?

   Rate: 21 m/s
   Start: 0 m

   Rate: 19 m/s
   Start: 7 m

3. The time, $t$, when two vehicles will be in the same position is represented by $10t = 2.5t$.

   When will these two vehicles be in the same position?

   A. Once          B. Never          C. Always

4. Here is Kaindra's work to solve $16x = 10x$.

   She says there is no solution.

   Is this correct? Show or explain your thinking.

   $$\frac{16x}{✗} = \frac{10x}{✗}$$

   $$16 = 10$$

   There is no solution.

5. Sort the equations by their number of solutions by writing the letter of the equation in the appropriate column.

    **A.** $5t = 3t$               **B.** $2t = 10 - 2t$           **C.** $15 - 3(t + 5) = -3t$

    **D.** $4t + 7 = 4(t + 2)$      **E.** $6t + 2 = -3 + 6t$

| One Solution | No Solution | Infinite Solutions |
|---|---|---|
| | | |

## Looking Back

6. Select **all** the expressions that are equivalent to $2(x + 3)$.

    ☐ $(x + 3) \cdot 2$     ☐ $2x + 6$     ☐ $2x + 3 \cdot 2$     ☐ $2x + 3$     ☐ $2x + 5$

## Explore

7. Using the digits 0–9, fill in each blank to create two different equations where the solution is $x = 1$.

    You may use the digits more than once.

    Explain what you notice about your equations.

$$\square x + \square = \square x + \square$$

$$\square x + \square = \square x + \square$$

## Reflect

1. Star the problem that you spent the most time on.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1. Select **all** the expressions that are equivalent to $8 - 12 - (6 + 4)$.

☐ $(6 + 4) - 8 - 12$                    ☐ $8 - 6 - 12 + 4$

☐ $8 - 12 - 6 - 4$                        ☐ $8 - (6 + 4) - 12$

## Practice

Adriana spent $24 on fruit punch and lemonade.

Fruit punch costs $3 per bottle. Lemonade costs $2 per bottle.

2.1   How many bottles of **fruit punch** could Adriana buy if she did not get any lemonade?

2.2   How many bottles of **lemonade** could Adriana buy if she did not get any fruit punch?

Adriana wrote this equation to represent the situation: $3F + 2L = 24$.

3.1   Use the equation to help you complete the table.

3.2   Which equation represents the same relationship?

A. $L = 12 - \dfrac{3}{2} F$          B. $L = 8 - \dfrac{3}{2} F$

C. $L = 8 - \dfrac{2}{3} F$           D. $L = 12 - \dfrac{2}{3} F$

| F | L |
|---|---|
| 2 | |
| 6 | |

Here is an equation: $2x + 4y = 80$.

4.1   Use the equation to help you complete the table.

4.2   Which equation represents the same relationship?

A. $y = 20 - 2x$          B. $y = 40 - 2x$

C. $y = 20 - \dfrac{1}{2} x$          D. $y = 40 - \dfrac{1}{2} x$

| x | y |
|---|---|
| 6 | |
| 12 | |

5. Nia is buying bananas and apples for her family. Bananas cost $0.50 each. Apples cost $1.00 each. Select **all** combinations of bananas and apples that Nia could buy for exactly $3.50.

   ☐ 1 banana and 3 apples          ☐ 5 bananas and 1 apple

   ☐ 3 bananas and 2 apples          ☐ 1 banana and 2 apples

   ☐ 5 bananas and 2 apples

## Looking Back

6. Here are two equations.

   | **Equation A** | **Equation B** |
   |:---:|:---:|
   | $48 - 5x = 13$ | $5x = 35$ |

   Explain how you know that these equations are equivalent.

## Explore

7. Using the digits 0–9 without repeating, create two equivalent equations.

$$\boxed{\phantom{x}}\,x + \boxed{\phantom{x}}\,y = \boxed{\phantom{x}}$$

$$y = \boxed{\phantom{x}} - \boxed{\phantom{x}}\,x$$

## Reflect

1. Put a star next to one question you are still wondering about.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Select **all** the equations where $x = -2$ is a solution.

    ☐ $4x = 4 + 2x$                    ☐ $19 = 2(x - 6) + 3$

    ☐ $2(x + 5) = x + 8$               ☐ $5 + 3x = -1$

    ☐ $3x - 5 = 1$

## Practice

2.1  A teacher bought packs of stickers and packs of
     pencils for her class. She spent $21.

     - Stickers cost $1.50 per pack.
     - Pencils cost $3.50 per pack.
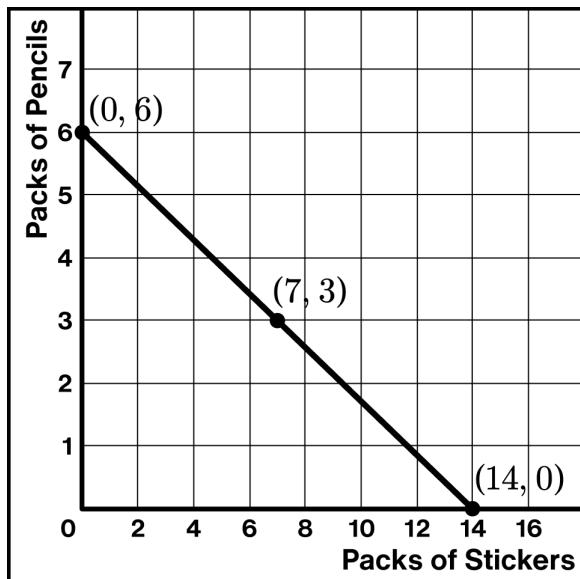
     Show or explain how you know this graph
     represents this situation.



2.2  Circle a coordinate and explain what it means in
     this situation.
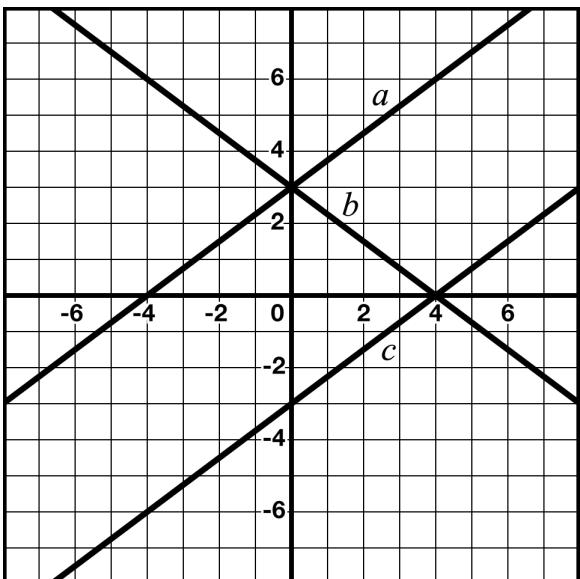
     $(0, 6)$              $(7, 3)$              $(14, 0)$

3.   Which line represents $12 = 3x + 4y$?

     A.  Line $a$        B.  Line $b$        C.  Line $c$

     Show or explain how you know.

# desmos ✏

**Unit A1.2, Lesson 8: Practice Problems**

4.  Which equation is equivalent to $15x + 3y = 2$?

   A. $y = \dfrac{2}{3} + 5x$          B. $y = \dfrac{2}{3} - 5x$

   C. $y = 2 - 15x$          D. $y = 2 - 5x$

## Looking Back

5.1  Solve for $y$:   $-3x + 4y = 28$  |  5.2  Solve for $y$:   $6x - 3y = 36$
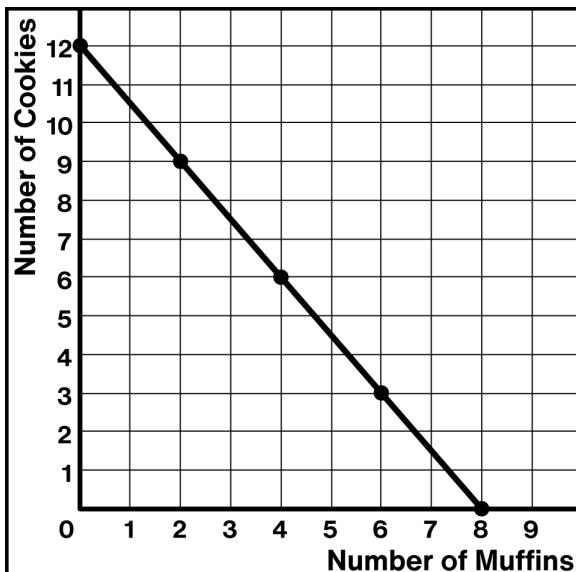
6.  Jordan had a bake sale. Muffins cost \$3 each and cookies cost \$2 each. Jordan earned \$24.

   Here is a graph of Jordan's situation.

   Select **all** the combinations of muffins and cookies they could have sold.

   ☐ 0 muffins and 8 cookies

   ☐ 9 muffins and 2 cookies

   ☐ 2 muffins and 9 cookies

   ☐ 6 muffins and 4 cookies

   ☐ 4 muffins and 6 cookies

## Reflect

1.  Put a smiley face next to a question you were stuck on and then figured out.
2.  Use the space below to ask a question or share something you are proud of.

**Unit A1.2, Lesson 10: Practice Problems**          Name _____

## Warm-Up

1.    For each constraint, write the letter of the matching inequality.

| A.  $a \leq 10$ | B.  $a > 10$ | C.  $a \geq 10$ |
|---|---|---|

_____ $a$ is less than or equal to 10.          _____ $a$ is as much as 10.

_____ $a$ is greater than or equal to 10.          _____ $a$ is at most 10.

_____ $a$ is at least 10.          _____ $a$ is greater than 10.

## Practice

2.    Marquis wants to work at least 20 hours a week to earn enough money for a concert. Which inequality represents $x$, the number of hours Marquis wants to work?

    A. $x > 20$          B. $x < 20$          C. $x \leq 20$          D. $x \geq 20$

3.    Demetrius can spend as much as $50 on shirts. Shirts, $s$, cost $16 each at a nearby store. Which inequality represents this situation?

    A. $50s \leq 16$          B. $50s \geq 16$          C. $16s \geq 16$          D. $16s \leq 50$

    Explain your thinking.

4.    List **at least three** values for $x$ that would make $8 + 2x \leq 20$ true.

# desmos ✎

Write an inequality for each constraint. Use $t$ for time (in hours).

5.1 Trevor practices his clarinet at least 1 hour each day.

5.2 At some colleges, students must work 20 hours or less per week.

5.3 The American Academy of Pediatrics recommends teenagers play video games for no more than 2 hours each day.

Write a constraint for each inequality. Be sure to specify what the variables represent.

6.1 $x \geq 3$

6.2 $5 > y$

## Looking Back
Solve each equation.

7.1 $4x - 6 = 12 - 2x$

7.2 $\dfrac{1}{3}x - 8 = 12 - 3x$

7.3 $2x + 7 - 3x = \dfrac{5}{2}$

## Reflect
1. Circle a question you want to talk to a classmate about.
2. Use the space below to ask a question or share something you are proud of.

## Practice

1.  Match each statement to the inequality.

    $h > 50$                                  $h$ is greater than **or** equal to a number
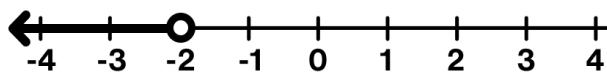
    $30 \leq h$                               $h$ is less than **or** equal to a number
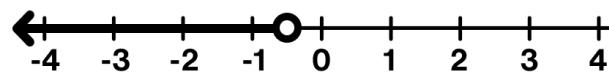
    $h \leq 20$                               $h$ is greater than a number

2.  Which graph represents the solutions to $2x < -4$ ?
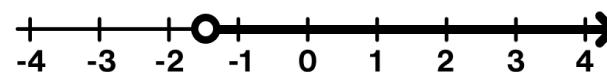
A.
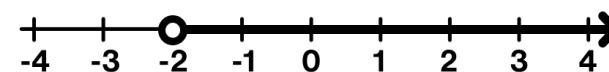


B.
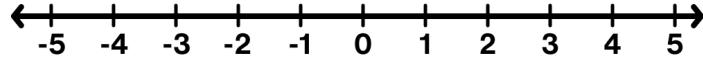


C.



D.
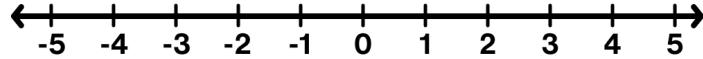


3.  Graph the solutions to $2x < 10$ on the number line. Then explain your thinking.



4.  Leo is solving $-15 + x < -14$. He knows the solution to $-15 + x = -14$ is $x = 1$.

    How can he determine whether the solutions to $-15 + x < -14$ are $x < 1$ or $x > 1$?



5.  Diego says that $x = 5$ is a solution to the inequality $-3x > 9$ because when you divide both
    sides by $-3$, you get $x > -3$. Is this correct?

    Explain your thinking.

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**Unit A1.2, Lesson 11: Practice Problems**

A community pool offers two different membership plans:
- Plan A: $4 per visit
- Plan B: An initial $12 fee, then $2 per visit

Brielle wants to spend $48 to swim at the community pool this month.

6.1  How many times could she visit the pool with Plan A?

6.2  How many times could she visit the pool with Plan B?

6.3  Nekeisha says that it is cheaper for her to use Plan A than Plan B.
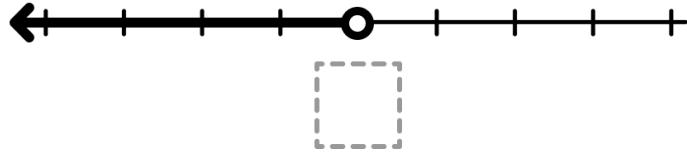
Write an inequality to represent this situation.

Use $x$ for the number of visits to the pool.

## Explore

7.  Using the digits 0–9 without repeating, fill in each blank to create an inequality and the graph of its solutions.

$$\boxed{\phantom{0}}\,x + \boxed{\phantom{0}} > \boxed{\phantom{0}}\,x$$



## Reflect

1.  Put a question mark next to a problem you would like to compare with a classmate.

2.  Use the space below to ask a question or share something you are proud of.

**Unit A1.2, Lesson 12: Practice Problems**　　　Name _____

## Warm-Up

1. Imani is going shopping with a budget of $125.
   Which inequality represents the amount of money that Imani can spend while shopping?

   A. $x > 125$　　　　　B. $x \leq 125$　　　　　C. $x \geq 125$　　　　　D. $x < 125$

## Practice

2. Here is Isabella's work solving the inequality
   $7x + 5 > 2x + 35$.

   Explain how solving the equation helps Isabella solve the
   inequality $7x + 5 > 2x + 35$.

   $$7x + 5 > 2x + 35$$
   $$7x + 5 = 2x + 35$$
   $$5x = 30$$
   $$x = 6$$

3. Solve this inequality: $-3x + 4 \geq 12$. Use the number line if it helps with your thinking.

Solve each inequality.

4.1　$4x + 5 \geq 37$　　　　│　4.2　$-6 + \dfrac{x}{2} < 7$　　　　│　4.3　$-8x - 6 > 2x - 26$

5.   Here is an inequality: $7x + 6 < 3x + 2$. Select **all** the values that are solutions.

☐ $x = 1$     ☐ $x = 0$     ☐ $x = -1$     ☐ $x = -2$     ☐ $x = -8$

Rudra takes medicine every day. The equation $y = 24\left(\dfrac{1}{2}\right)^{x}$ represents the amount of medicine in Rudra's body (in milligrams) $x$ hours after he takes it.

6.1   How much medicine does Rudra take?     6.2   How much medicine is still in his body after 1 hour?

## Explore

7.   Using the digits 0–9, fill in each blank such that the two inequalities are equivalent.

$$\boxed{\phantom{0}}\,x + \boxed{\phantom{0}} < \boxed{\phantom{0}}\,x + \boxed{\phantom{0}}$$

$$x > \boxed{\phantom{0}}$$

## Reflect

1.   Put a star next to a question that looked more difficult than it really was.
2.   Use the space below to ask a question or share something you are proud of.
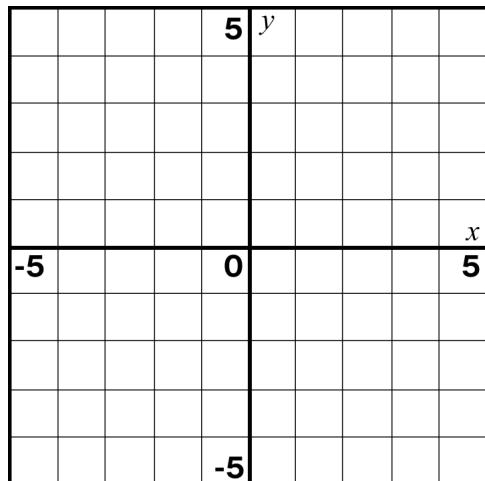
**Unit A1.2, Lesson 13: Practice Problems**        Name _____

## Warm-Up
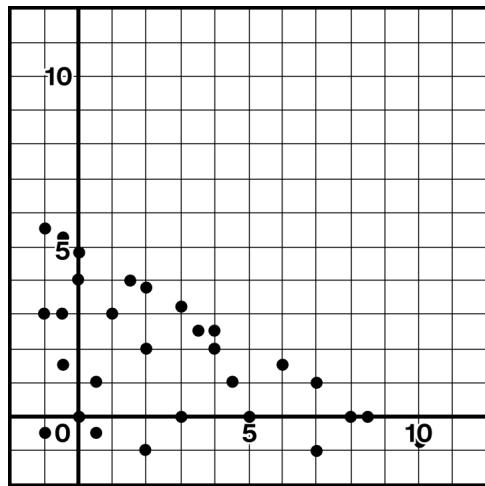
1.  Plot and label each point on the graph.

| A | B | C | D | E |
|---|---|---|---|---|
| $(-4, 0)$ | $(4, 0)$ | $(3, -4)$ | $(0, 4)$ | $(-1, -2)$ |

## Practice

2.  This graph shows some solutions to $5x + 9y < 45$.
    Select **all** of the points that are also solutions.

    ☐ $(1, 1)$

    ☐ $(4, 0)$

    ☐ $(10, 4)$

    ☐ $(0, 10)$

    ☐ $(6, -1)$
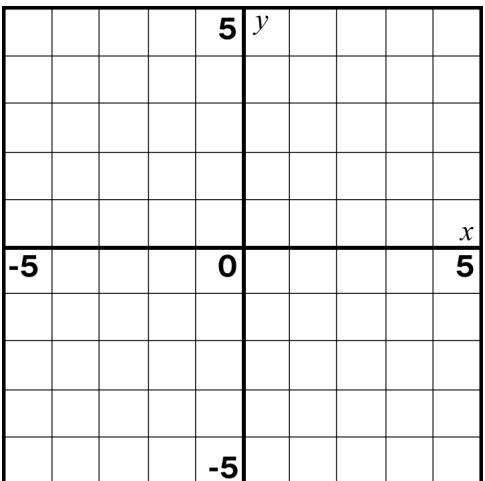
3.  Here is an inequality: $x \leq y$.

    Write at least three coordinate pairs that are solutions to this inequality.

    Use the graph if it helps with your thinking.

| $(x, y)$ |
|---|
| 1. |
| 2. |
| 3. |

# desmos ✏

**Unit A1.2, Lesson 13: Practice Problems**

Tyler can spend up to $45 on shirts and socks. A shirt costs $10 and a pair of socks cost $2.50.

4.1 Which inequality represents this situation?
- Use $t$ for the number of shirts.
- Use $p$ for the number of pairs of socks.

A. $10t + 2.50p > 45$

B. $10t + 2.50p < 45$

C. $10t + 2.50p \geq 45$

D. $10t + 2.50p \leq 45$

4.2 Explain how you know $t = 2$ and $p = 1$ are solutions in this situation.

## Looking Back

Write an inequality to show each situation.

5.1 Duri will stay warm in their sleeping bag when the temperature is at least 30°F.
Use $t$ to represent temperatures where Duri will stay warm in their sleeping bag.

5.2 Duri wants their backpack to weigh less than 45 pounds.
Use $w$ to represent weights where Duri can carry their backpack.

Here is an equation: $6x + 2y = 36$.

6.1 For each value of $x$, determine the value of $y$.

| $x$ | $y$ |
|-----|-----|
| 2 | |
| 4 | |

6.2 Which equation represents the same relationship?

A. $y = 6 - 3x$    B. $y = 18 - \frac{1}{3}x$    C. $y = 18 - 3x$    D. $y = 6 - \frac{1}{3}x$

## Warm-Up

1.    Select **all** of the inequalities that are true when $x = 5$.

☐ $x < 2$          ☐ $x < 10$          ☐ $x < 5$          ☐ $x \geq 5$          ☐ $x \geq 8$

## Practice

Here is a graph of the equation $x + 2y = 7$.

2.1   Which of these points $(x, y)$ is a solution to the
      inequality $x + 2y < 7$?
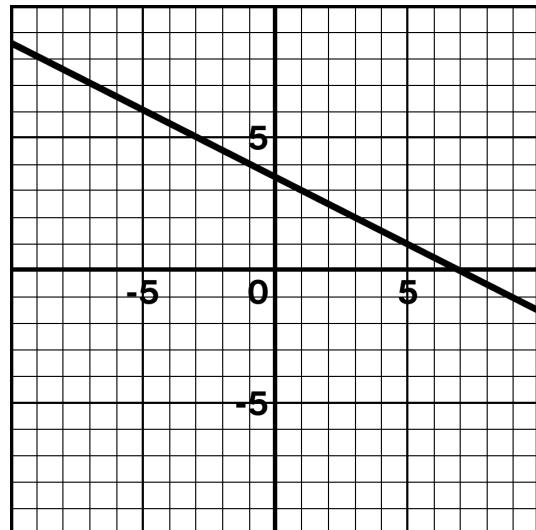
      A. $(0, 0)$               B. $(7, 0)$

      C. $(0, 7)$               D. $(10, 0)$

2.2   Complete the graph of $x + 2y < 7$.
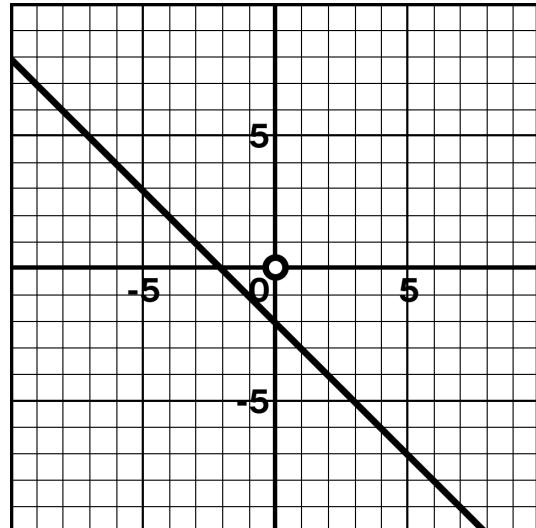
      Explain how you decided which region to shade.



3.    Here is an inequality: $x + y \leq -2$.

      ● Ada graphed the equation $x + y = -2$.

      ● Ada noticed that $(0, 0)$ is **not** a solution to
        $x + y \leq -2$.

      How can Ada use this information to graph the
      solutions to this inequality?

# desmos ✏
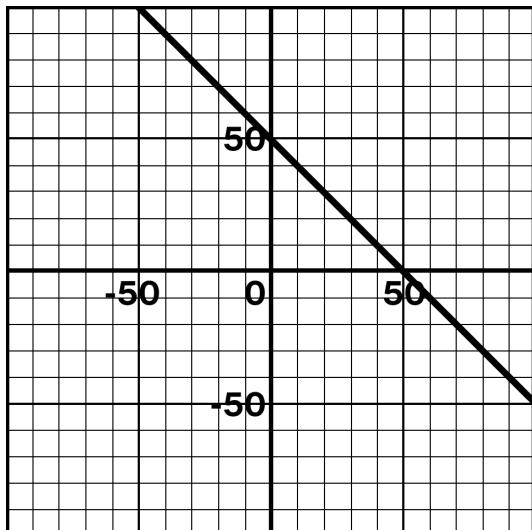
**Unit A1.2, Lesson 14: Practice Problems**

A food truck only sells hot dogs and hamburgers.
They want to sell 50 items or more each day.

4.1 Which inequality represents this situation?

A. $x + y > 50$    B. $x + y > 50$

C. $x + y \geq 50$    D. $x + y \leq 50$



4.2 Complete the graph so that it represents all the
solutions to the inequality for this situation.

For each graph, write the letter of the inequality that matches it.
You will have two inequalities left over.

| **A.** $4 > x$ | **B.** $4 \geq y$ | **C.** $y < 4$ | **D.** $x > 4$ | **E.** $x \leq 4$ |
|---|---|---|---|---|

5.1



Inequality _____

5.2



Inequality _____

5.3
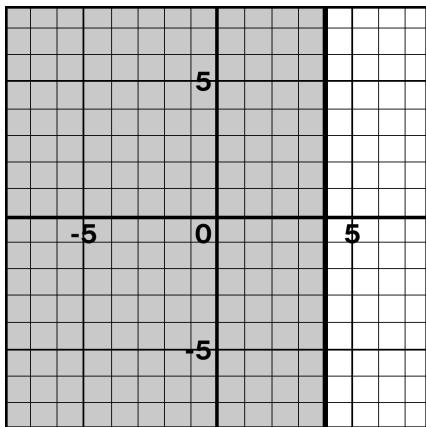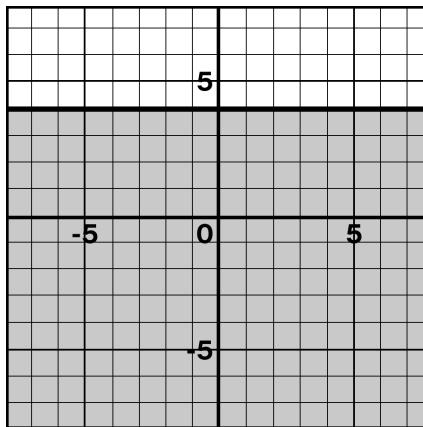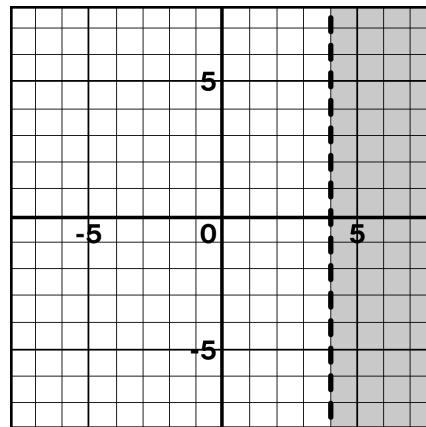


Inequality _____

## Looking Back

6. Write two equations that are equivalent to $2(3x - 1) = 6 + 4x - 10$.

## Warm-Up

1.  Which would **not** be a good survey question?

    A.  What grade are you in?

    B.  How many books did you read in the last year?

    C.  How many inches are in 1 foot?

    D.  How many pets do you have?

## Practice

2.  For each question, write the letter of the type of data they produce.

    **A. Quantitative Data**          _____ Do you have any pets?

                                      _____ How many siblings do you have?

    **B. Categorical Data**           _____ What language is spoken most in your home?

                                      _____ What is your age?

3.  Select **all** the questions that would produce *quantitative data*.

    ☐ How many people live in your home?

    ☐ What is your favorite breakfast food?

    ☐ How did you travel to school this morning?

    ☐ How many minutes did it take you to get ready this morning?

    ☐ What is the last thing you ate or drank?

4.  Callen claims that players on the school basketball teams are taller than players on the soccer teams. Write two survey questions that Callen could ask to investigate the claim.

    1.                                2.

5.  Nikolai wants to know about the types of food his classmates prefer. Write a survey question that would give him *categorical* data about his classmates' food preferences.

# desmos ✏

## Looking Back

6. Solve for $x$. $\qquad$ $5(3x - 2) = -55$

A scientist is studying how two different types of bacteria grow. The two tables represent the number of cells of bacteria in the days since her experiment began.

If the patterns continue, which will there be more of:

7.1 After 4 days? (Circle one.)

Bacteria A     Bacteria B     There will be the same

7.2 After 10 days? (Circle one.)

Bacteria A     Bacteria B     There will be the same

Show or explain how you decided.

| Day | Cells of Bacteria A |
|-----|---------------------|
| 0   | 1                   |
| 1   | 3                   |
| 2   | 9                   |
| 3   | 27                  |
| 4   | ?                   |

| Day | Cells of Bacteria B |
|-----|---------------------|
| 0   | 80                  |
| 1   | 100                 |
| 2   | 120                 |
| 3   | 140                 |
| 4   | ?                   |

## Explore

Here are two questions that generate data. Jaylin is unclear whether the data is categorical or quantitative.

8.1 Choose one of the questions and explain why it is unclear.

8.2 What is another question that might generate data that is unclear?

> **What is your zip code?**
>
> 94117   43272   06001

> **What is your birthday?**
>
> January 7   March 18   December 23

## Reflect

1. Star the problem you spent the most time on.
2. Use the space below to ask a question or share something you are proud of.
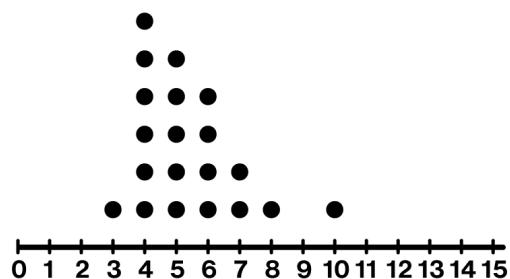
## Warm-Up

1. Which would produce *categorical* data?

   A. What is your height?                    B. Do you have any pets?

   C. How many books did you read in the      D. How many pets do you have?
   last year?

## Practice

2. A class made this dot plot to explore how many letters are in their first names.

   How many letters are in the longest first name?

   **Number of Letters in First Name**

   

3. Thiago asked ten of his classmates how many pets they had.

   These were their responses:

   3, 0, 1, 0, 2, 4, 4, 0, 3, 5
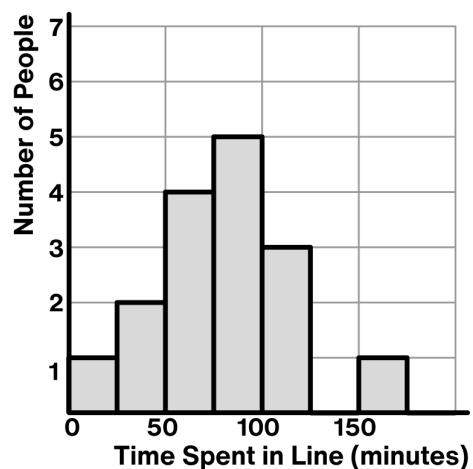
   Make a dot plot of the data.

   **Number of Pets**

   

4. A group of 15 people went to a theme park for the day. Each person kept track of how many minutes they spent waiting in line. The data is shown in the histogram.

   Select **all** the statements that must be true.

   ☐ 1 person was in line for over 150 minutes.

   ☐ 3 people were in line for less than 50 minutes.

   ☐ Most people spent over 100 minutes in line.

   ☐ 1 person spent 0 minutes in line.

   ☐ No one spent exactly 125 minutes in line.

   

# desmos ✏
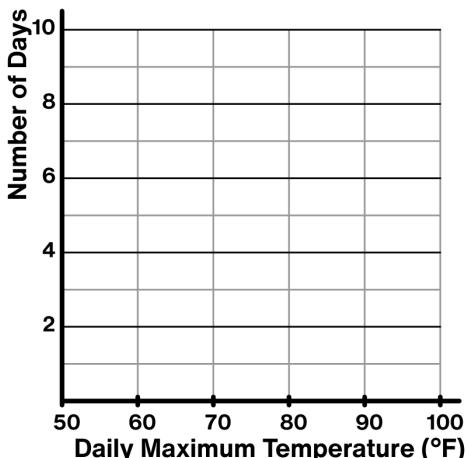
**Unit A1.3, Lesson 2: Practice Problems**

5. Tiam recorded the high temperature where they live each day for the past ten days.

    Here is their data:

    56, 62, 73, 65, 68, 74, 81, 65, 59, 53
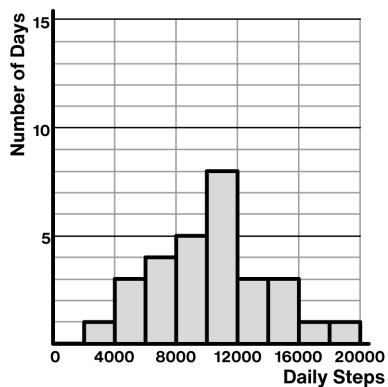
    Make a histogram of this data.
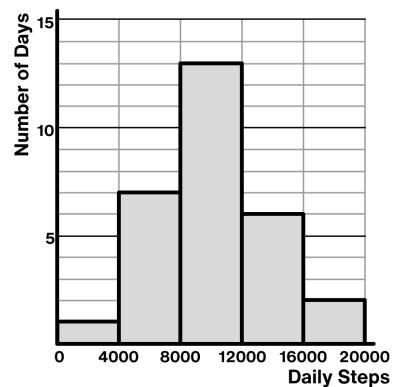


6. These histograms show how many steps Dakota took each day in June.
    On how many days did Dakota walk more than 15 000 steps? *Choose the appropriate bin width to answer the question.*
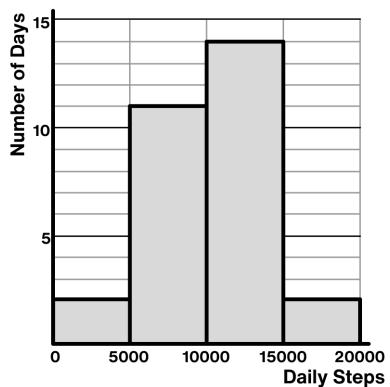
**Bin Width:** 2 000    **Bin Width:** 4 000    **Bin Width:** 5 000
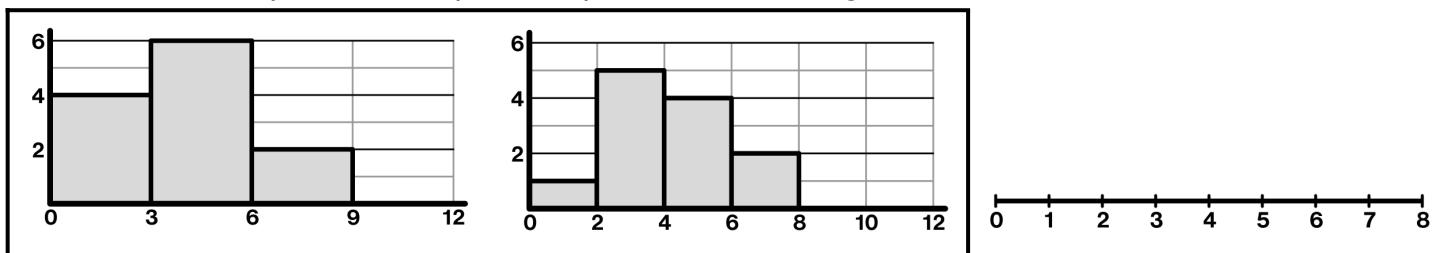


## Explore

7. Here are two histograms of the same data but with different bin widths.
    Create one possible dot plot to represent both histograms.

**Unit A1.3, Lesson 3: Practice Problems**        Name _____

## Warm-Up

1.  Determine the number that is **halfway** between each pair of numbers.

    1 and 13                5 and 45                3 and 30
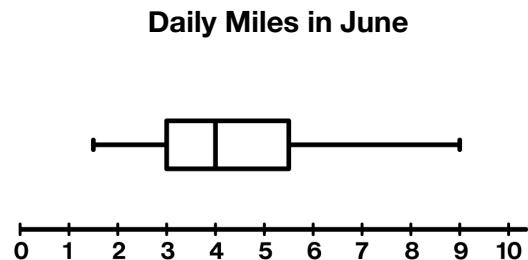
## Practice

2.  Ricardo used a fitness app to track how many miles he walked each day in June. The blox plot represents the data.

    Determine each of the statistics below.

    **Daily Miles in June**

    | Min | Q1 | Median | Q3 | Max |
    |-----|-----|--------|-----|-----|
    |     |     |        |     |     |

3.  Select **all** of the questions that the box plot can answer.
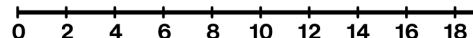
    ☐ Did Ricardo walk more than 8 miles any day in June?
    ☐ How many times did Ricardo walk more than 8 miles in a day?
    ☐ Did Ricardo walk more on weekends or weekdays?
    ☐ About how often did Ricardo walk 4 miles or more in a day?
    ☐ Did Ricardo walk exactly 5 miles on any day in June?

4.  A team of scientists wanted to know how long people with a particular virus were contagious.
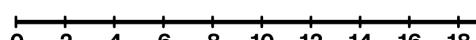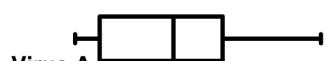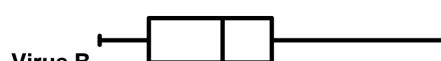
    They studied 500 people and measured how many days each person was contagious.

    What can you say about the results of the study?

    **Days of Contagiousness**
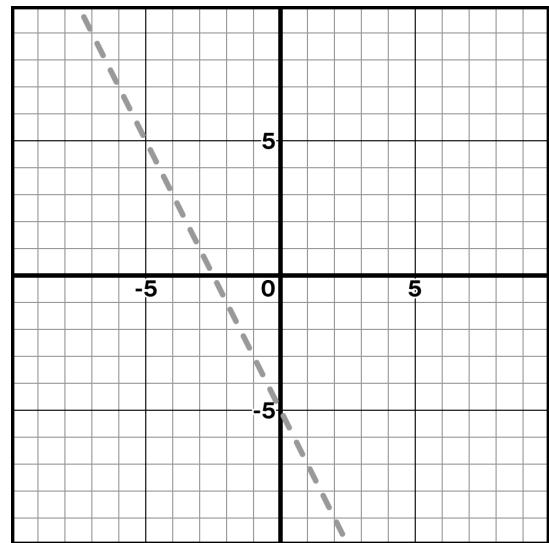
5.  The scientists found data about a similar virus. How do the two viruses compare?

    **Days of Contagiousness**

    Virus B

    Virus A

# desmos ✎

## Looking Back
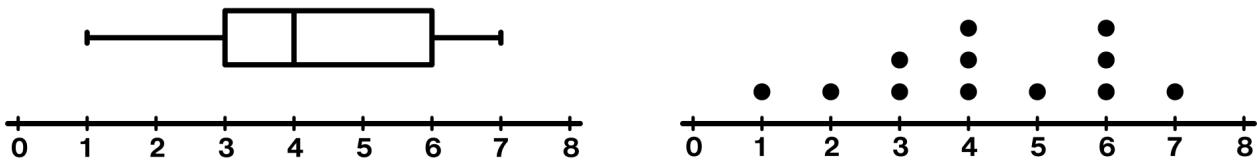
6. Solve $3(x - 4) = 12x$.

7. Create a graph of $2x + y \leq -5$.

## Explore

8. Here is a dot plot and a box plot of the same data.
   Remove five points from the dot plot such that it produces the same box plot.

## Reflect

1. Put a question mark next to a problem you would like to compare with a classmate.
2. Use the space below to ask a question or share something you are proud of.

**Unit A1.3, Lesson 4: Practice Problems**          Name _____

## Warm-Up

1.  Determine the median of each set.
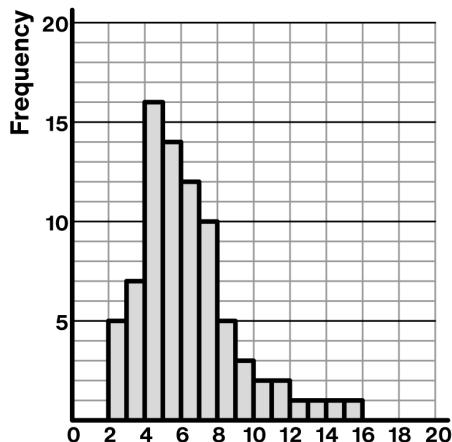
    0, 0, 1, 7, 15                    2, 4, 6, 8, 8, 8                    15, 17, 18, 25
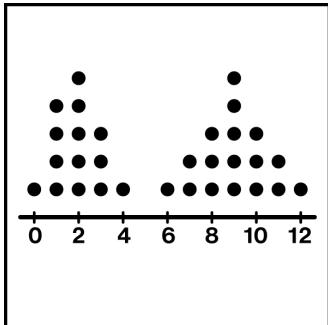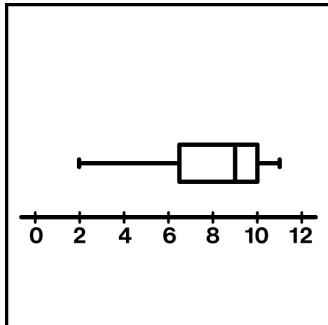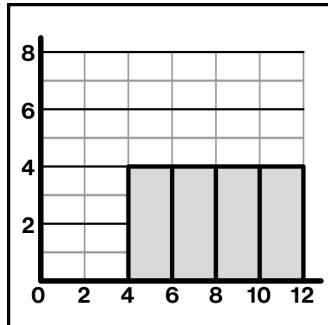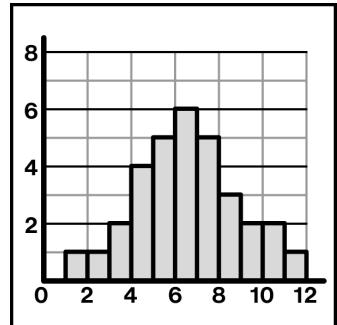
## Practice

2.  Which term best describes the data shown in the histogram?
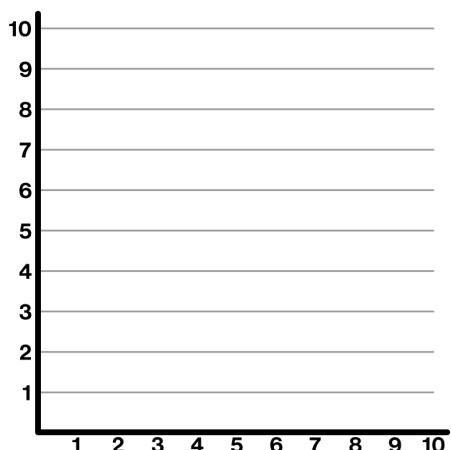
    A.  Symmetric

    B.  Skewed

    C.  Uniform

    D.  Bimodal

    E.  Bell-shaped

3.  Write the letter for each graph next to the term that best describes it.
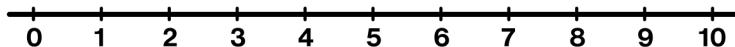
| A. | B. | C. | D. |
|---|---|---|---|

____ Skewed          _____ Bell-shaped          _____ Bimodal          _____ Uniform

4.  Create a histogram that is bell-shaped.

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**Unit A1.3, Lesson 4: Practice Problems**

5.  Use the number line to create a dot plot that is **symmetric but not uniform**.
    Plot at least eight points.

```
    +----+----+----+----+----+----+----+----+----+----+
    0    1    2    3    4    5    6    7    8    9    10
```

6.  This box plot shows the average cost of 1 gigabyte
    (GB) of cell data in 25 countries.

    **Cost of 1GB of Data (dollars)**

    In the U.S., the average cost of 1 gigabyte is $5.62$.

    ```
        +----+----+----+----+----+----+----+
        0    1    2    3    4    5    6    7
    ```
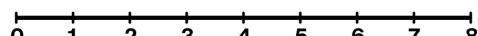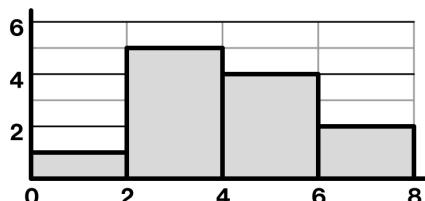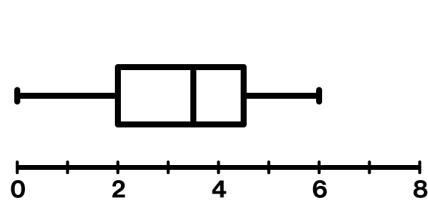
    Which sentence best describes how the U.S. compares to the other countries?

    **A.** Cell data in the U.S. is **cheaper** than in most other countries.

    **B.** Cell data in the U.S. is **more expensive** than in most other countries.

    Explain your thinking.

## Explore

7.  Here is a box plot and a histogram of the same data set.
    Create a possible dot plot that could also represent this data set.

    ```
        +----+----+----+----+
        0    2    4    6    8
    ```
    ```
        0    2    4    6    8
    ```
    ```
        +----+----+----+----+----+----+----+----+
        0    1    2    3    4    5    6    7    8
    ```

**Unit A1.3, Lesson 5: Practice Problems**          Name _____

## Warm-Up

1.  Use mental math to determine the mean and median of each data set.

| Data Set | Mean | Median |
|---|---|---|
| 27, 30, 33 | | |
| 0, 100, 100, 100, 100 | | |
| 3, 5, 7, 15 | | |
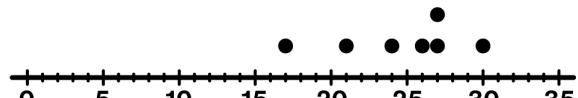
## Practice

2.  Seven people estimated how many marbles there were in a jar.

    Determine the mean and median of the estimates. Use a calculator if it helps with your thinking.

| Median | Mean |
|---|---|
| | |

**Marble Jar Estimates**
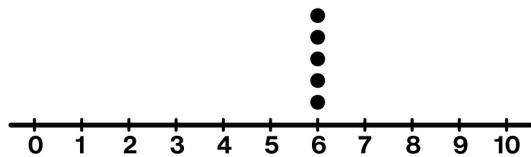
17  21  27  27  24  26  30
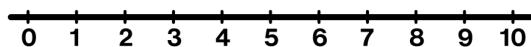


3.  Here is a dot plot. If the values 4 and 9 are added to the data set, which statistic(s) will change?

    A.  Mean
    B.  Median
    C.  Both
    D.  Neither



4.  Create a dot plot that has:
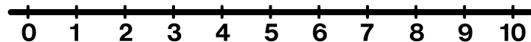
    ● A median of 3.
    ● A mean that is greater than the median.

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5. Create a dot plot that has:
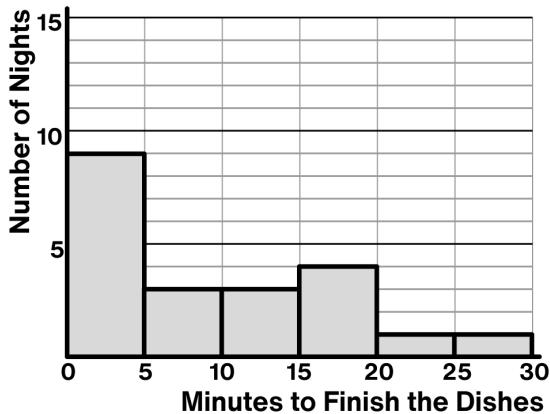
   - Has a median of 6.
   - Is bell-shaped.

   0  1  2  3  4  5  6  7  8  9  10

6. Anand does the dishes every night. For the past few weeks, he kept track of how long it took him each night. The histogram shows the results.

   Which interval contains the median?

   A. 0 to 5 minutes
   B. 5 to 10 minutes
   C. 10 to 15 minutes
   D. 15 to 20 minutes
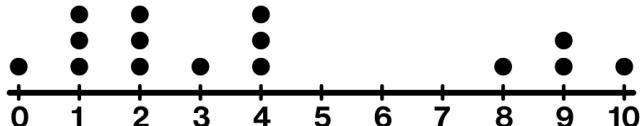


7. Select **all** the expressions that are equivalent to $2(x + 3)$.
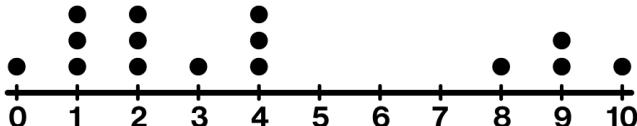
   ☐ $2 \cdot (x + 3)$
   ☐ $2 \cdot x + 3 \cdot 2$
   ☐ $(2 + x)\,3$
   ☐ $(x + 3)\,2$
   ☐ $2 \cdot x + 3$

## Explore

Remove one value to change the **mean**, not the median.



Remove one value to change the **median**, not the mean.

## Warm-Up

1. Use mental math to determine the mean and median of each data set.

| Data Set | Mean | Median |
|---|---|---|
| $15, 25, 35$ | | |
| $4, 24, 24, 24, 24$ | | |
| $2, 3, 7, 8$ | | |

## Practice

2. Use a calculator to determine the mean and standard deviation of this data set.

$[14, 14, 15, 16, 16, 18, 18, 19]$

| Mean | Standard Deviation |
|---|---|
| | |

Titus and Alejandro are both on the track team. Each day in May, they recorded how long it took them to run one mile.

**Titus**

**Mean:** $7.2$ minutes
**Standard deviation:** $0.15$ minutes

3.1     Based on the data, who had a greater spread?

**Alejandro**

**Mean:** $7.1$ minutes
**Standard deviation:** $0.34$ minutes

3.2     What does that tell you about how the two runners compare?

4. Here are three data sets.

   **Set A:** $[7, 10, 12, 14, 17, 19]$     **Set B:** $[2, 2, 5, 22, 25, 25]$     **Set C:** $[4, 8, 9, 10, 12, 13]$

   Order the data sets from smallest to largest standard deviation.
   Use a calculator to help you with your thinking.

   Smallest  _____ , _____ , _____  Largest
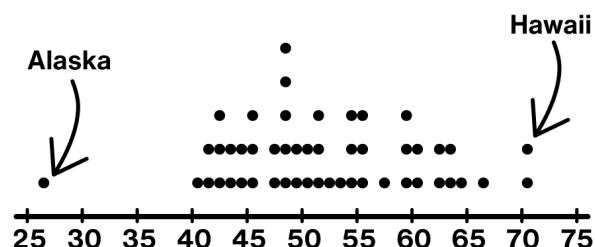
5. Here are the average temperatures in all 50 states.

   The arrows show the data points for Hawaii and Alaska, where the climates are different from other states.

   If the data points for Alaska and Hawaii were removed, what would happen to the standard deviation?

   **Average Temp by State (°F)**

   

   A. It would increase

   B. It would decrease

   C. It would stay the same

6. Here is a data set. Which of the following will make the standard deviation **smaller**? Use a calculator to help you with your thinking.
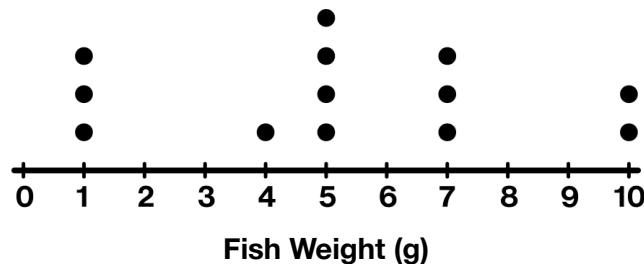
   ☐ Add a 2 to the data set.

   ☐ Add a 6 to the data set.

   ☐ Remove the 4 from the data set.

   ☐ Remove the 9 from the data set.

   ☐ Increase each value by 10.

   ## 4, 5, 5, 6, 7, 9

## Explore

The dot plot represents the weights of all the fish in Rafael's tank.

He wants to add a new fish.



**Fish Weight (g)**

7.1 Which weight of fish would change the standard deviation the **most**?

   A. 1 gram    B. 4 grams    C. 5 grams    D. 7 grams    E. 10 grams

7.2 Which weight would change the standard deviation the **least**?

   A. 1 gram    B. 4 grams    C. 5 grams    D. 7 grams    E. 10 grams

## Warm-Up

1.  Create three different data sets that have a median of 13.
    Each set should have five numbers or less.

    _____          _____          _____

## Practice
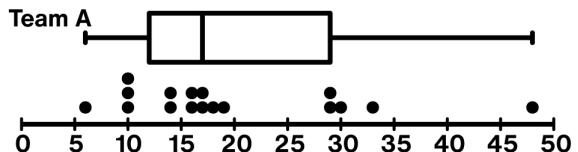
The box plots represent the points scored per game for three different football teams over the course of a season.

2.1  Which team generally scored the most points?

      Team A        Team B        Team C
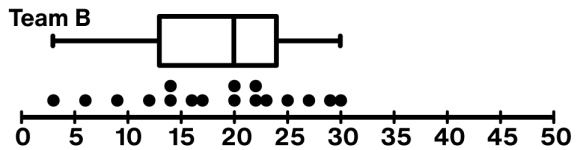
2.2  Which team scored the most points in a single game?

      Team A        Team B        Team C
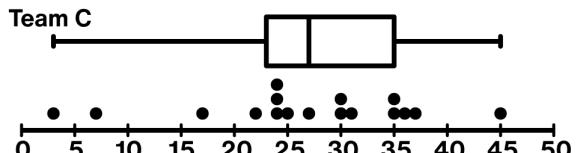
2.3  Which team was the most consistent?
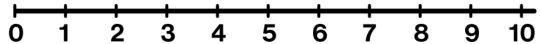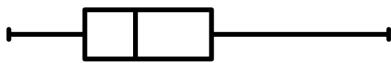
      Team A        Team B        Team C

Explain your thinking.

**Points by Game**



3.  Mariana used a fitness app to track how many miles she walked each day in June. The box plot represents the data.

    Determine the IQR for the data.

**Daily Miles in June**

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**Unit A1.3, Lesson 8: Practice Problems**

Mariana used the app again in August.

**Daily Miles**
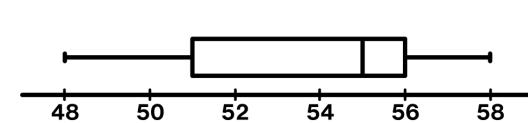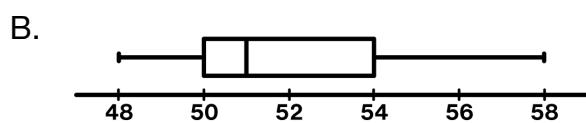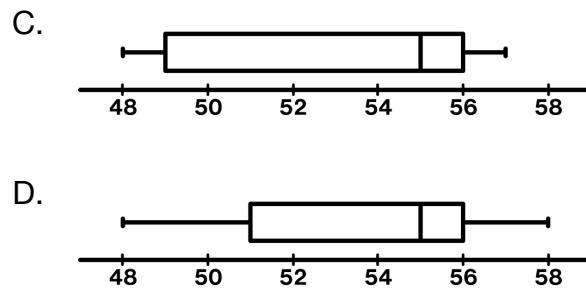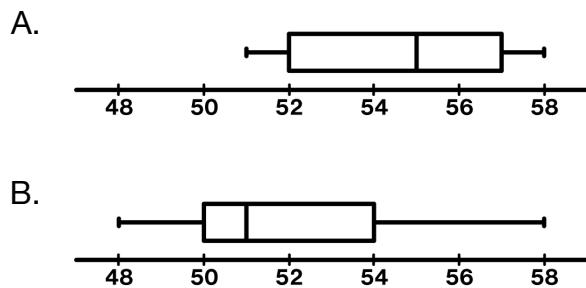
4.1 Which data set has a smaller IQR?

   A. June

   B. August

   C. They're the same



4.2 What does this tell you about Mariana's walking habits in June and August?

5. Which data set has the largest IQR?

   A.



   C.



   B.



   D.



6. Here is a data set: [2, 2, 4, 4, 5, 5, 6, 7, 9, 15].

   If 24 was added as a new data point, how would the IQR change?
   Use a calculator if it helps with your thinking.

   A. Increase                B. Decrease                C. Stay the same

   Explain your thinking.
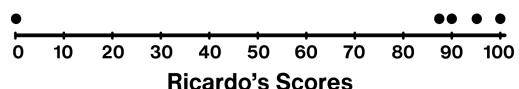
## Reflect
1. Put a heart next to the problem you feel most confident about.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Use mental math to determine the value of each.

    A.  50% of 60                              B.  25% of 60

    C.  10% of 60                              D.  30% of 60
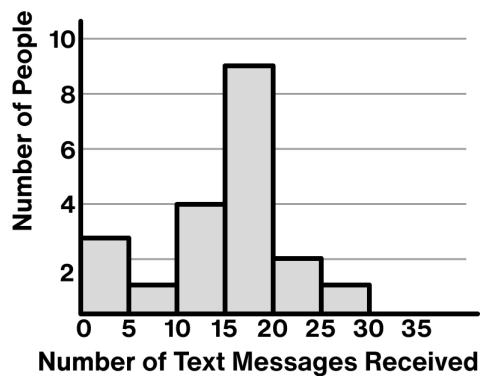
## Practice

2.  Ricardo got the following scores on his five class assignments: $87, 90, 0, 85, 100$.
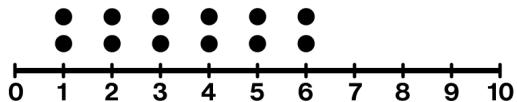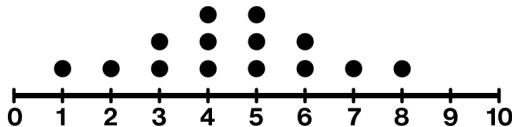
    
    **Ricardo's Scores**

    His teacher lets students select a measure of center to summarize the scores. Which would you recommend Ricardo use?
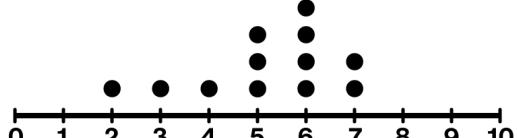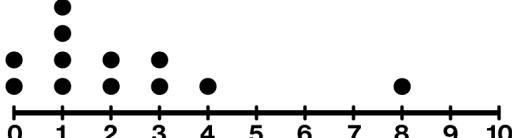
    A.  Mean
    B.  Median

3.  The histogram represents the number of text messages that 20 people received in one day. A new person with 52 text messages received is added to the data set. Which is likely to change more?

    A.  Mean
    B.  Median

    
    **Number of Text Messages Received**

4.  Select the data set that contains an outlier.

    A.

    

    B.

    

    C.

    

    D.
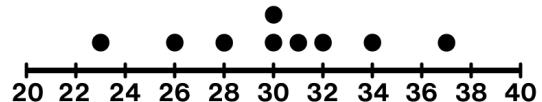
    

# desmos ✏

5.  Here is a data set.

    [26, 30, 31, 32, 28, 30, 34, 37, 23]

    Julian says that 37 is an outlier because it is the maximum value.

    What could you say to Julian to help him understand his mistake?
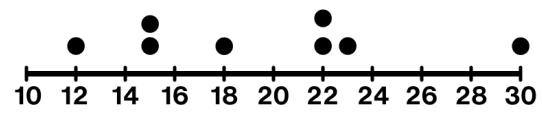
6.  The data set represents the ages of different people in a bike shop.

    [12, 15, 15, 18, 22, 22, 23, 30]
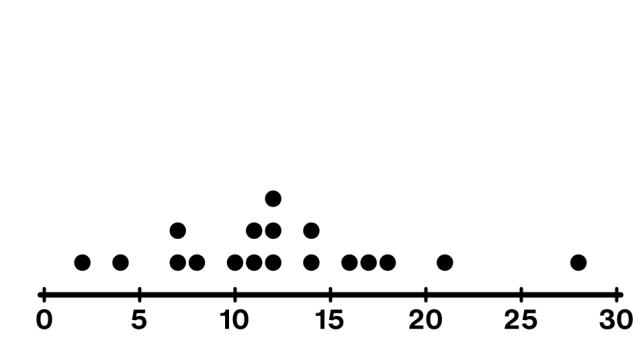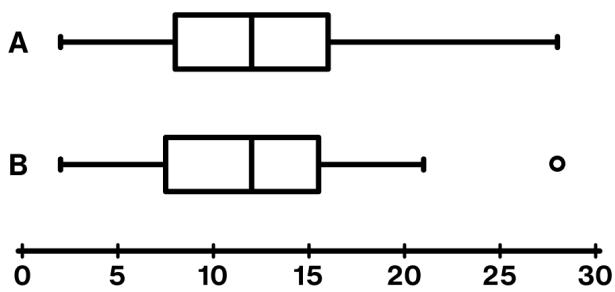
    Which data point would be an outlier if it were added to the data set?

    A. 44                B. 8                C. Both                D. Neither

## Explore

7.  Here are two box plots. Box Plot A represents the data in the dot plot. Remove one point from the dot plot so that it represents Box Plot B.

## Reflect

1.  Put a heart next to the problem you feel most confident about.
2.  Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Order these numbers from least to greatest.
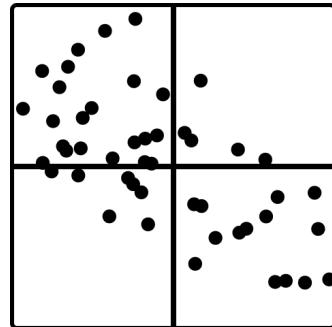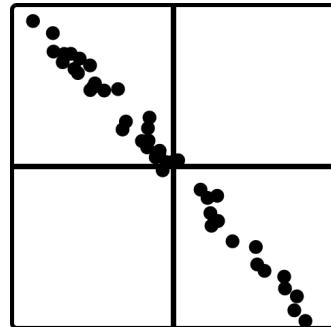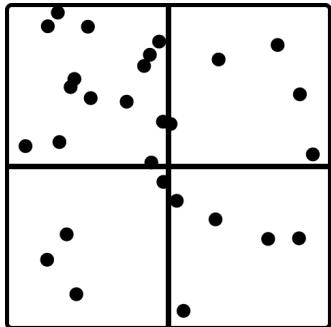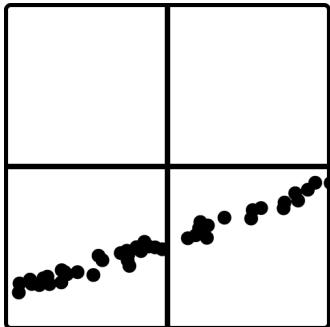
$$\frac{4}{5} \qquad 0.07 \qquad -0.2 \qquad -\frac{9}{10} \qquad 0.65$$

## Practice

2.  Match each scatter plot to the words that describe it.

**No Linear Relationship**          **Weak Linear Relationship**          **Strong Linear Relationship**



3.  Which number could be the correlation coefficient for this scatter plot?
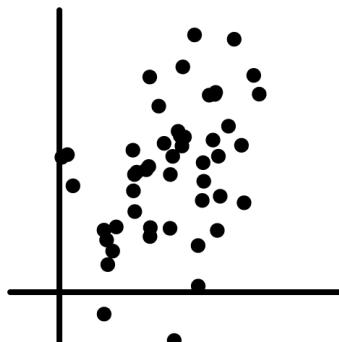
    A.  $0.4$                    B.  $-0.4$

    C.  $0.9$                    D.  $-0.9$
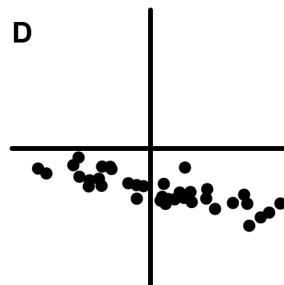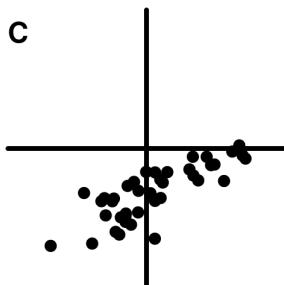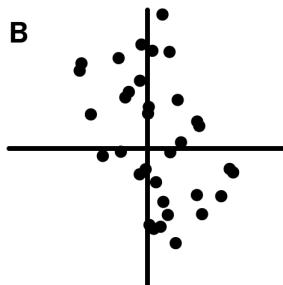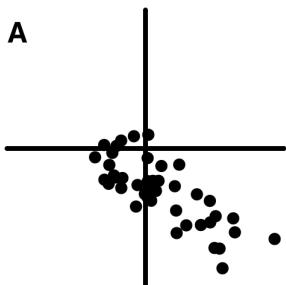
    Explain your thinking.



4.  A scatter plot is found to have a correlation of $r = 0.85$. What does this tell you about the data?
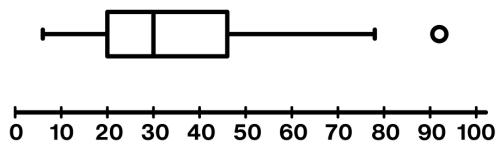
5.  Select **all** of the scatter plots that have an $r$-value of $-0.8$.

**A**

**B**

**C**

**D**

An online store is curious about who buys the fanny packs they sell. The box plot represents the ages of people who have bought fanny packs this year.
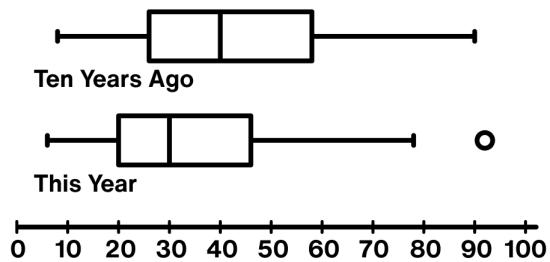
6.1  What is the median age?

**Ages of Fanny Pack Buyers**

6.2  What is the interquartile range?

0   10   20   30   40   50   60   70   80   90   100

7.  The box plots represent the ages of people who bought fanny packs this year compared to ten years ago.

    According to these data sets, which has changed since ten years ago?

    A.  More **younger** people are buying fanny packs now than ten years ago.
    B.  More **older** people are buying fanny packs now than ten years ago.

**Ages of Fanny Pack Buyers**

Ten Years Ago

This Year

0   10   20   30   40   50   60   70   80   90   100

## Reflect
1.  Put a heart next to the problem you feel most confident about.
2.  Use the space below to ask a question or share something you are proud of.

**Unit A1.3, Lesson 12: Practice Problems**          Name _____

## Warm-Up
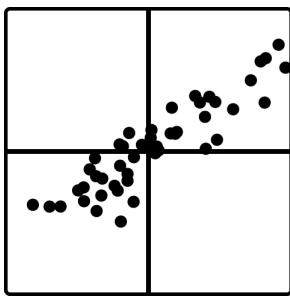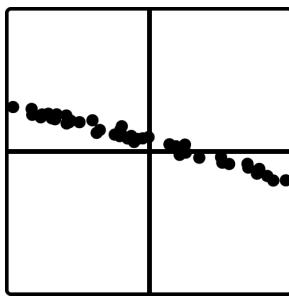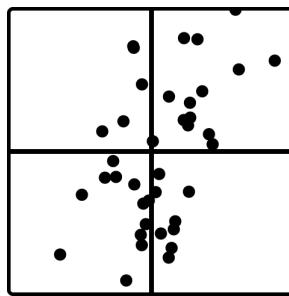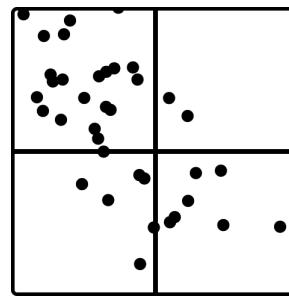
1.  Order these numbers from least to greatest.

$$1.4 \qquad -1.5 \qquad \frac{3}{7} \qquad -1 \qquad 0.5$$

Least  _____,  _____,  _____,  _____,  _____  Greatest

## Practice

2.  Match each scatter plot to its $r$-value.
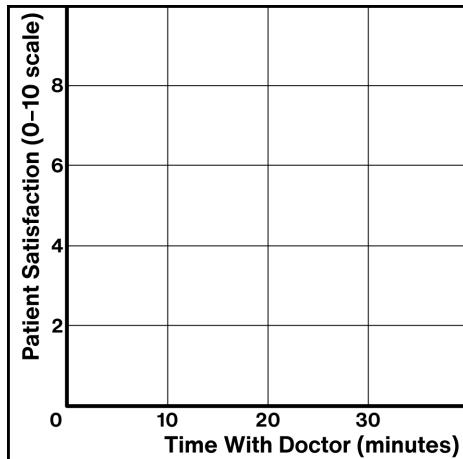
**A.** $0.7$          **B.** $-0.7$          **C.** $0.9$          **D.** $-0.99$



_____          _____          _____          _____

3.  A medical clinic wanted to know about the experiences of their patients. They looked at the following variables:

   ● Patient satisfaction (on a 1-10 scale).
   ● The number of minutes spent with a doctor.

   They found a **weak, positive** relationship.

   Make a scatter plot that could be this data.

# desmos ✏

**Unit A1.3, Lesson 12: Practice Problems**
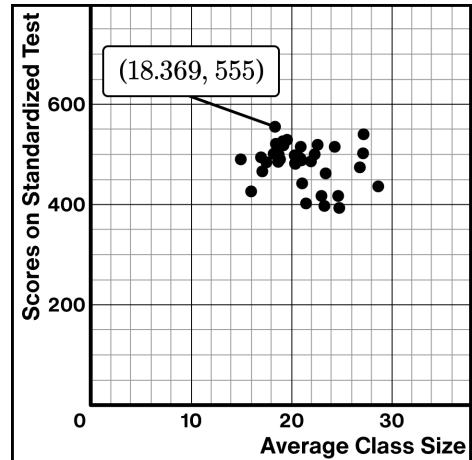
Martina was interested in education systems in different countries.

She found data about two variables for different countries:
- The average class size.
- The scores on a standardized test.

The scatter plot for the data is shown.

4.1 The point $(18.369, 555)$ represents Slovakia.
What do the coordinates tell you about Slovakia?



4.2 The $r$-value for the data is $r = -0.23$.
Is there a positive association, negative association or no association between the variables?
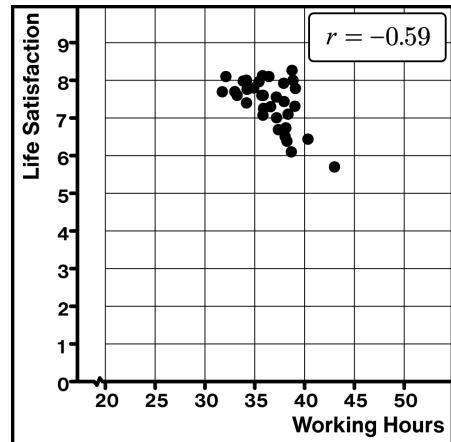
Is there a weak or strong association between the variables?

5. Saanvi was interested in life in different countries.
She found data about two variables:

- Average life satisfaction (on a 1–10 scale).
- The average number of hours people worked in a week.

What does the $r$-value tell you about the relationship between life satisfaction and hours worked?
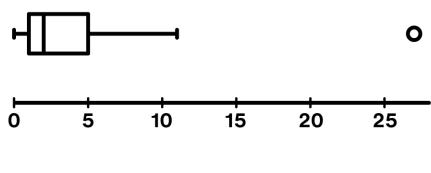


6. The World Series determines which Major League Baseball team is the league champion.

The box plot shows how many World Series championships each team has won.

The San Francisco Giants have won 8 championships.

Where does this put them compared to the other teams?
(Circle your choice)

**Number of World Series Championships**



Lowest 25%                Middle 50%                Top 25%

**Unit A1.3, Lesson 13: Practice Problems**      Name _____

## Warm-Up

1.  Circle **all** of the coordinate pairs that are solutions to $y = 3x + 5$.

    $(5, 3)$          $(4, 17)$          $(0, 5)$          $(3, 5)$          $(1, 8)$

## Practice
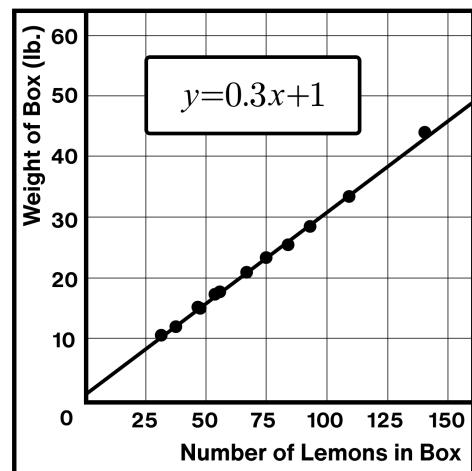
A store receives 12 boxes that contain many different numbers of lemons. They weigh each box and then count the lemons. The data is in the scatter plot.

2.1  A new box weighs 30 pounds.
     Approximately how many lemons are in the box?

2.2  The equation for the line that best fits the data is
     $y = 0.3x + 1$.

     What do the numbers $0.3$ and $1$ mean in this
     context?



$y=0.3x+1$

Weight of Box (lb.) vs Number of Lemons in Box

3.  Other fruits also come in boxes.
    Here are the equations for each fruit's line of fit.

    Order these fruits by weight:
    lemons, mangos, oranges, pomegranates.

    | Heaviest |
    | --- |
    | |
    | |
    | |
    | |
    | Lightest |

$x =$ number of fruits in box
$y =$ weight of box in pounds

Orange
$y = 0.45x + 0.95$

Lemon
$y = 0.3x + 1$

Pomegranate
$y = 1.05x + 1.15$

Mango
$y = 0.85x + 1.25$

# desmos ✎
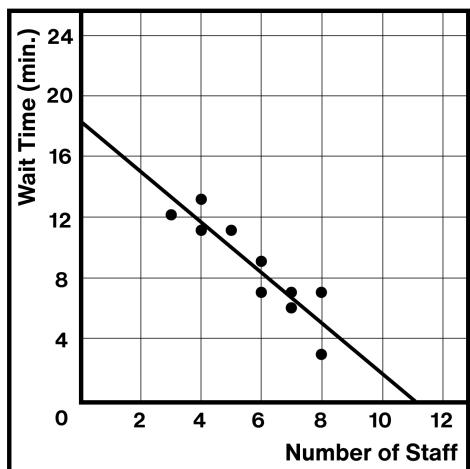
**Unit A1.3, Lesson 13: Practice Problems**

A restaurant gathered data about how long customers had to wait and how many staff members were working.

> The slope of the line of fit is $-1.62$.
> The $r$-value is $-0.9$.

4.1   What does each number mean in this context?
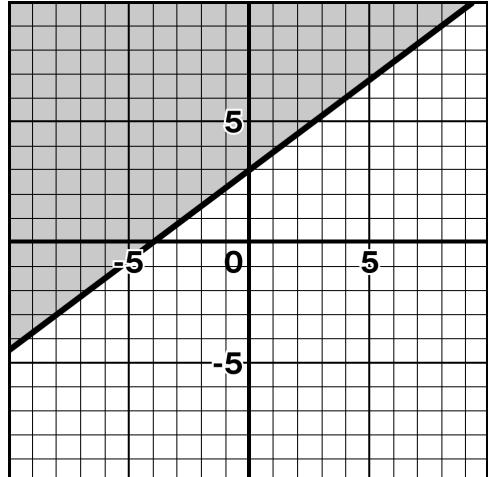


4.2   Madison says that for **any** scatter plot, if the $r$-value is negative, the slope must also be negative.

Is this true or false? Explain your thinking.

## Looking Back

5.   The inequality $y \geq 0.75x + 3$ is graphed.
Select **all** the coordinate pairs that are solutions to the inequality.

☐ $(-9, -5)$
☐ $(0, 3)$
☐ $(-3, 2)$
☐ $(6, 8)$
☐ $(2, -3)$



## Reflect

1.   Put a heart next to the problem you feel most confident about.

2.   Use the space below to ask a question or share something you are proud of.

**Unit A1.3, Lesson 14: Practice Problems**          Name _____

## Warm-Up

1.  Solve each equation for $x$.
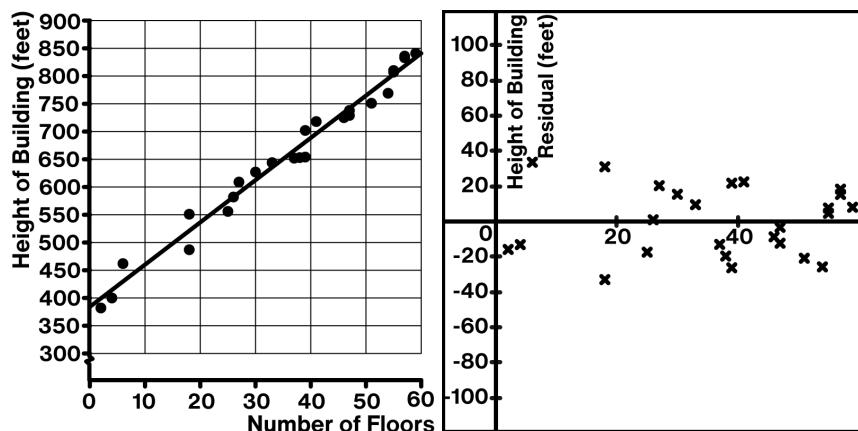
$$y = 3x + 5 \qquad\qquad 4y - 2x = 10 \qquad\qquad y = \frac{1}{6}x$$

## Practice

The scatter plot shows the heights and number of floors of many buildings, and the line that best fits the data.
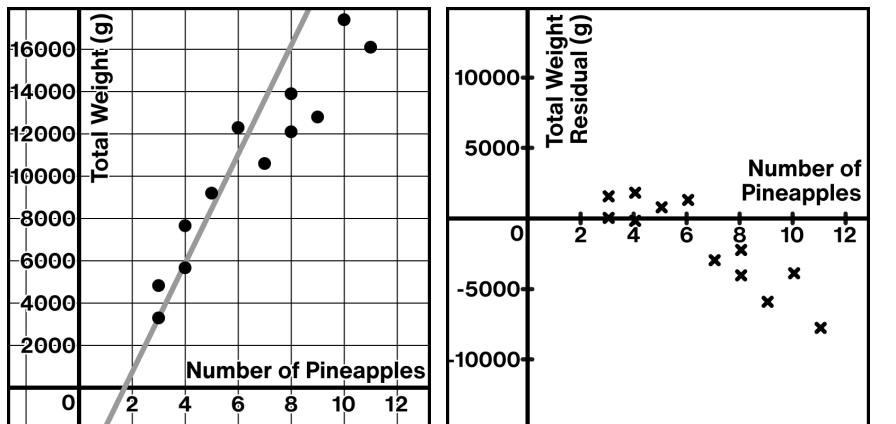
2.1   Predict the height of a building that has 50 floors.



2.2   Explain how you can tell that the graphed line is a good fit for the data. Use the residual plot if it helps with your thinking.
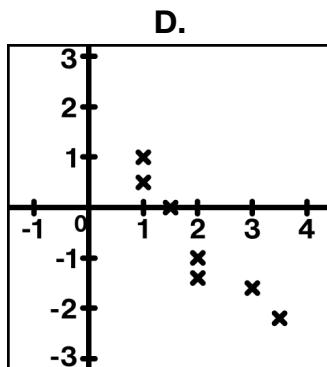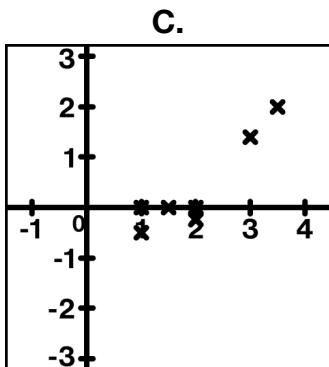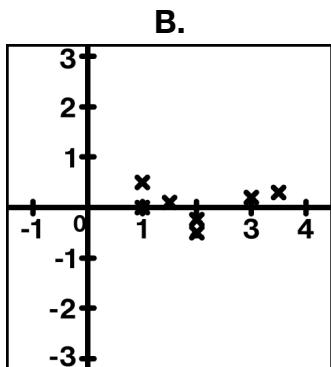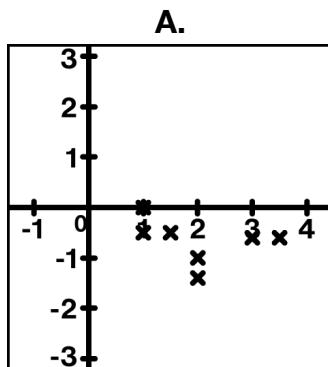
3.    Here is a line of fit and a residual plot.

Draw a line that is a **better** fit for the data.

# desmos ✏

4. These residual plots are from the same set of data, but each one represents a different line of fit. Which residual plot shows the best line of fit? (Circle one.)

**A.**

**B.**

**C.**

**D.**
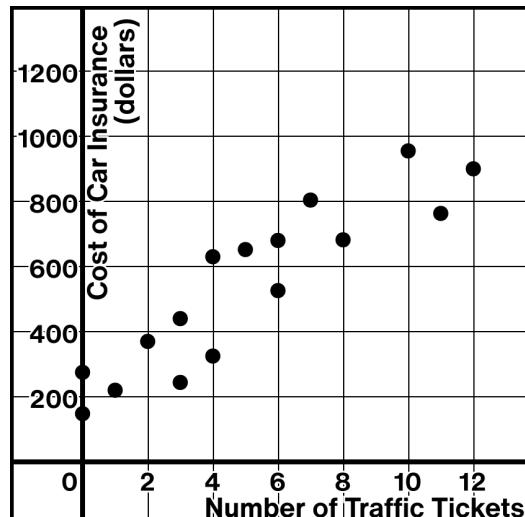
Explain your thinking.

The scatter plot shows the cost of car insurance for many people and the number of traffic tickets they have gotten.

5.1 What is the best estimate for the correlation coefficient ($r$-value) for the data?

   A. $0.25$   B. $-0.25$   C. $0.9$   D. $-0.9$

5.2 Which equation is the best estimate for the line of best fit?

   A. $y = -62x + 220$

   B. $y = 62x + 220$

   C. $y = -220x + 62$

   D. $y = 220x + 62$

Explain your thinking.

## Looking Back

6. Are there any outliers in this data set? Explain your thinking.
   Use a calculator if it helps with your thinking. $[1, 1, 1, 1, 2, 2, 3, 3, 4, 4, 5, 5, 5, 6, 20]$

## Warm-Up

1.   Solve each equation for $y$.

$$7 = 6x - y \qquad\qquad 3y + 15x = 24 \qquad\qquad 4y - x = 44$$

## Practice
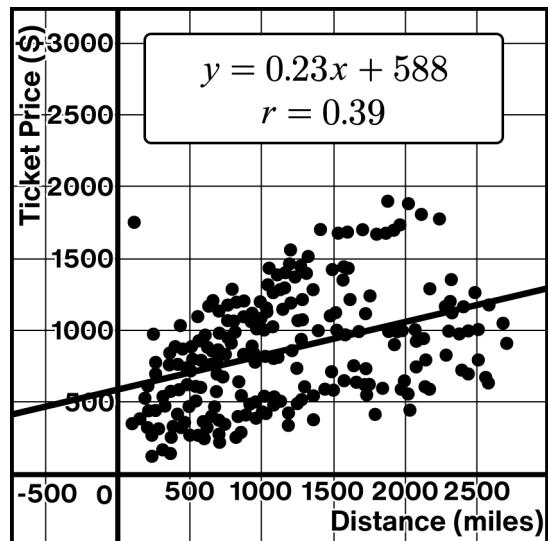
2.   The scatter plot shows the distances of flights and their ticket prices.

The equation for the line of best fit is
$y = 0.23x + 588$.

What does the number $0.23$ mean in this situation?



The distance from Phoenix, Arizona, to Jacksonville, Florida, is 1 795 miles.

3.1   Use the line of best fit to predict the cost of a plane ticket from Phoenix to Jacksonville.

3.2   Do you think the prediction is accurate? Use the $r$-value to explain your thinking.

# desmos ✏

**Unit A1.3, Lesson 15: Practice Problems**
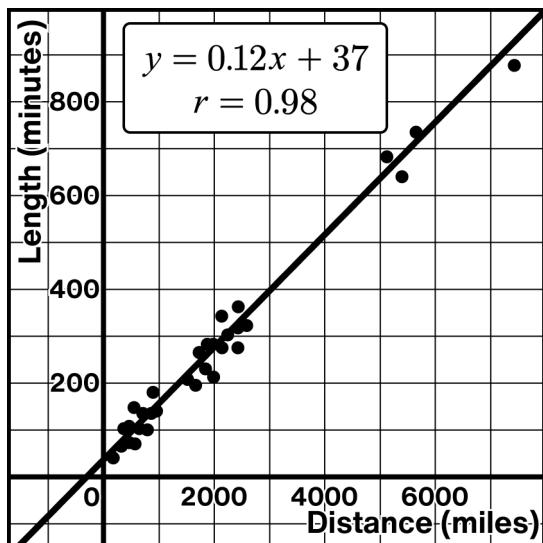
4.  The scatter plot shows the distances of non-stop flights and their lengths in minutes.

    The equation for the line of best fit is
    $y = 0.12x + 37$.

    What does the number $0.12$ mean in this situation?

The distance from Phoenix, Arizona, to Jacksonville, Florida, is 1 795 miles.

5.1  Use the line of best fit to predict the length, in minutes, of a direct flight from Phoenix to Jacksonville.

5.2  Do you think the prediction is accurate? Use the $r$-value to explain your thinking.

6.  The line of best fit $y = -1.83x + 67.4$ was calculated for a data set. Which value could be the $r$-value of the data?

    $r = 0.65$           $r = -0.65$           Both are possible

Here is a data set: $[1, 1, 2, 2, 3, 3, 7, 8, 9, 10, 11, 35]$.

7.1  Complete the table. Use the graphing calculator if it helps with your thinking.

| Min. | Q1 | Median | Q3 | Max. |
|------|----|--------|----|------|
|      |    |        |    |      |

7.2  Are there any outliers in this data set?

         Yes                             No

**Unit A1.4, Lesson 1: Practice Problems**          Name _____

## Warm-Up

1. Use the rule below to complete the table.

   **Rule**: Add 2 to the input, then multiply by 3 to get the output.

| Input | –5 | 0 | 4 |
|-------|----|----|----|
| Output | –9 | | |

## Practice

Predict the missing output of Rule A and B.

Then determine if each of the following rules represent a function. Explain your thinking.

2.1  **Rule A**

| Input | Output |
|-------|--------|
| 4 | blue |
| 6 | purple |
| 6 | yellow |
| 4 | gray |
| 3 | |

2.2  **Rule B**

| Input | Output |
|-------|--------|
| 5 | |
| 6 | 4 |
| 8 | 5 |
| 12 | 7 |

2.3  **Rule C**

Takes any word as an input and writes the word backwards as an output.

3. A machine uses Rule F to turn inputs into outputs. The table shows two inputs and their outputs.

   Hoang tried the input 4 again and the output was not 27.
   He claims that this is enough information to determine whether Rule F is a function.

   Is Hoang correct? Explain how you know.

**Rule F**

| Input | Output |
|-------|--------|
| 2 | 3 |
| 4 | 27 |

4. This table shows every month of the year and how many days are in each month. Imagine a rule where the input is a month and the output is the number of days in that month.

| | J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 28 | | X | | | | | | | | | | |
| 29 | | X | | | | | | | | | | |
| 30 | | | | X | | X | | | X | | X | |
| 31 | X | | X | | X | | X | X | | X | | X |

Does this rule represent a function? Explain your thinking.

## Looking Back
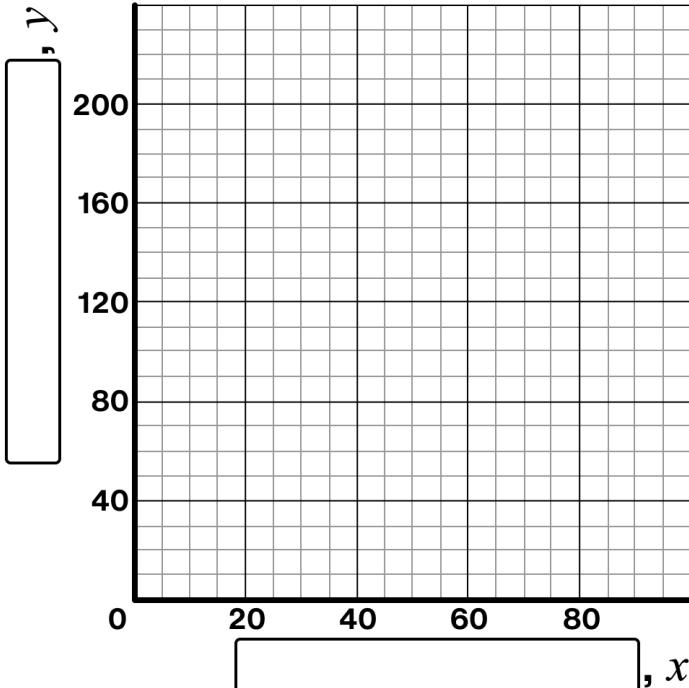
A school sells adult tickets and student tickets for a sports game.

Adult tickets cost $5 each and student tickets cost $2 each. They collected $400 in total.

5.1 Write an equation that represents the relationship.

Use $x$ to represent the number of adult tickets sold and $y$ to represent the number of student tickets sold.

5.2 Sketch a graph representing this relationship. Make sure to label the axes



## Reflect

1. Put a heart next to a question that you understand well.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Using the table of $f(x)$, determine the missing values in the function statements:

    $f(\_\_) = 23$

    $f(-5) = \_\_\_$

    $f(\_\_) = -5$

| $x$ | $f(x)$ |
|-----|--------|
| -5  | 17     |
| -2  | -5     |
| 5   | 23     |

## Practice

The function $f(t)$ gives the temperature, in degrees Celsius, $t$ hours after midnight.

2.1  Select the equation that represents the statement: *At 1:30 AM, the temperature was* 20°C.

    **A.** $f(1.3) = 20$　　　　**B.** $f(1.5) = 20$　　　　**C.** $f(20) = 1.3$　　　　**D.** $f(20) = 1.5$

Use function notation to represent each statement.

2.2  The temperature at 2 AM.　　　　　　　　　　　　　　　　_____

2.3  The temperature was the same at 9 AM and at 11 AM.　　　_____

2.4  It was warmer at 9 AM than at 6 PM.　　　　　　　　　　_____

2.5  Sometime after midnight, the temperature was 24°C.　　　　_____


A restaurant sells three different salads.

They use the functions $c(x)$, $g(x)$, and $p(x)$ to represent the price of their Caesar, Garden, and Pasta salads in dollars, with $x$ additional ingredients added.

Explain the meaning of each statement:

3.1　$g(0) = 10$


3.2　$g(3) > c(1)$
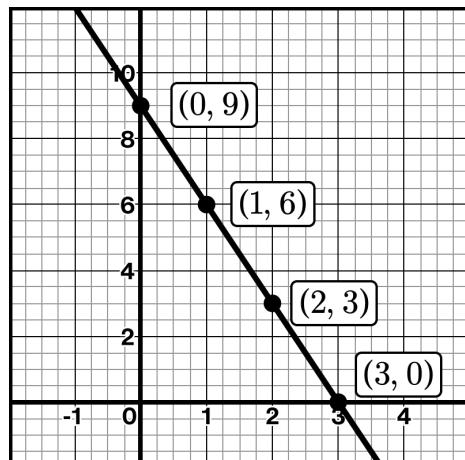

3.3　$p(2) < g(3)$

# desmos ✎

## Looking Back

4. Here's a graph of a relationship and its table of values. Write a linear equation to represent this relationship.

| $x$ | $y$ |
|-----|-----|
| 0 | 9 |
| 1 | 6 |
| 2 | 3 |
| 3 | 0 |



(0, 9)
(1, 6)
(2, 3)
(3, 0)

## Explore

5. Desminos Pizza's online menu offers small, medium, and large pizzas.

   Using the digits 0–9, without repeating, fill in each blank such that each equation is true.

**MENU**

| SIZE | PRICE |
|------|-------|
| SMALL | $12 + $1 PER TOPPING |
| MEDIUM | $15 + $2 PER TOPPING |
| LARGE | $18 + $3 PER TOPPING |

$$s(\square) = m(\square)$$
$$m(\square) = l(\square)$$
$$l(\square) = s(\square)$$

## Reflect

1. Star the question you spent the most time on.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1. Let $f(x) = 2x + 5$.

   Calculate the value of each function notation expression. The first value has already been completed for you.

| Expression | Value |
|---|---|
| $f(0)$ | $f(0) = 2(0) + 5$ <br> $f(0) = 5$ |
| $f(4)$ | |
| $f(6)$ | |
| $f(-3)$ | |

## Practice

A toy factory makes toy bunnies. Each toy bunny holds a carrot. A bunny's height, $h(x)$, is three times the length of the carrot, $x$.

2.1 Complete the table.

| $x$ | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| $h(x)$ | | | | | | |

2.2 Write an equation for the function $h(x)$.

3. The functions $f(x)$ and $g(x)$ are defined by these equations:

$$f(x) = -15x + 80 \qquad\qquad g(x) = 10x + 25$$

   Which is greater: $f(2)$ or $g(2)$? Explain your thinking.

The function $p(s)$ gives the perimeter of an equilateral triangle of side length $s$. It is represented by the equation $p(s) = 3s$.

4.1 What is the value of $p(20)$?

4.2 What does your answer mean in this context?

# desmos ✏

**Unit A1.4, Lesson 3: Practice Problems**

5. Model rockets are created in various sizes. The height of a rocket in inches, $h(x)$, depends on the radius of the base of the rocket in inches, $x$.

   Use the table to write an equation for $h(x)$ that outputs the height of the rocket with a base radius, $x$.

| Radius, $x$ | Height, $h(x)$ |
|:---:|:---:|
| 1 | 5 |
| 3 | 13 |
| 5 | 21 |
| 10 | 41 |
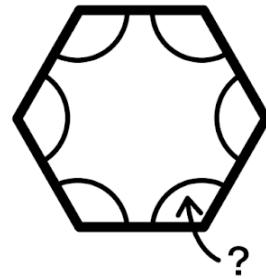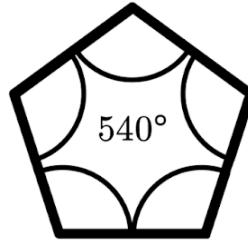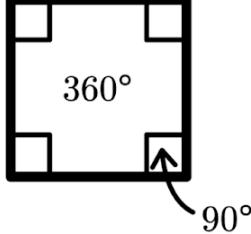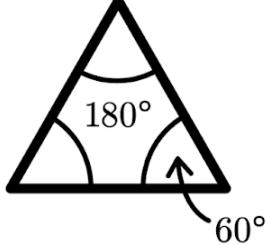
## Looking Back

The function $w(t)$ gives the weight of a puppy, in pounds, as a function of its age $t$, in months. Explain the meaning of each statement.

6.1 $w(2) = 5$

6.2 $w(6) > w(4)$

6.3 $w(12) = w(15)$

## Explore

A regular polygon is a polygon where all side lengths are equal and all interior angle measures are equal. Here are four regular polygons with interior angles labeled.
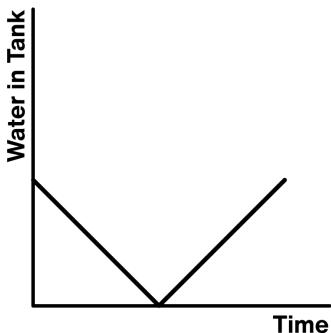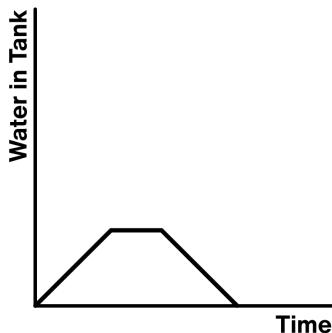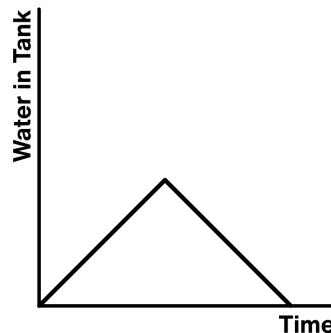


7.1 Write an equation for the interior angle of any regular polygon, where $n$ represents the number of sides.

7.2 Use your equation to determine the interior angle of a regular hexagon.

## Reflect

1. Circle the question you think will help you most on the end of unit assessment.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1. An empty water tank is filled until it is half full. Two minutes later, it drains until it is empty again. Which graph could represent this situation? Circle your choice.
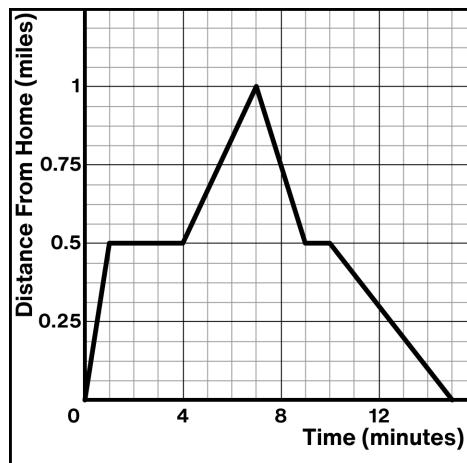
| **Graph A** | **Graph B** | **Graph C** |
|:---:|:---:|:---:|
|  |  |  |

## Practice

Prisha rode her bike around town. Her fitness tracker made a graph to represent the distance she was from her home at any given time during her ride.



2.1   How many minutes was Prisha's bike ride?

2.2   What was the farthest distance she was from her home?
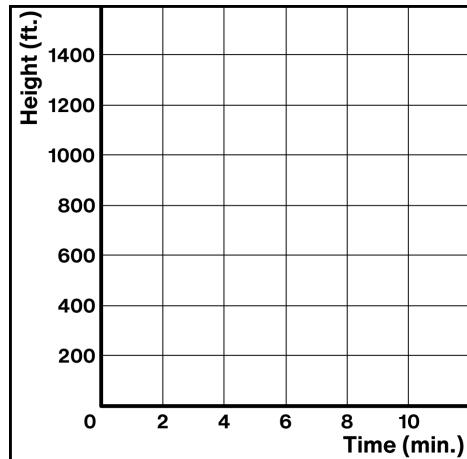
2.3   Did Prisha take any rest periods?
       If so, how long did she rest in total?

3. The relationship between time spent in the air and the height of a hot air balloon can be expressed as a function.

   Use the following information to sketch a possible graph of the function.

   - Rises a vertical distance of 1000 feet in 2 minutes.
   - Continues to rise for another minute until it reaches a maximum height of 1200 feet.
   - Maintains a height of 1200 feet for 2.5 minutes.
   - Descends for the next 4 minutes until it lands on the ground.

# desmos ✎
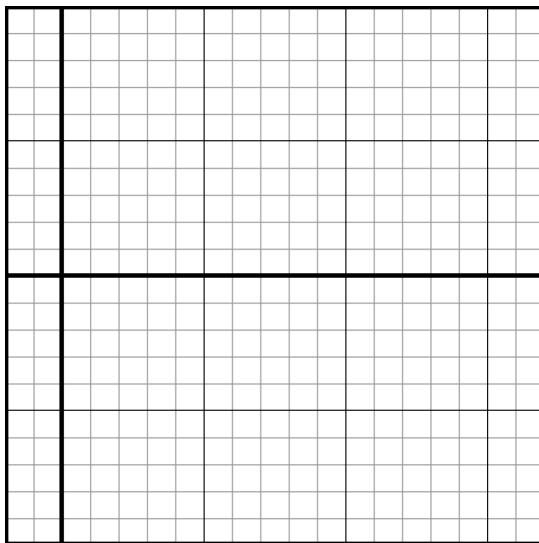
**Unit A1.4, Lesson 5: Practice Problems**

4.  Aba describes her morning at school yesterday like this:

    *I entered the school on the ground floor, then walked up the stairs to the third floor to attend an hour-long class. Afterward, I had an hour-long class in the basement, then I went up to the ground floor and sat outside to eat my lunch.*

    Sketch a possible graph of Aba's height from the ground floor as a function of time. Label both axes.

## Looking Back

5.  $p(t)$ represents the height of water in a bathtub, in inches, after $t$ minutes. Match each sentence to its equation.

    **A.** After 20 minutes, the bathtub is empty.

    **B.** The bathtub starts out with no water.

    **C.** After 10 minutes, the height of the water is 4 inches.

    **D.** The height of the water is 10 inches after 4 minutes.

    **E.** The height of the water is $w$ inches after $t$ minutes.

    _____ $p(10) = 4$
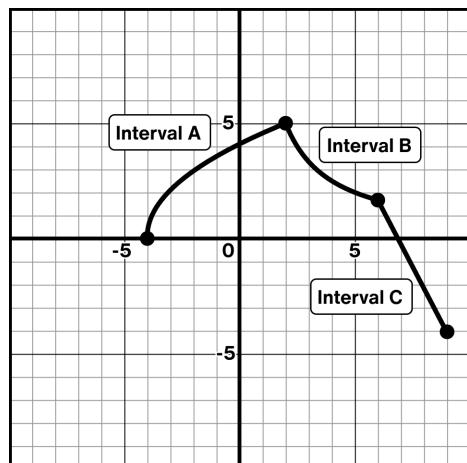
    _____ $p(t) = w$

    _____ $p(20) = 0$

    _____ $p(0) = 0$

    _____ $p(4) = 10$

## Reflect

1.  Circle a question you want to talk to a classmate about.
2.  Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Select **all** the true statements about this graph.
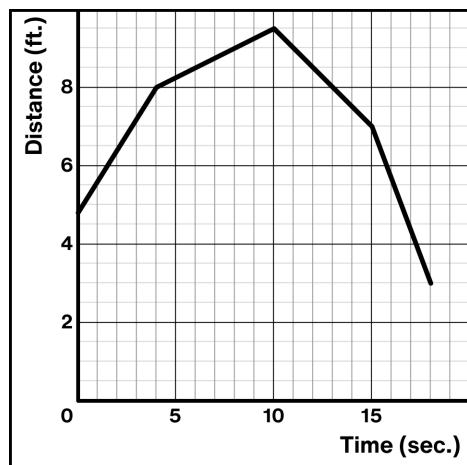
    ☐  This graph is a function.

    ☐  Interval A is decreasing.

    ☐  Interval B is decreasing

    ☐  The maximum is at $(2, 5)$.

    ☐  The minimum is at $(-4, 0)$.



## Practice

2.  Manuel is watching his little brother at the park.

    The graph represents the distance Manuel is from his brother as a function of time.
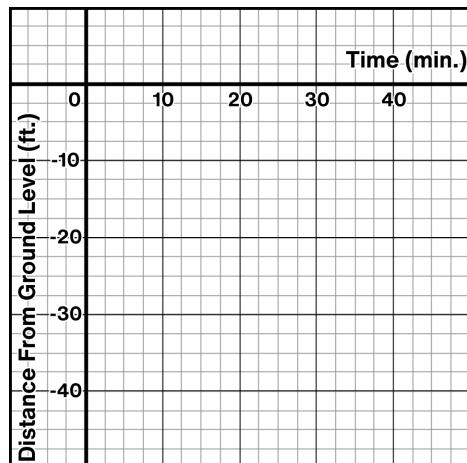
    Describe Manuel's distance from his brother over time. Use terms that you learned in this lesson.



3.  Ivory goes on a tour of a cave. The tour starts at ground level.
    *   The tour stays at this level for 15 minutes.
    *   Then the tour descends (goes down) for 15 minutes to a depth of 20 feet below ground level.
    *   The tour stays at this level for 10 minutes.
    *   The tour spends the last 5 minutes ascending (going up) to ground level.

    Sketch a possible graph describing Ivory's elevation as a function of time.

# desmos ✏️
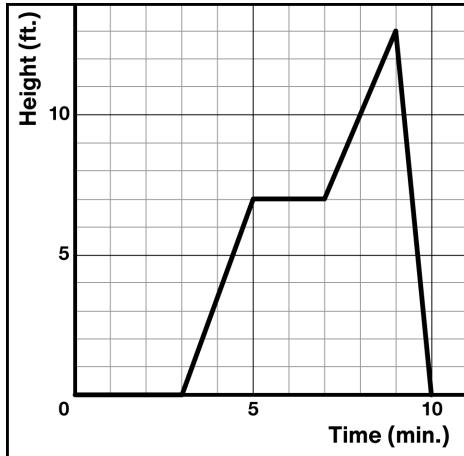
**Unit A1.4, Lesson 6: Practice Problems**

4. A squirrel is searching for food on the ground and in trees.

   The graph represents the height of the squirrel $h(t)$, in feet, as a function of time $t$, in minutes.

   Select **all** of the statements that are true.

   ☐ The squirrel spent more time in the trees than on the ground.

   ☐ The squirrel's height is always increasing.

   ☐ The squirrel spent a total of 4 minutes climbing up.

   ☐ The squirrel moved faster when it was climbing down the tree than when it was climbing up.

   ☐ 10 feet is the maximum height the squirrel climbed.

   

## Looking Back

5. Consider the function $h(x) = 4x - 11.2$. What is the value of $h(4)$?

   **A.** $16$      **B.** $-3.2$      **C.** $-28.8$      **D.** $4.8$

6. Consider the function $f(x) = 2x + 11$.
   Determine the value of $c$ that makes $f(c) = 37$ true.
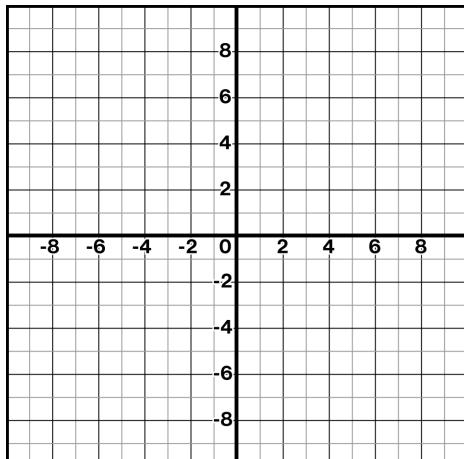
## Explore

7. Here are three statements:
   - The function is always positive.
   - The function is sometimes increasing.
   - The function is sometimes decreasing.

   Sketch a graph of a function such that two of the statements are true and one is a lie.

   

## Reflect

1. Put a heart next to a question you are most proud of.
2. Use the space below to ask a question or share something you are proud of.

## Warm-Up

1.  Use the graph to match each interval to its average rate of change.

| Interval | Average Rate of Change |
|---|---|
| $A$ to $B$ | _____ $\dfrac{1}{5}$ |
| $B$ to $C$ | _____ $\dfrac{1}{4}$ |
| $A$ to $C$ | _____ $\dfrac{1}{6}$ |

## Practice

The temperature was recorded at several times in a 24-hour period.
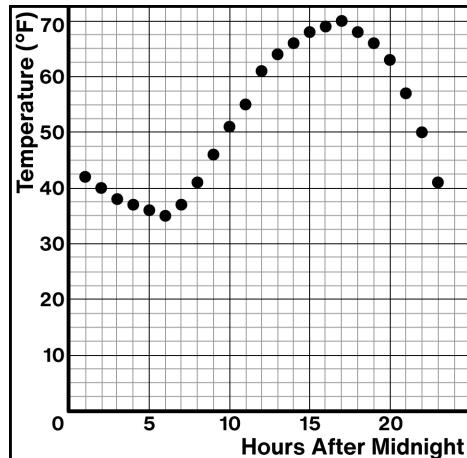
Function $t(n)$ gives the temperature in degrees Fahrenheit $n$ hours after midnight.

Use the graph to determine if the average rate of change for each interval is *positive*, *negative*, or *zero*.

2.1   $n = 1$ to $n = 5$          _____

2.2   $n = 5$ to $n = 7$          _____
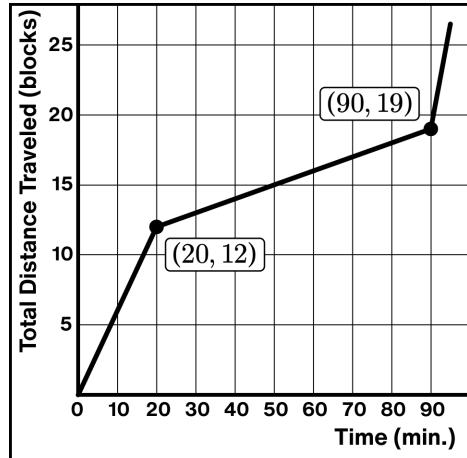
2.3   $n = 10$ to $n = 20$       _____

The graph shows the total distance in city blocks, $d(t)$, that Pilar walked as a function of time in minutes, $t$.

3.1   Determine the average rate of change between $t = 20$ and $t = 90$.

3.2   What do you think the average rate of change you calculated means in this situation?

# desmos ✏

**Unit A1.4, Lesson 7: Practice Problems**

The table gives the population of a city from 1988 to 2016.

4.1 Determine the average rate of change for $p(t)$ between 1992 and 2000.

4.2 Select two values of $t$ that create an interval with a **negative** average rate of change. Determine the average rate of change of this interval.

4.3 Select two values of $t$ that create an interval with a **positive** average rate of change. Determine the average rate of change of this interval.

| Year, $t$ | Population, $p(t)$ |
|-----------|-------------------|
| 1988 | 35 700 |
| 1992 | 42 700 |
| 1996 | 33 100 |
| 2000 | 33 700 |
| 2004 | 45 000 |
| 2008 | 48 400 |
| 2012 | 40 900 |
| 2016 | 43 000 |

## Looking Back

5. Jada is walking to school. The function $d(t)$ gives her distance from school, in meters, $t$ minutes since she left home. Which equation represents the statement:

   *Jada is* 600 *meters from school after* 5 *minutes.*

   A. $d(5) = 600$      B. $d(600) = 5$      C. $t(5) = 600$      D. $t(600) = 5$

## Explore
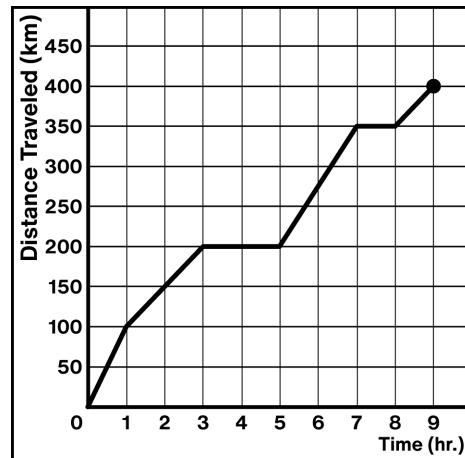
6. Mayra's car trip was 400 kilometers and took 9 hours.

   Using the digits 0–9, without repeating, fill in each blank such that each interval has the same average rate of change.

   ☐ to ☐ hours

   ☐ to ☐ hours

   ☐ to ☐ hours

**Unit A1.4, Lesson 8: Practice Problems**      Name _____

## Warm-Up

1. Mai built a model racecar to race for a school competition. $m(t)$ gives Mai's car's distance after $t$ seconds.

   Use the graph to determine the missing value in each function statement.
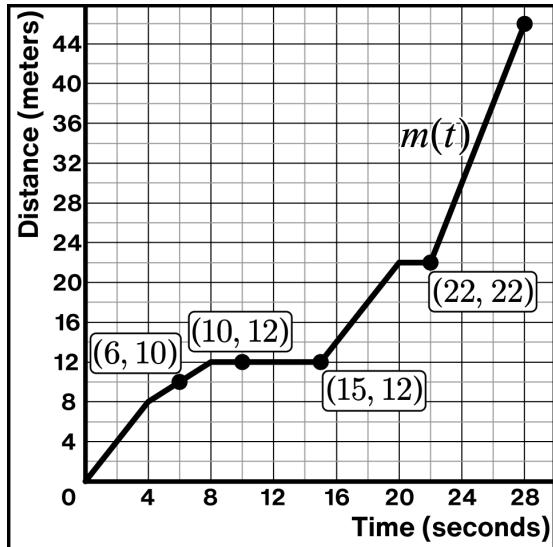
   $m(\underline{\hspace{0.8cm}}) = 10$

   $m(10) = \underline{\hspace{1cm}}$

   $m(15) = \underline{\hspace{1cm}}$

   $m(22) = \underline{\hspace{1cm}}$

   $m(\underline{\hspace{0.8cm}}) = 46$



## Practice
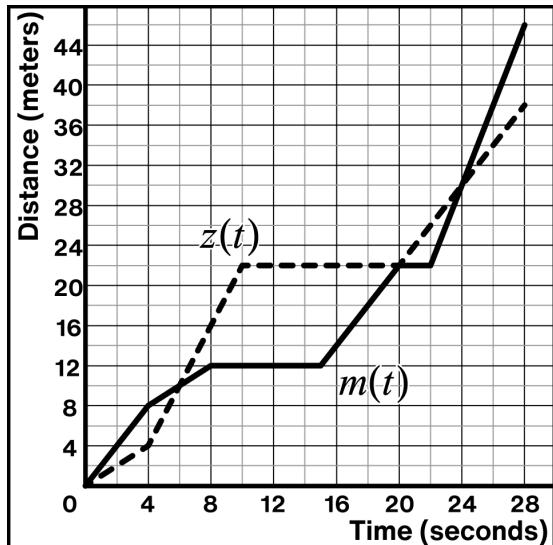
Zion also built a model racecar for the school competition.

The graph shows the distance of Zion's car $z(t)$ after $t$ seconds and the graph for Mai's car, $m(t)$.

Who had the greater average rate of change over the following intervals? Explain your thinking.

2.1   $t = 4$ to $t = 8$

2.2   $t = 10$ to $t = 20$

**Unit A1.4, Lesson 8: Practice Problems**
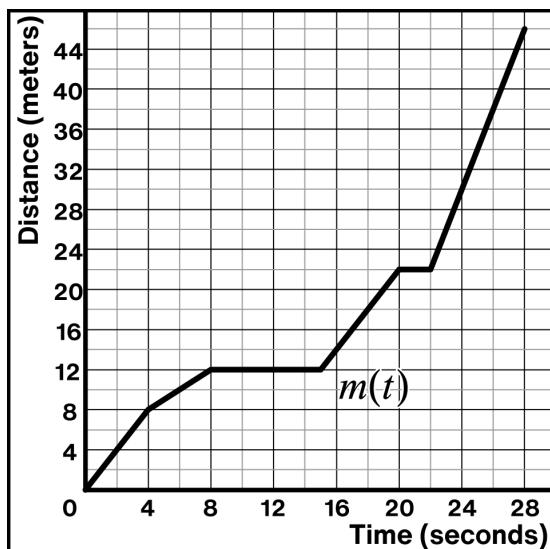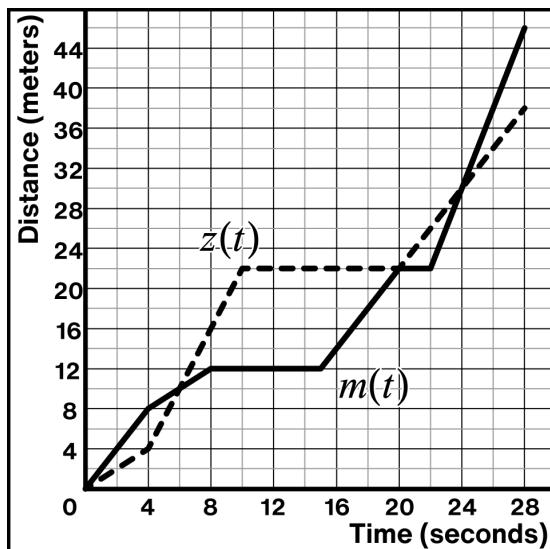
3. Use the graph of $m(t)$ and $z(t)$ to determine **all** the true statements.

   ☐ $m(t)$ has a greater maximum than the maximum of $z(t)$.

   ☐ $z(t)$ and $m(t)$ have the same minimum at $(6, 10)$.

   ☐ $z(20) = m(20)$

   ☐ $m(t)$ and $z(t)$ are both increasing from 22 to 28 seconds.

   ☐ $m(15) > z(15)$



4. Parv made a racecar to race against Mai. Here is the graph of Mai's racecar.

   Make a graph that could represent Parv's racecar's distance after $t$ seconds:
   - $p(8) < m(8)$
   - $p(12) = m(12)$
   - The average rate of change of $p(t)$ and $m(t)$ is the same from $t = 22$ to $t = 28$.
   - The maximum of $m(t)$ is greater than the maximum of $p(t)$.



## Looking Back

Nekeisha goes for a bike ride. $d(t)$ represents the distance from home, in miles, $t$ minutes after Nekeisha leaves. Explain the meaning of each statement in context.

5.1  $d(0) = 0$

5.2  $d(30) = d(60)$

5.3  $d(90) = 0$

## Warm-Up
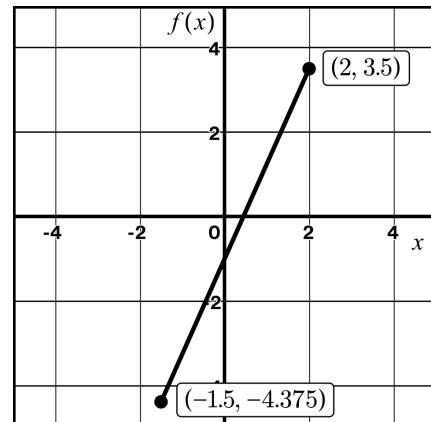
1.  Tickets to the state fair cost $10 each. The function $c(t) = 10t$ gives the cost in dollars for the number of tickets purchased, $t$. Select **all** values that are possible outputs for $c(t)$.

    ☐ 0            ☐ 70            ☐ 105            ☐ 880            ☐ 963

## Practice

2.  Valeria and Thiago disagree about the domain of the graph of the function.

    - Valeria says the domain is $-1.5 \le x \le 2$
    - Thiago says the domain is $-4.375 \le x \le 3.5$

    Who is correct? Why is the other person incorrect? Explain your thinking.

    

Haru bikes to his friend's house. After visiting for a while, Haru heads home. On the way, he stops at the market to buy a bottle of water. $d(t)$ represents Haru's distance from his house, in kilometers, after $t$ hours.
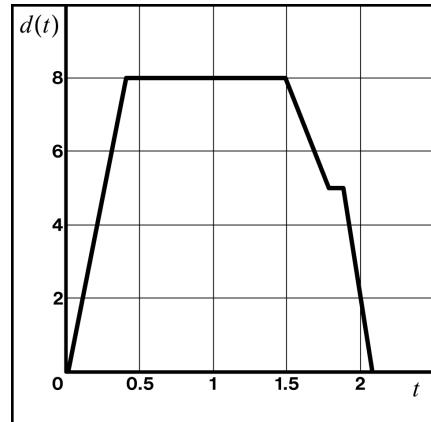
3.1  Which describes the domain of $d(t)$?

   A.  $0 \le d(t) \le 2.1$
   B.  $0 \le d(t) \le 8$
   C.  $0 \le t \le 2.1$
   D.  $0 \le t \le 8$



3.2  Which describes the range of $d(t)$?

   A.  $0 \le d(t) \le 2.1$
   B.  $0 \le d(t) \le 8$
   C.  $0 \le t \le 2.1$
   D.  $0 \le t \le 8$
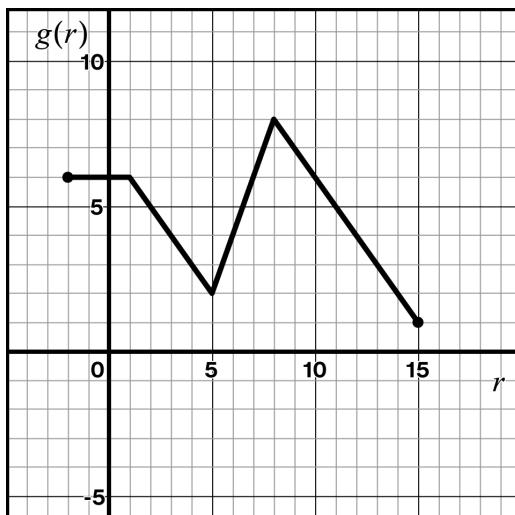
3.3  If Haru had not stopped at the market, which would have changed: the domain or the range? Explain your thinking.

# desmos ✏️

**Unit A1.4, Lesson 10: Practice Problems**

Here is a graph of $g(r)$.



**4.1** Write a compound inequality to describe the domain.

**4.2** Write a compound inequality to describe the range.

## Looking Back

5. Refer to the graph of $g(r)$ in problem 4.
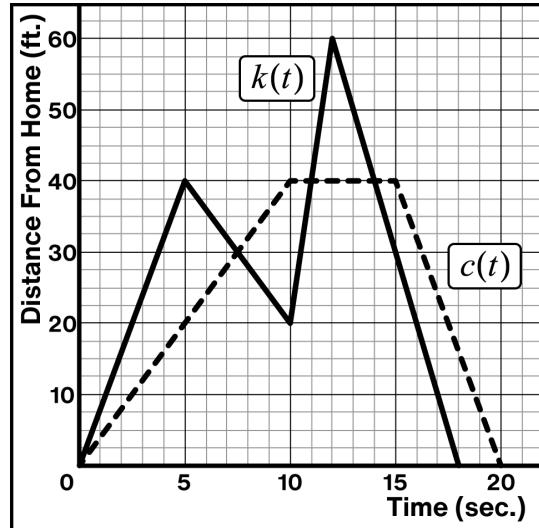
   Determine the average rate of change for each interval.

| Interval | Average Rate of Change |
|---|---|
| $r = -2$ to $r = 1$ | |
| $r = -2$ to $r = 5$ | |
| $r = -2$ to $r = 8$ | |

6. Functions $c(t)$ and $k(t)$ give the distance of two cats from home after $t$ seconds.

   Select **all** of the true statements.

   ☐ $k(5) > c(5)$

   ☐ $k(t)$ and $c(t)$ have the same domain and range.

   ☐ $k(t)$ is always increasing from 0 to 13 seconds.

   ☐ $k(11) = c(11)$

   ☐ Both cats return home.

## Warm-Up

Here is the graph of a function.

1.1   What is the domain of the function?

   A. $x \geq 0$     B. $x \geq -2$     C. $x \leq -2$     D. $x \geq 1$
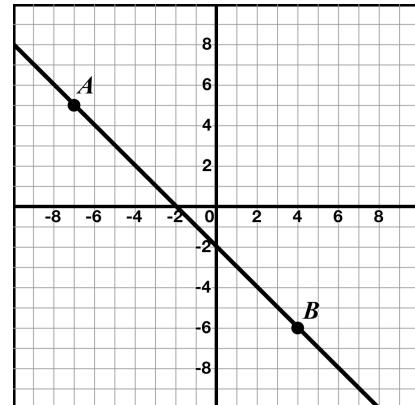
1.2   What is the range of the function?

   A. $y \geq 0$     B. $y \geq -2$     C. $y \leq 1$     D. $y \geq 1$

## Practice

2.   Fill in the blanks for the domain and range of $y = -x - 2$
   to restrict the graph from point $A$ to point $B$.

   _____ $\leq x \leq$ _____

   _____ $\leq y \leq$ _____

Precious leaves her home to go to the grocery store. This is her path:
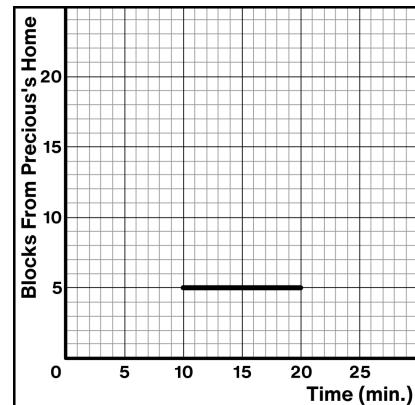
- She walks to the store, which is 5 blocks away, at a speed of half of a block per minute.
- She is in the store for 10 minutes.
- She runs back home at a speed of 1 block per minute.

Part of her path is shown on the graph.

3.1   Sketch the graph of the missing pieces of Precious's path.

3.2   Which of these equations represents the beginning piece of Precious's path? Explain your thinking.

   A.   $y = 0.5x$
        $\{0 < x < 5\}$

   B.   $y = 0.5x$
        $\{0 < x < 10\}$

   C.   $y = -x$
        $\{20 < x < 25\}$

   D.   $y = -x + 15$
        $\{10 < x < 20\}$

# desmos ✏️

**Unit A1.4, Lesson 11: Practice Problems**
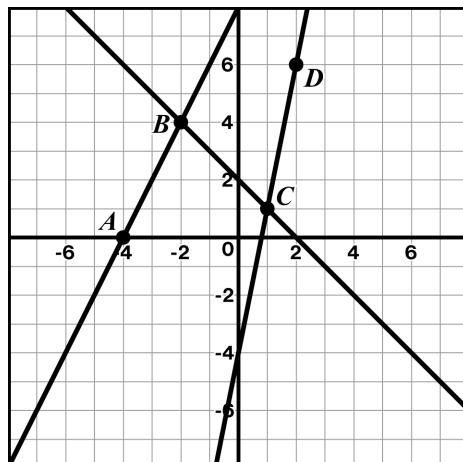
Sneha attempts to connect points $A$ to $B$ to $C$ to $D$ with three segments. She graphs three lines but needs help restricting each line's domain.

Determine the domain restriction for each of the lines.

    4.1    Domain restriction for $A$ to $B$:

    4.2    Domain restriction for $B$ to $C$:

    4.3    Domain restriction for $C$ to $D$:

## Looking Back

Elena is deciding between two cafeteria meal plans:

**Plan 1:** Each meal costs $2.50.          **Plan 2:** One month of meals costs $30.
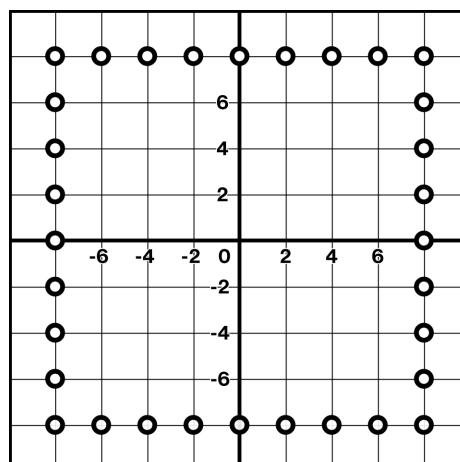
    5.1    Write an equation for $f(n)$ that gives the cost of buying $n$ meals under Plan 1 for a month.

    5.2    Write an equation for $g(n)$ that gives the cost of buying $n$ meals under Plan 2 for a month.

    5.3    Elena estimates that she will buy 15 meals per month. Which meal plan should she choose? Explain your thinking.

## Explore

    6.    Connect some dots on the graph with line segments to create a design. Then write the equations with their domain or range restriction to represent each line segment in your design.

# desmos ✏ Science Mom Lesson 41

**Unit A1.4, Lesson 12: Practice Problems**      Name _____
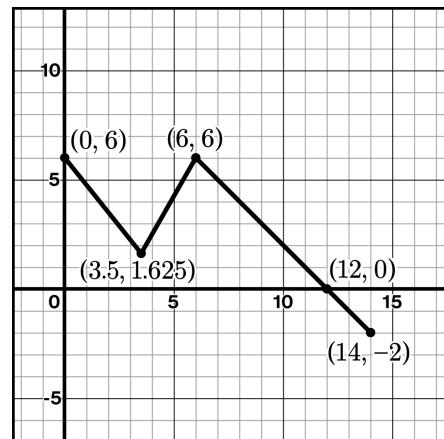
## Warm-Up

Use the graph of f(x) to determine the following:

1.1   $f(0)$

1.2   $x$ when $f(x) = 0$



$(0, 6)$   $(6, 6)$

$(3.5, 1.625)$   $(12, 0)$

$(14, -2)$

## Practice

Inola is not feeling well. She decides to monitor her temperature for 24 hours. The graph represents her recorded temperatures.

2.1   Explain what each term says about Inola's temperature.
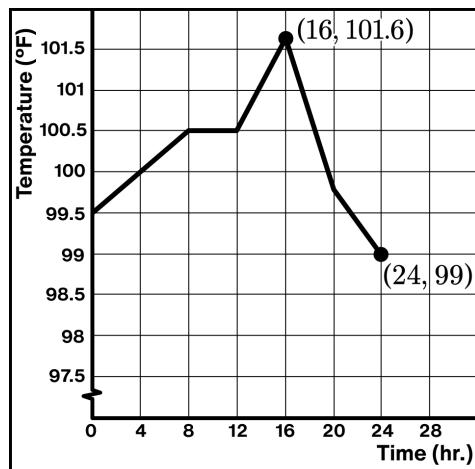
Maximum:

Minimum:

Increasing interval:

Decreasing interval:
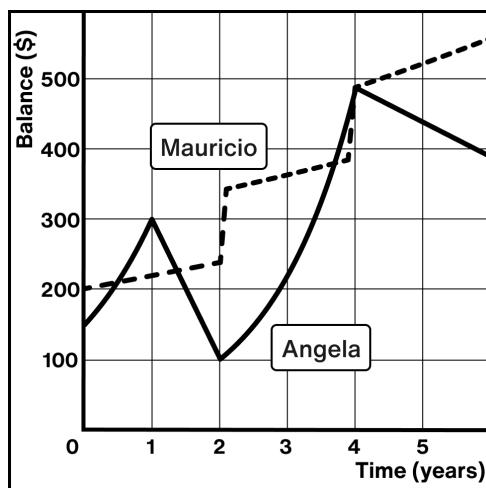
2.2   There are two points labeled on the graph.
What is the average rate of change for that interval?



$(16, 101.6)$

$(24, 99)$

Temperature (°F)

Time (hr.)

3.   Mauricio and Angela each drew a graph of their savings account balances.

Select **all** of the statements that are true.

☐ Angela's balance is always less than Mauricio's.

☐ Maurico's balance is increasing from year 0 to year 6.

☐ Mauricio has a higher average rate of change in the first four years.

☐ These graphs have the same domain.

☐ These graphs have the same range.



Balance ($)

Mauricio

Angela

Time (years)

# desmos ✎
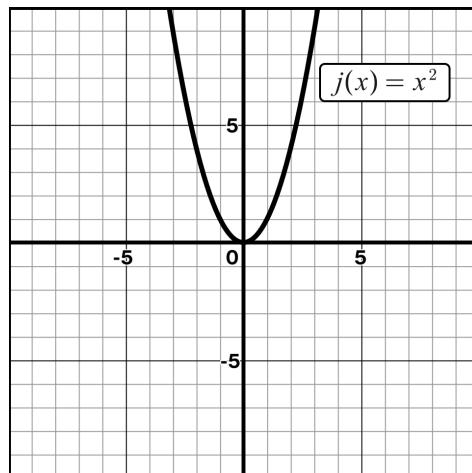
**Unit A1.4, Lesson 12: Practice Problems**

## Looking Back

Jamal is trying to write his name using graphing technology.

4.1   How could he restrict the domain of the graph of $j(x) = x^2$ so that it creates a J?


$j(x) = x^2$

4.2   Could Jamal restrict the range instead to accomplish the same thing? Explain your thinking.
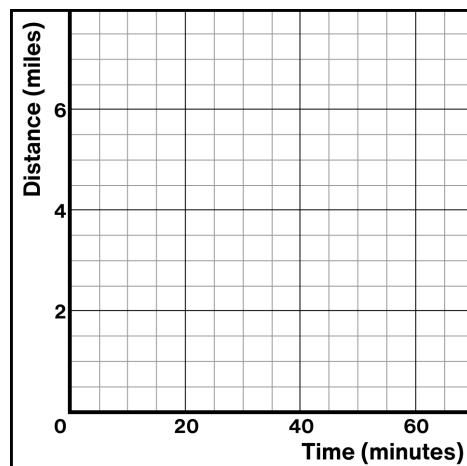
Kanna runs for 20 minutes at a constant rate and goes a total distance of $2.5$ miles. She stops and rests for 15 minutes. She then runs 2 more miles for 25 minutes at a constant rate.
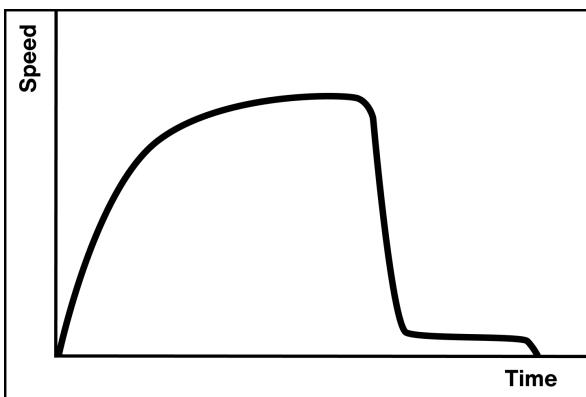
5.1   Sketch a graph to represent this situation.

5.2   What is the domain of this situation and what does it represent?

5.3   What is the range and what does it represent?



## Explore

Here is a graph of speed and time. Which sport do you think produced this graph?



A.  Fishing      B.  Skydiving      C.  100-yard sprint

D.  Golf          E.  Soccer          F.  Something else

Explain how you think that sport fits the graph.
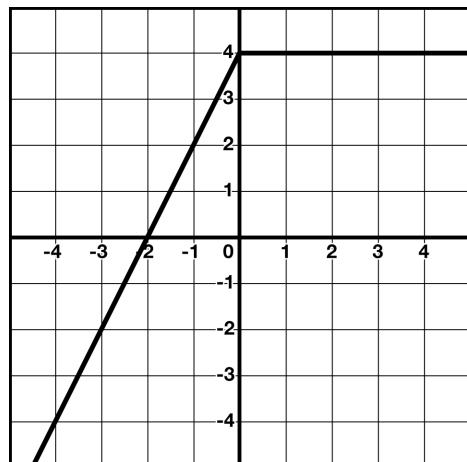
**Unit A1.4, Lesson 13: Practice Problems**        Name _____

## Warm-Up

Here is the graph of $f(x)$. Determine the following values from the graph.

1.1   $f(-3)$

1.2   $f(0)$

1.3   $f(3)$



## Practice

Determine the following values of the piecewise-defined function $g(x)$.

2.1   $g(0)$

2.2   $g(2)$

2.3   $g(4)$

$$g(x) = \begin{cases} -3x & x < 2 \\ 12 & x \geq 2 \end{cases}$$

A parking garage charges $5 to park for less than 1 hour, $10 to park 1 to 3 hours, and $12 to park more than 3 hours. Let $c(t)$ represent the price of parking, in dollars, for $t$ hours.

3.1   Complete the table.

| $t$ (hours) | $c(t)$ (dollars) |
|---|---|
| 0 | |
| 0.5 | |
| 1 | |
| 1.75 | |
| 2 | |
| 5 | |

3.2   The parking garage tried to represent their pricing with this graph. What is correct and what should change to make the graph more accurate?

# desmos ✎

Use the graph of function $h(x)$ to complete the following problems.

4.1 Complete $h(x)$ so that it matches the graph.
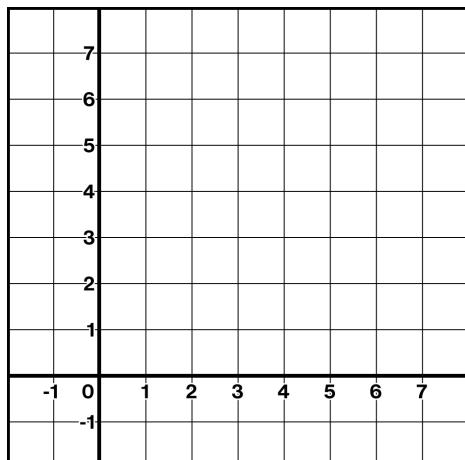
$$h(x) = \begin{cases} \boxed{\phantom{xx}} & -1 \le x < 1 \\ 4 & \boxed{\phantom{x}} \le x < \boxed{\phantom{x}} \\ 8 & 10 \le x < 15 \end{cases}$$



4.2 What are the values of $h(2)$ and $h(10)$?

## Looking Back

5. Graph the function $f(x) = x + 2$ over the domain $0 \le x \le 3$.
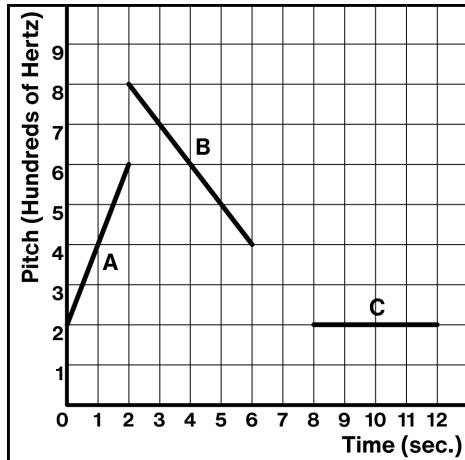


## Explore

6. The pitch of a singer's recorded voice is represented by the piecewise function $p(t)$ and its graph, which consists of pieces A, B, and C.

$$p(t) = \begin{cases} 2t + 2 & 0 \le t < 2 \\ -t + 10 & 2 \le t < 6 \\ 2 & 8 \le t < 12 \end{cases}$$

Eliminate any breaks or jumps in her recording by changing two values in the piecewise function.

## Warm-Up

1.   Select **all** of the true statements. Use the number line if it helps with your thinking.

☐ −4 > −2                    ☐ 8 is the only number 2 units away from 6.
☐ −4 ≥ −6                    ☐ The distance from −2 to 2 is equal to the
☐ |3| = |−3|                      distance from 6 to 10.



## Practice
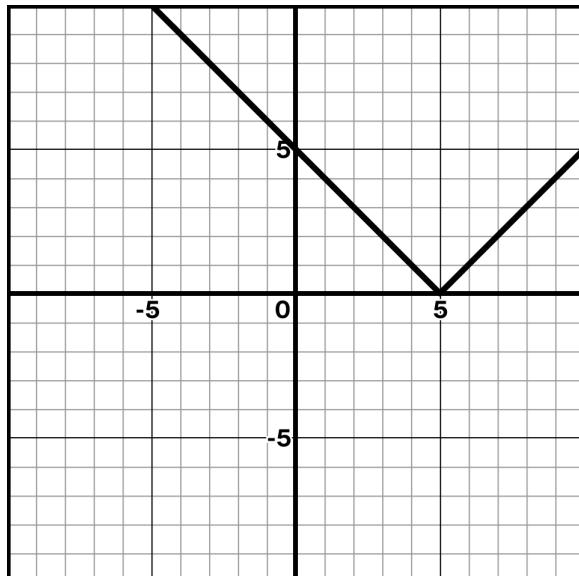
The function $f(x) = |x - 5|$ is graphed.
Determine each value below.



2.1   $f(0)$
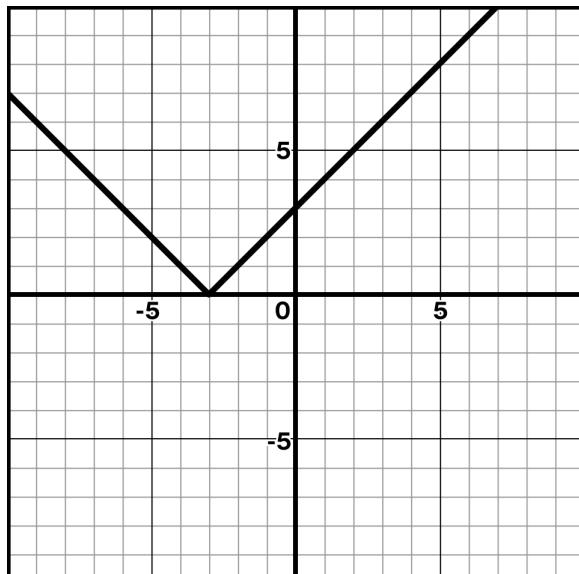
2.2   $f(8)$

2.3   $f(5)$

3.   Which equation represents the graph?

A.  $g(x) = |x| - 3$

B.  $g(x) = |x - 3|$

C.  $g(x) = |x| + 3$

D.  $g(x) = |x + 3|$

# desmos ✎

**Unit A1.4, Lesson 15: Practice Problems**

Ricardo works at a juice packaging facility. He randomly selects and measures the weights of 10 containers of juice. The graph shows the error scores given to each container.

Ricardo writes the function $j(x) = |x - 16|$ to represent the relationship between the weight and the score.
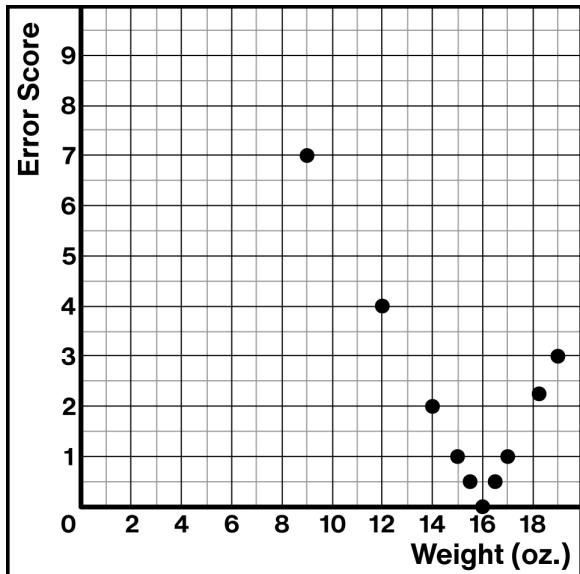
4.1 What does each part of the function represent?

   $j(x)$ represents:

   $x$ represents:

   16 represents:

4.2 What does $j(14) = 2$ mean in this situation?
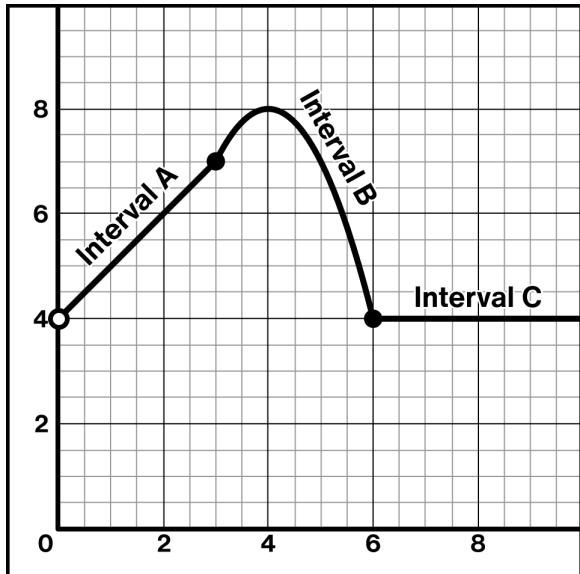


## Looking Back

Match each domain to an interval of the piecewise function on the graph.

5.1 $3 \leq x \leq 6$ _____

5.2 $x \geq 6$ _____

5.3 $0 < x \leq 3$ _____



6. The California Department of Fish and Wildlife estimated there were 460 420 deer in the state in 2021. The deer population in 2018 was estimated to be 470 000.

   Calculate the average rate of change during this time interval and explain what it tells us about the deer population.

## Warm-Up

Write each expression as a single integer.

1.1   $(5 - 2) + 6$   |   1.2   $|{-4}|$   |   1.3   $|7| - 2$   |   1.4   $|{-8}| + 1$
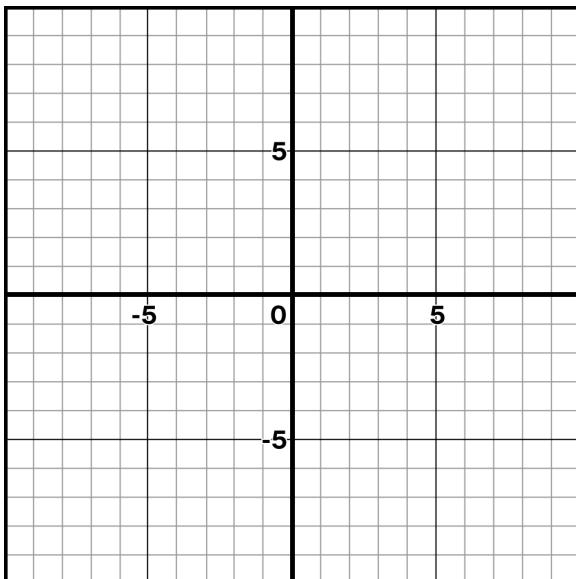
## Practice

2.1   Complete the table using the equation $g(x) = |x + 1| + 4$.

| $x$ | $g(x)$ |
|-----|--------|
| $-3$ |  |
| $-1$ |  |
| $0$ |  |
|  |  |
|  |  |

2.2   Sketch a graph of $g(x)$.
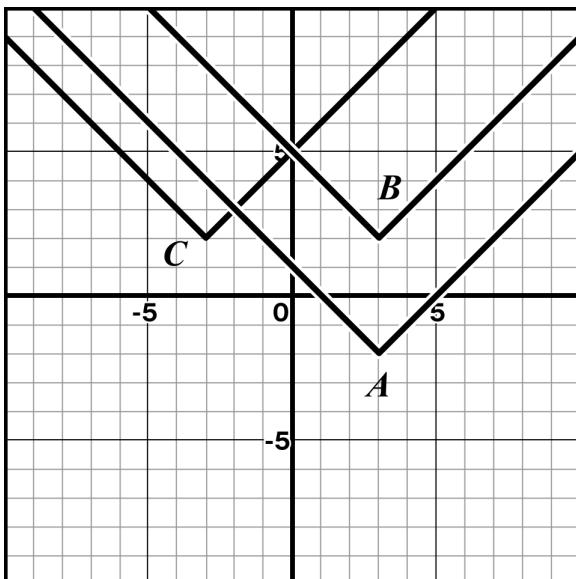


Match each function with its graph.

3.1   $f(x) = |x + 3| + 2$   _____

3.2   $g(x) = |x - 3| - 2$   _____

3.3   $h(x) = |x - 3| + 2$   _____

# desmos ✏
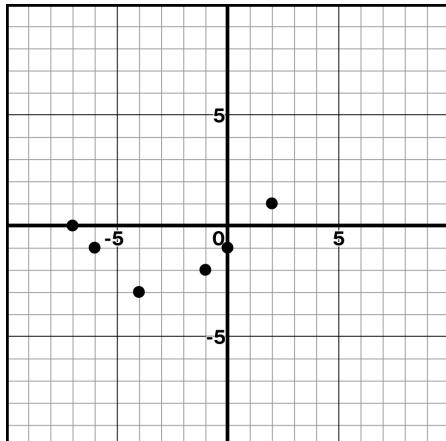
**Unit A1.4, Lesson 16: Practice Problems**
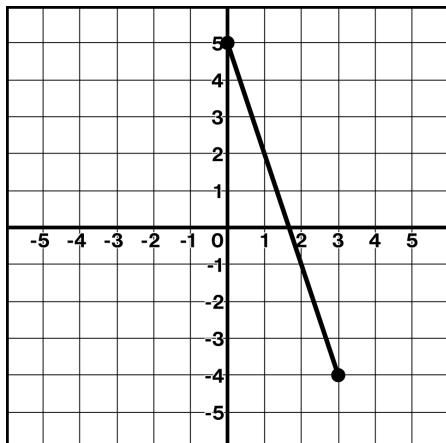
Here are some points on the graph of $h(x) = |x + 3| - 4$.

   4.1    Make a sketch to show what all the points look like.

   4.2    Describe your sketch using vocabulary from this unit.



## Looking Back

   5.    Select **all** of the statements that apply to this graph.

       ☐  The domain is $0 < x < 3$.
       ☐  The range is $-4 \leq f(x) \leq 5$.
       ☐  The graph is always decreasing.
       ☐  The graph is always negative.
       ☐  The maximum occurs at $(0, 5)$.



## Explore

   6.    Determine two different piecewise-defined functions that could represent this graph.