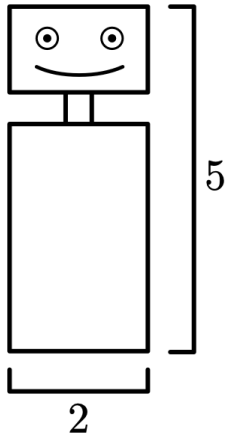
Unit 7.2, Lesson 4: Notes Name _____

My Notes

The table shows information about three robots. The relationship between width and height is proportional.



1. Complete the table.

Robot Width in Inches (w)	Robot Height in Inches (h)
2	5
6	
11	

2. Write instructions explaining how to calculate the height of the robot given any robot width.

3. Write an equation that relates the robot height, h, to the robot width, w.

Summary

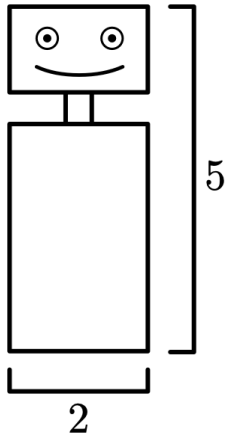
- ☐ I can explain where to find the constant of proportionality as a value in a table.
- ☐ I can write equations to represent proportional relationships.

desmos

Unit 7.2, Lesson 4: Notes Name _____

My Notes

The table shows measurements for three robots. The relationship between width and height is proportional.



1. Complete the table.

Robot Width in inches (w)	Robot Height in inches (h)
2	5
6	15
11	27.5

2. Write instructions explaining how to calculate the height of the robot given any robot width.

   ***Responses vary*. If you know the width of the robot, you can multiply it by the constant of proportionality, 2.5, to find the height of the robot.**

3. Write an equation that relates the robot height, h, to the robot width, w.

   $h = 2.5w$ **(or equivalent)**

Summary

- ☐ I can explain where to find the constant of proportionality as a value in a table.
- ☐ I can write equations to represent proportional relationships.

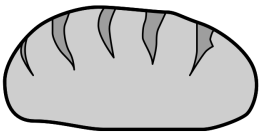
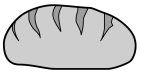
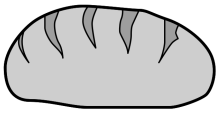
Unit 7.2, Lesson 5: Notes Name _____

My Notes

A bakery uses the equation $f = 1.5h$ to decide how many tablespoons of honey, h, to add to f cups of flour for bread.

1. What does the 1.5 mean in this situation?

2. Fill in the missing information for each bread recipe.

		
Honey: 14 tbsp. Flour: 21 cups	Honey: 5 tbsp. Flour: ____ cups	Honey: ____ tbsp. Flour: 18 cups

3. A truck is traveling at a constant speed. Its distance, d, in miles after t hours is represented by the equation $d = 45t$.

   How long does it take the truck to travel 18 miles?

Summary

- ☐ I can connect each part of an equation of the form $y = kx$ to the situation it represents.
- ☐ I can use an equation to solve problems involving a proportional relationship.

desmos

Unit 7.2, Lesson 5: Notes Name _____

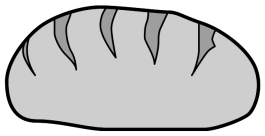
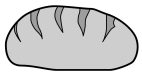
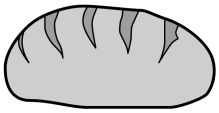
My Notes

A bakery uses the equation $f = 1.5h$ to decide how many tablespoons of honey, h, to add to f cups of flour for bread.

1. What does the 1.5 mean in this situation?

   ***Responses vary*. 1.5 means that there are 1.5 cups of flour for every tablespoon of honey in the bread recipe.**

2. Fill in the missing information for each bread recipe.

		
Honey: 14 tbsp.	Honey: 5 tbsp.	Honey: 12 tbsp.
Flour: 21 cups	Flour: 7.5 cups	Flour: 18 cups

3. A truck is traveling at a constant speed. Its distance, d, in miles after t hours is represented by the equation $d = 45t$.

   How long does it take the truck to travel 18 miles?

   It takes $18 \div 45 = 0.4$ hours to travel 18 miles.

Summary

- ☐ I can connect each part of an equation of the form $y = kx$ to the situation it represents.
- ☐ I can use an equation to solve problems involving a proportional relationship.

Unit 7.2, Lesson 7: Notes Name _____

My Notes

x	y
0	
2	
	27
3.5	

1. Use the equation $y = 2x + 3$ to complete the table.
2. Does the equation represent a proportional relationship?

   Explain.

$\frac{x}{2} = y$
$y = 2x + 1$
$y = 1.5x$

3. Circle the equations that represent a proportional relationship.
4. How can you tell if an equation represents a proportional relationship?

Summary

☐ I can explain why a relationship is proportional or not by looking at the equation.

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Unit 7.2, Lesson 7: Notes Name _____

My Notes

x	y
0	3
2	7
12	27
3.5	10

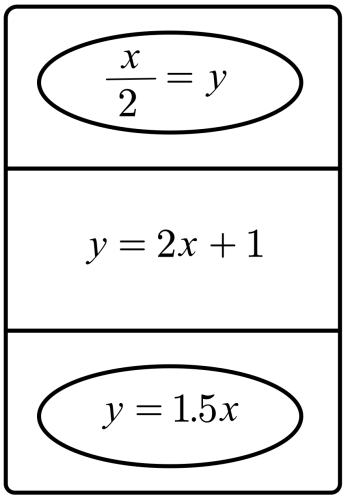
1. Use the equation $y = 2x + 3$ to complete the table.

2. Does the equation represent a proportional relationship?

   Explain.

   No.

   ***Explanations vary*. The constant of proportionality is not the same for each row.**



3. Circle the equations that represent a proportional relationship.

4. How can you tell if an equation represents a proportional relationship?

   ***Responses vary*. Proportional relationships have equations of the form $y = kx$.**

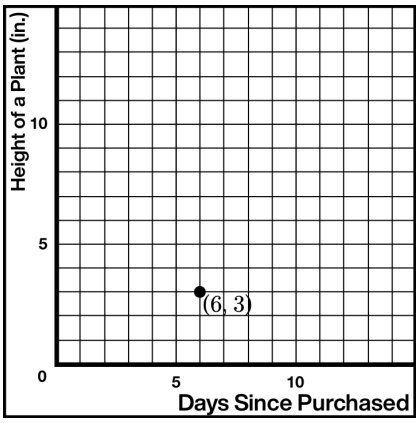
Summary

☐ I can explain why a relationship is proportional or not by looking at the equation.

Unit 7.2, Lesson 8: Notes Name _____

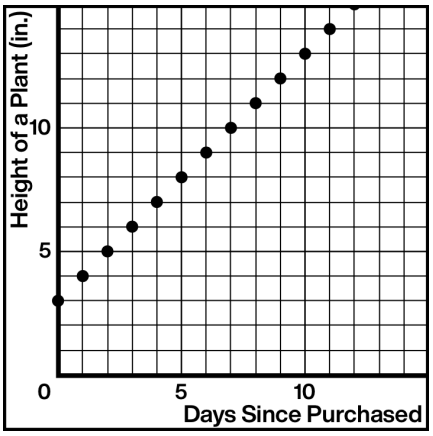
My Notes

A plant's height is proportional to the number of days since it was purchased. On Day 6, it was 3 inches tall.



1. Add more points to the graph to represent the plant's height on other days.

2. Should the origin, $(0, 0)$, be included in this relationship? Why or why not?



3. This graph shows information about a different plant. Does this represent a proportional relationship? Why or why not?

Summary

- ☐ I can explain what a proportional relationship looks like when represented with a graph.
- ☐ I can justify if a graph represents a proportional relationship or not.

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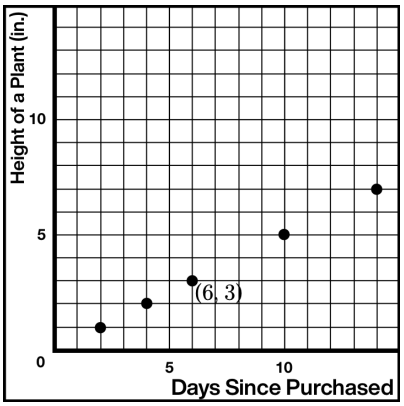
Unit 7.2, Lesson 8: Notes Name _____

My Notes

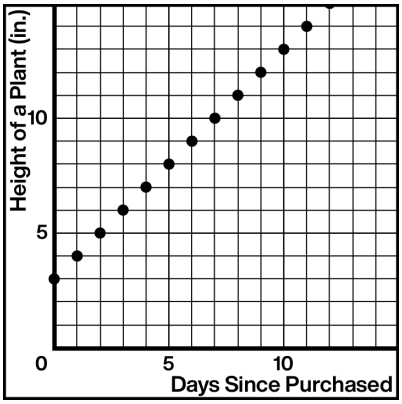
A plant's height is proportional to the number of days since it was purchased. On Day 6, it was 3 inches tall.



1. Add more points to the graph to represent the plant's height on other days.

2. Should the origin, $(0, 0)$, be included in this relationship? Why or why not?

   Yes. *Responses vary*. In proportional relationships, the y-value is equal to the x-value times the constant of proportionality, k. This means that the y-value when x is 0 is equal to $0 \cdot k$, which is always equal to 0.



3. This graph shows information about a different plant. Does this represent a proportional relationship? Why or why not?

   No. *Responses vary*. The graph doesn't go through the origin, so the relationship isn't proportional.

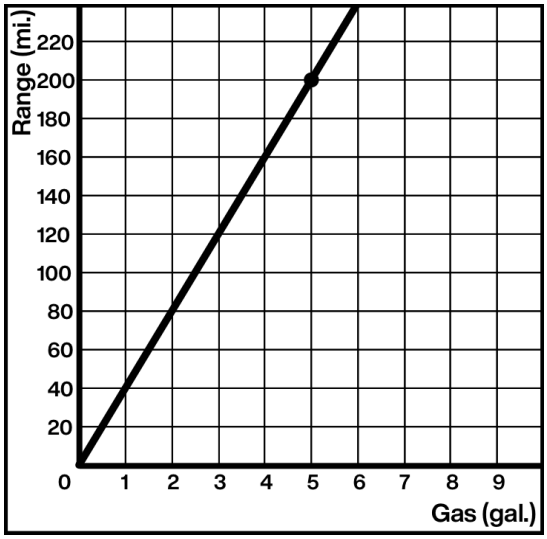
Summary

- ☐ I can explain what a proportional relationship looks like when represented with a graph.
- ☐ I can justify if a graph represents a proportional relationship or not.

Unit 7.2, Lesson 9: Notes Name _____

My Notes

The graph shows how far a car travels using any amount of gas.



1. Determine the constant of proportionality for the relationship between gallons of gas and miles.

2. What does the constant of proportionality mean in this situation?

3. In general, how can you use a graph to find the constant of proportionality for a proportional relationship?

Summary

- ☐ I can interpret points on the graph of a proportional relationship.
- ☐ I can identify the constant of proportionality from a graph of a proportional relationship.

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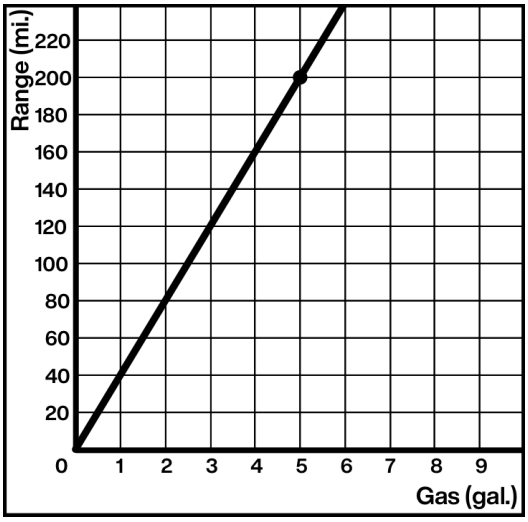
Unit 7.2, Lesson 9: Notes Name _____

My Notes

The graph shows how far a car travels using any amount of gas.



1. Determine the constant of proportionality for the relationship between gallons of gas and miles.

   40

2. What does the constant of proportionality say about the car?

   ***Responses vary*. The constant of proportionality tells us the gas mileage of the car, or how far it can travel using 1 gallon of gas.**

3. In general, how can you use a graph to find the constant of proportionality for a proportional relationship?

   - **Determine the y-value when the x-value is 1.**
   - **Determine the number you need to multiply the x-value by to find the y-value. For example, each y-coordinate in the example is 40 times the x-coordinate.**

Summary

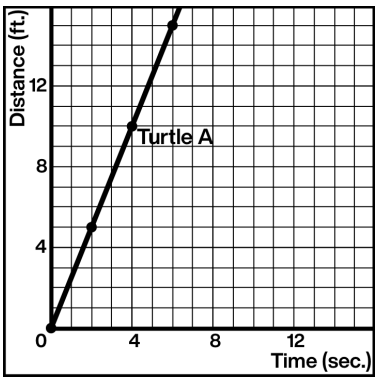
- ☐ I can interpret points on the graph of a proportional relationship.
- ☐ I can identify the constant of proportionality from a graph of a proportional relationship.

Unit 7.2, Lesson 10: Notes Name _____

My Notes

Two turtles went for a walk. They each walked a distance, d, after t seconds.

1. Turtle A's walk is represented in the graph. Write an equation for this relationship.

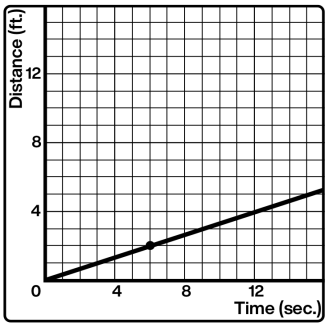


2. Turtle B's walk is represented by the equation $d = 2t$.

   Which turtle walked faster?

   Explain how you know.

3. Explain how you know the equation $d = \frac{1}{3}\ t$ matches the graph.



$$d = \frac{1}{3}t$$

Summary

- ☐ I can write an equation of a proportional relationship from a point on a graph.
- ☐ I can compare related proportional relationships based on their graphs.

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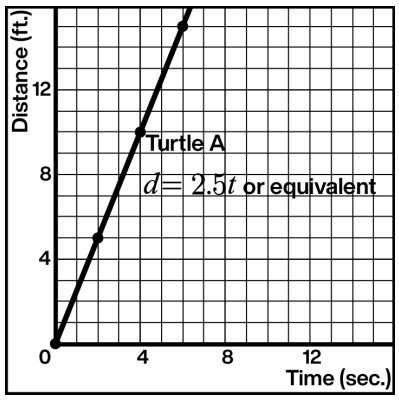
Unit 7.2, Lesson 10: Notes Name _____

My Notes

Two turtles went for a walk. They each walked a distance, d, after t seconds.

1. Turtle A's walk is represented in the graph. Write an equation for this relationship.



2. Turtle B's walk is represented by the equation $d = 2t$.

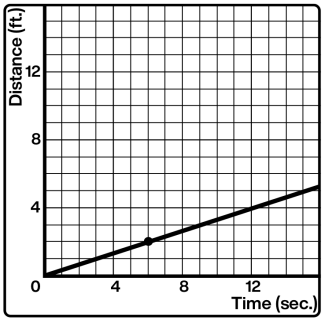
   Which turtle walked faster? **Turtle A.**

   Explain how you know.

   Explanations vary. **Turtle A walked 2.5 feet per second, while Turtle B walked 2 feet per second.**

3. Explain how you know the equation $d = \frac{1}{3}\ t$ matches the graph.

   Responses vary**. The graph goes through the points $(0,\ 0)$ and $(6,\ 2)$, so a constant of proportionality is $\frac{2}{6}$ or $\frac{1}{3}$, which is the same as the constant of proportionality in the equation.**



$d = \frac{1}{3}t$

Summary

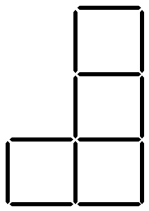
- ☐ I can write an equation of a proportional relationship from a point on a graph.
- ☐ I can compare related proportional relationships based on their graphs.

Unit 7.3, Lesson 1: Notes Name _____

My Notes

1. Here is a shape with a side length of 2 toothpicks. Sketch a scaled copy of this shape with a side length of 4 toothpicks.

Bottom Side Length: 2



Bottom Side Length: 4

2. Complete the table with the number of toothpicks needed to build the perimeter and interior of each shape.

Side Length	Perimeter	Interior
2		
4		

3. Explain which relationships are proportional: side length and perimeter, side length and interior toothpicks, both, or neither.

Summary

- ☐ I can explain whether or not the relationship between a side length or a diagonal of a shape and its perimeter is proportional.
- ☐ I can use proportional relationships to figure out missing side lengths, diagonals, and perimeters.

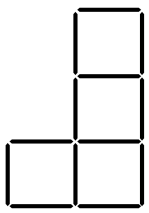
desmos

Unit 7.3, Lesson 1: Notes Name _____

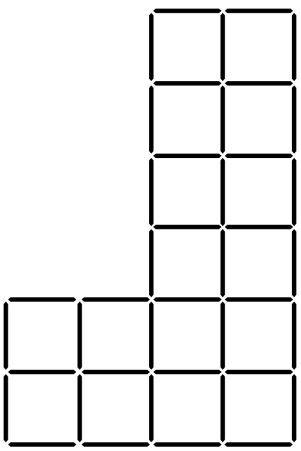
My Notes

1. Here is a shape with a side length of 2 toothpicks. Sketch a scaled copy of this shape with a side length of 4 toothpicks.

Bottom Side Length: 2



Bottom Side Length: 4



2. Complete the table with the number of toothpicks needed to build the perimeter and interior of each shape.

Side Length	Perimeter	Interior
2	10	3
4	20	22

3. Explain which relationships are proportional: side length and perimeter, side length and interior toothpicks, both, or neither.

Only the relationship between side length and perimeter is proportional. *Explanations vary.* There is the same constant of proportionality from side length to perimeter because $2 \cdot 5 = 10$ and $4 \cdot 5 = 20$.

Summary

- ☐ I can explain whether or not the relationship between a side length or a diagonal of a shape and its perimeter is proportional.
- ☐ I can use proportional relationships to figure out missing side lengths, diagonals, and perimeters.

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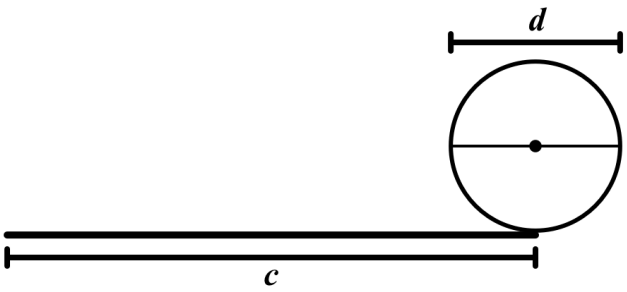
Unit 7.3, Lesson 3: Notes Name _____

My Notes

1. Describe the relationship between the diameter of a circle, d, and its **circumference**, C.



2. List some things you know about π.

3. Complete the table with measurements for each object.

Object	Radius (cm)	Diameter (cm)	Circumference (cm)
Coaster	5		
Ring		2.4	
Hoop			150

Summary

- ☐ I can describe the relationship between the radius, diameter, and circumference of a circle.
- ☐ Given the radius, diameter, or circumference of a circle, I can calculate the other two measurements.

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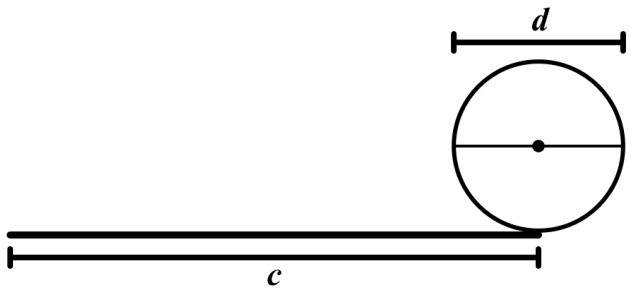
Unit 7.3, Lesson 3: Notes Name _____

My Notes

1. Describe the relationship between the diameter of a circle, d, and its **circumference**, C. ***Responses vary.***



The relationship between the diameter of a circle and its circumference is proportional. You can write the formula $C = \pi d$ to represent the relationship.

2. List some things you know about π. ***Responses vary.***

- **It is the constant of proportionality between the diameter of a circle and its circumference.**
- **It cannot be written as an exact decimal.**
- **It is close to but not exactly 3.14 and $\frac{22}{7}$.**

3. Complete the table with measurements for each object.

Object	Radius (cm)	Diameter (cm)	Circumference (cm)
Coaster	5	10	10π
Ring	1.2	2.4	2.4π
Hoop	$\frac{150}{2\pi} \approx 23.87$	$\frac{150}{\pi} \approx 47.75$	150

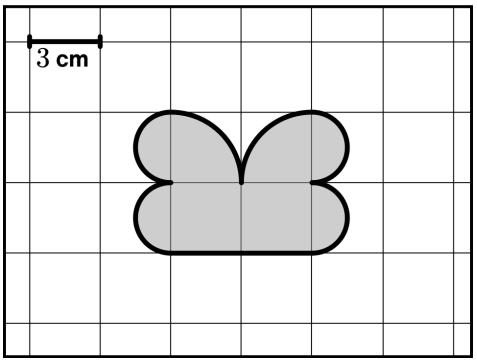
Summary

- ☐ I can describe the relationship between the radius, diameter, and circumference of a circle.
- ☐ Given the radius, diameter, or circumference of a circle, I can calculate the other two measurements.

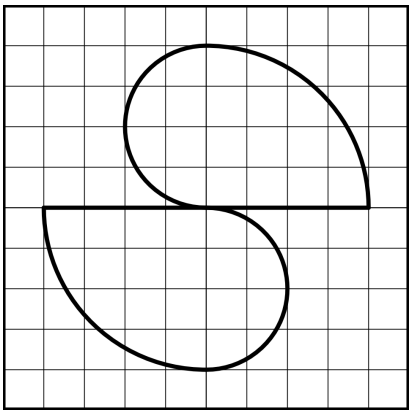
Unit 7.3, Lesson 4: Notes Name _____

My Notes

1. Irene calculated the perimeter of the shape below as $9\pi + 6$ centimeters. Explain how you know she is correct.



2. Calculate the perimeter of the shape below. Show all of your thinking.



Summary

- ☐ I can calculate the perimeter of a complex shape that includes parts of circles.
- ☐ I can write perimeter as an expression that includes π, such as $20\pi + 50$.

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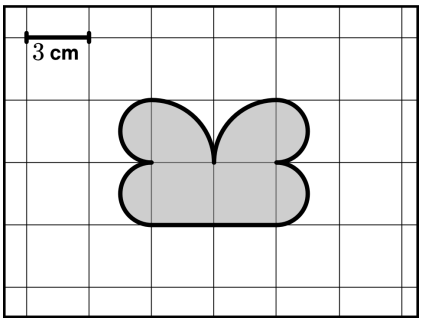
Unit 7.3, Lesson 4: Notes Name _____

My Notes

1. Irene calculated the perimeter of the shape below as $9\pi + 6$ centimeters. Explain how you know she is correct.



Responses vary.

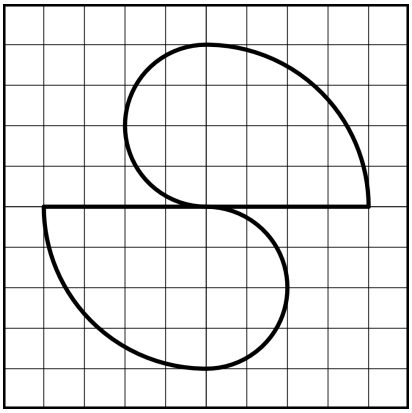
The total perimeter is equal to the perimeter of 2 quarter circles, 4 semicircles, and 2 straight edges.

Total perimeter:

$2\left(\frac{1}{4} \cdot 6 \cdot \pi\right) + 4\left(\frac{1}{2} \cdot 3 \cdot \pi\right) + 2(3)$

$= 3\pi + 6\pi + 6 = 9\pi + 6$ **cm**

2. Calculate the perimeter of the shape below. Show all of your thinking.



Total perimeter:
2 **quarter circles**
$+ 2$ **semicircles**
$+ 2$ **straight edges**

Total perimeter:

$2\left(\frac{1}{4} \cdot 8 \cdot \pi\right)$

$+ 2\left(\frac{1}{2} \cdot 4 \cdot \pi\right)$

$+ 2(4)$

Total perimeter = $4\pi + 4\pi + 8 = 8\pi + 8$ **units**

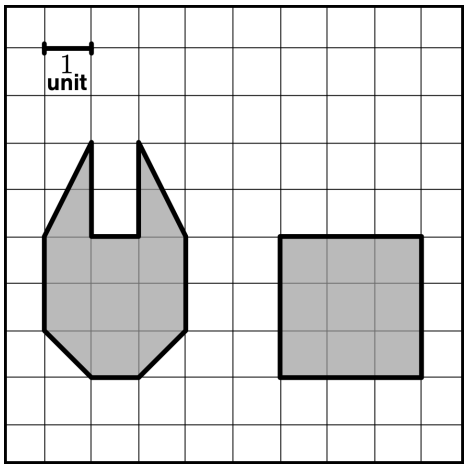
Summary

- ☐ I can calculate the perimeter of a complex shape that includes parts of circles.
- ☐ I can write perimeter as an expression that includes π, such as $20\pi + 50$.

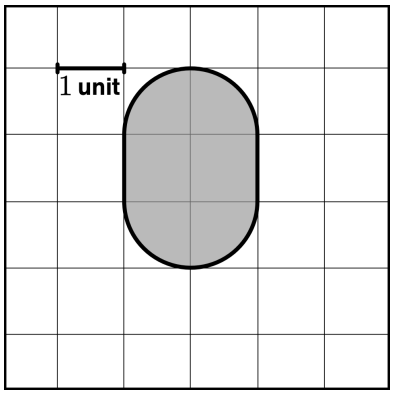
Unit 7.3, Lesson 5: Notes Name _____

My Notes

1. Tiara says these two figures have the same area. Is Tiara correct? Explain and show your thinking.



2. Do you think the area of this shape is more than 4 square units, less than 4 square units, or exactly 4 square units? Explain your thinking.



Summary

- ☐ I can determine the area of a complex shape using a variety of strategies.
- ☐ I can estimate the area of a shape with curved edges.

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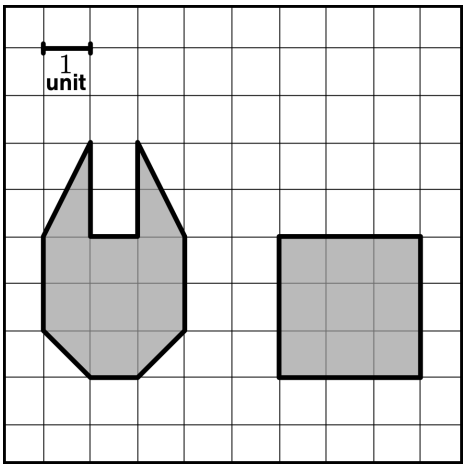
Unit 7.3, Lesson 5: Notes Name _____

My Notes

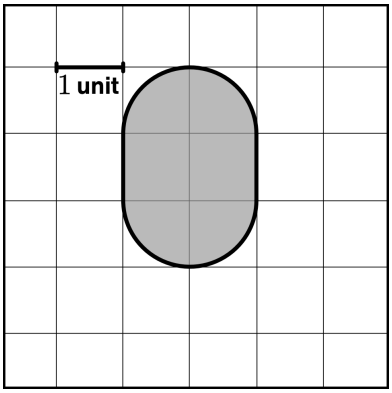
1. Tiara says these two figures have the same area. Is Tiara correct? Explain and show your thinking.



No. *Explanations vary.*

The two triangles on top of the left shape can be rearranged to make a 2 -by- 1 rectangle. The two triangles on the bottom can be rearranged to make a 1 -by- 1 square. This makes the total area of the left shape $2 + 6 + 1 + 1 = 10$ square units, 1 square unit more than the area of the square.

2. Do you think the area of this shape is more than 4 square units, less than 4 square units, or exactly 4 square units? Explain your thinking.



More than 4 square units.
Explanations vary.

Each rounded section takes up more than half of the unit square, so the total area is more than $2 + 4(0.5)$, or 4 square units.

Summary

- ☐ I can determine the area of a complex shape using a variety of strategies.
- ☐ I can estimate the area of a shape with curved edges.

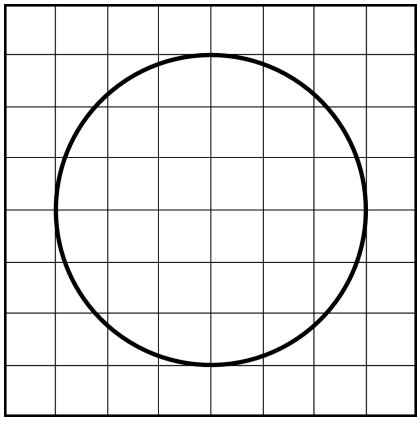
desmos Science Mom Lesson 73

Unit 7.3, Lesson 6: Notes Name _____

My Notes

1. Draw a radius square for this circle.

   What is the area of the radius square?



2. Estimate the area of this circle using radius squares.

3. What is the formula for the relationship between the radius of a circle and its area?

4. Use the formula to calculate the exact area of the circle.

Summary

- ☐ I can describe the relationship between the radius of any circle and its area.
- ☐ I can calculate the area of a circle.

desmos

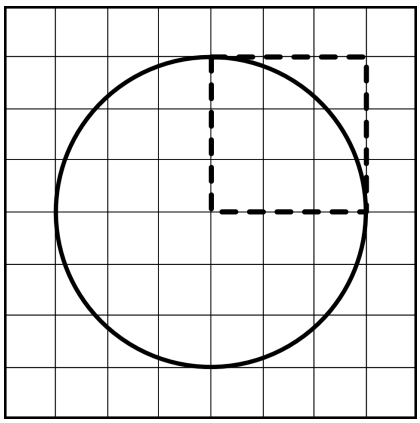
Unit 7.3, Lesson 6: Notes Name _____

My Notes

1. Draw a radius square for this circle.

   What is the area of the radius square?

   9 **square units**



2. Estimate the area of this circle using radius squares.

   The area is about 3 **times the area of the radius square, so the area of the circle is a little more than** $3 \cdot 9 = 27$ **square units.**

3. What is the formula for the relationship between the radius of a circle and its area?

   $A = \pi \cdot r^2$ **or Area =** $\pi \cdot$ **(radius)^2**

4. Use the formula to calculate the exact area of the circle.

   $A = \pi \cdot r^2$

   $A = \pi \cdot 3^2 = 9\pi \approx 28.27$ **square units**

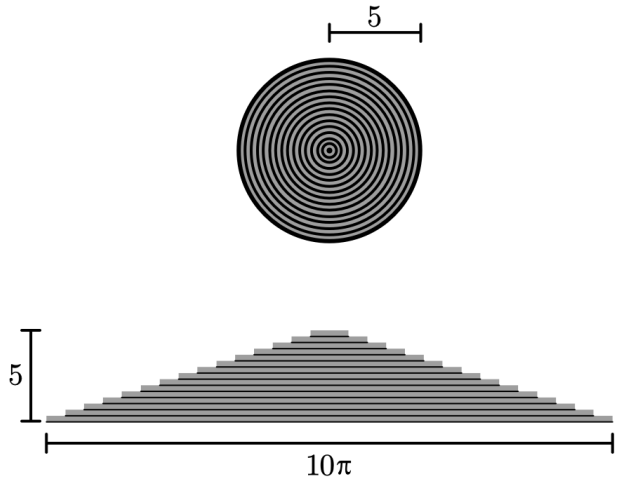
Summary

- ☐ I can describe the relationship between the radius of any circle and its area.
- ☐ I can calculate the area of a circle.

Unit 7.3, Lesson 7: Notes Name _____

My Notes

Here is a circle cut into rings and unrolled into a triangle shape.



1. Calculate the area of the circle.

2. Label the base and the height of the triangle.

3. Calculate the area of the triangle. How is it related to the area of the circle?

Summary

- ☐ I can explain whether the relationship between the radius and area of a circle is proportional or not.
- ☐ I can explain the formula of a circle's area by rearranging the circle into a triangle of the same area.

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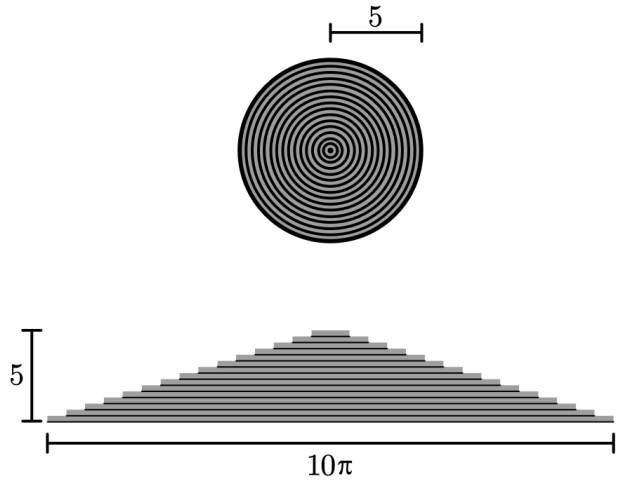
Unit 7.3, Lesson 7: Notes Name _____

My Notes

Here is a circle cut into rings and unrolled into a triangle shape.



1. Calculate the area of the circle.

   $A = \pi \cdot r^2 = \pi \cdot 5^2 = 25\pi$ **square units**

2. Label the base and the height of the triangle.

   The base is the same length as the circumference of the circle, or 10π units.

   The height is equal to the radius, or 5 units.

3. Calculate the area of the triangle. How is it related to the area of the circle?

   $A = \frac{1}{2} \cdot b \cdot h = \frac{1}{2} \cdot 10\pi \cdot 5 = 25\pi$

   The area of the triangle is equal to the area of the circle!

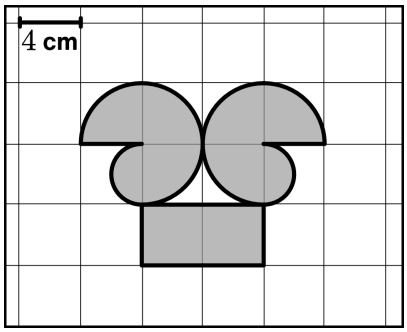
Summary

- ☐ I can explain whether the relationship between the radius and area of a circle is proportional or not.
- ☐ I can explain the formula of a circle's area by rearranging the circle into a triangle of the same area.

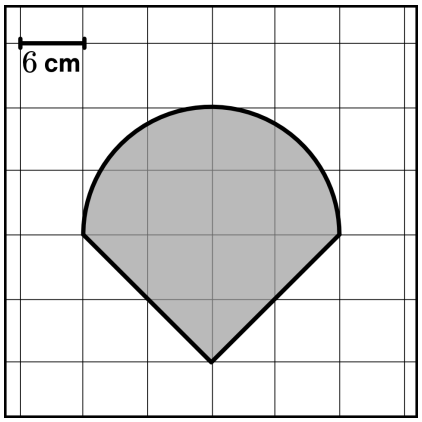
Unit 7.3, Lesson 8: Notes Name _____

My Notes

1. Amari calculated the area of the shape below as $28\pi + 32$ square centimeters. Explain how you know they are correct.



2. Determine the area of the shape below.



Summary

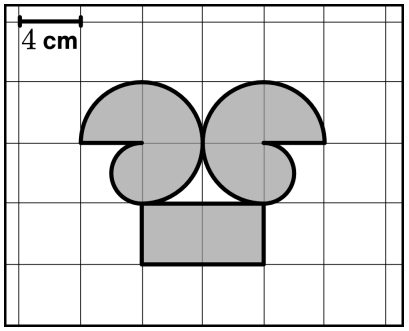
- ☐ I can calculate the area of a complex shape that includes parts of circles.
- ☐ I can write area as an expression that includes π, such as $20\pi + 50$.

desmos

Unit 7.3, Lesson 8: Notes Name _____

My Notes

1. Amari calculated the area of the shape below as $28\pi + 32$ square centimeters. Explain how you know they are correct.



Responses vary.

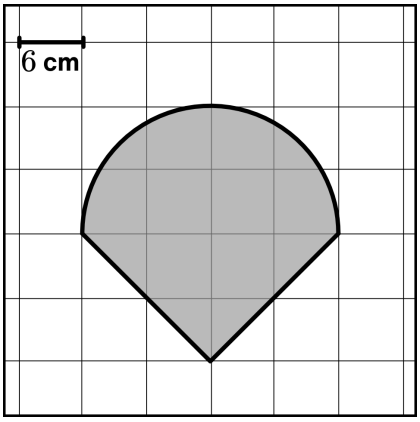
The total area is equal to the area of 6 quarter circles, 2 semicircles, and 2 squares.

Total area:

$$6\left(\frac{1}{4}\cdot 4^2\cdot \pi\right) + 2\left(\frac{1}{2}\cdot 2^2\cdot \pi\right) + 2(4\cdot 4)$$

Area: $24\pi + 4\pi + 32 = 28\pi + 32$ **square centimeters**

2. Determine the area of the shape below.



Total area:
semicircle + triangle

Total area:

$$\frac{1}{2}\cdot 12^2\cdot \pi + \frac{1}{2}\cdot 12\cdot 24$$

Total area:
$72\pi + 144$ **square units**

Summary

- ☐ I can calculate the area of a complex shape that includes parts of circles.
- ☐ I can write area as an expression that includes π, such as $20\pi + 50$.

Unit 6.3, Lesson 8: Notes Name _____

My Notes

1. In your own words, explain what 25% of a number means.

Esteban bought a bag of candies that come in different colors. They like the orange candies the least.

2. How many orange candies are in each bag?

3. There are 60 candies in Bag B. 75% of them are red. How many red candies are in Bag B? Explain your thinking.

Summary

- ☐ I can use the word *percent* and the symbol $\%$ to mean for every 100.
- ☐ I can calculate 10%, 25%, 50%, or 75% of a number.

desmos

Unit 6.3, Lesson 8: Notes Name _____

My Notes

1. In your own words, explain what 25% of a number means.

***Responses vary*. 25% means 25 out of every 100, or $\frac{1}{4}$ of something. If you have 80 duckies and 25% of them have stars, then $80 \cdot \frac{1}{4} = 20$ of them have stars.**

Esteban bought a bag of candies that come in different colors. They like the orange candies the least.

2. How many orange candies are in each bag?

Bag A: 25% of Bag A is 10 candies.

10	10	10	10

Bag B: 10% of Bag B is 6 candies.

6	6	6	6	6	6	6	6	6	6

3. There are 60 candies in Bag B. 75% of them are red. How many red candies are in Bag B? Explain your thinking.

45 candies are red. *Explanations vary.*

75% means 75 out of every 100, or $\frac{3}{4}$ of the candies.

$\frac{1}{4}$ of 60 is 15, so $\frac{3}{4}$ of 60 is $3 \cdot 15 = 45$.

Summary

- ☐ I can use the word *percent* and the symbol $\%$ to mean for every 100.
- ☐ I can calculate 10%, 25%, 50%, or 75% of a number.

Unit 6.3, Lesson 9: Notes Name _____

My Notes

Faaria's goal was to ride her bike 30 kilometers.

1.1 Complete the table.

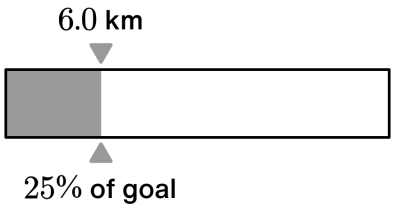
1.2 She rode 40% of her goal.

How far did she ride?

Km Biked	%of Goal
30	100
	10
	40

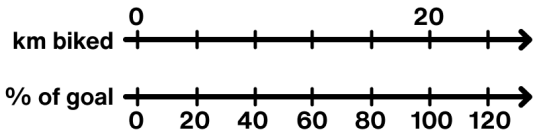
Juliana rode 6 kilometers, which is 25% of her goal.

2. What was her goal distance?



Emmanuel's goal was to ride 20 km. He rode 120% of his goal.

3. How far did he ride?



Summary

- ☐ I can make connections between percentages and ratios.
- ☐ I can use a double number line, tape diagram, or table to determine unknown parts or wholes.

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Unit 6.3, Lesson 9: Notes Name _____

My Notes

Faaria's goal was to ride her bike 30 kilometers.

1.1 Complete the table.

1.2 She rode 40% of her goal.

How far did she ride?

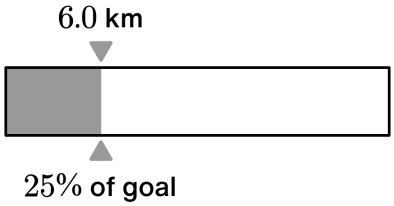
12 **kilometers**

Km Biked	%of Goal
30	100
3	10
12	40

Juliana rode 6 kilometers, which is 25% of her goal.

2. What was her goal distance?

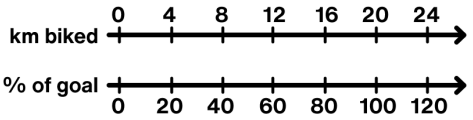
$6 \cdot 4 = 24$ **kilometers**



Emmanuel's goal was to ride 20 km. He rode 120% of his goal.

3. How far did he ride?

20% **is** 4 **km, so he rode** $20 + 4 = 24$ **km.**



Summary

- ☐ I can make connections between percentages and ratios.
- ☐ I can use a double number line, tape diagram, or table to determine unknown parts or wholes.

Unit 6.3, Lesson 11: Notes Name _____

My Notes

Here is the work Anand did to calculate 21% of $\$52$.

1. Explain Anand's strategy.

Percentage (%)	Cost (dollars)
100	52
1	$\frac{52}{100}$
21	$\frac{52}{100} \cdot 21$

2. Select **all** of the expressions that could be used to calculate 54% of $\$22$.

- ☐ $\frac{22}{100} \cdot 54$
- ☐ $\frac{22}{100}$
- ☐ $\frac{100}{22} \cdot 54$
- ☐ $\frac{54}{100} \cdot 22$
- ☐ $\frac{22}{54} \cdot 100$

A pair of shoes cost $\$60$. The store's profit is 22% of the cost.

3. How much is the store's profit on a pair of shoes?

Summary

- ☐ I can calculate any percentage of a number.
- ☐ I can explain two different expressions you can use to calculate a percentage of a number.

desmos

Unit 6.3, Lesson 11: Notes Name _____

My Notes

Here is the work Anand did to calculate 21% of $\$52$.

1. Explain Anand's strategy.

Percentage (%)	Cost (dollars)
100	52
1	$\frac{52}{100}$
21	$\frac{52}{100} \cdot 21$

***Explanations vary*. First Anand divided by 100 to find out the cost for 1%. Then he multiplied by 21 to get the cost for 21%.**

2. Select **all** of the expressions that could be used to calculate 54% of $\$22$.

- ✓ $\frac{22}{100} \cdot 54$
- ☐ $\frac{22}{100}$
- ☐ $\frac{100}{22} \cdot 54$
- ✓ $\frac{54}{100} \cdot 22$
- ☐ $\frac{22}{54} \cdot 100$

A pair of shoes cost $\$60$. The store's profit is 22% of the cost.

3. How much is the store's profit on a pair of shoes?

$\$13.20$

Summary

- ☐ I can calculate any percentage of a number.
- ☐ I can explain two different expressions you can use to calculate a percentage of a number.

Unit 6.3, Lesson 12: Notes Name _____

My Notes

On Thursday, Alejandro rode 21 km. His goal was 25 km.
Here is how he calculated the percentage of his goal that he rode.

Distance (km)	Percent of Goal
25	100
1	$\frac{100}{25}$
21	$\frac{100}{25} \cdot 21$

1. 1 kilometer is what percent of Alejandro's goal?

2. What percent of his goal did he ride?

3. Use Alejandro's strategy to calculate 17 out of 25 as a percentage.

4. Write an expression that can be used to calculate 46 out of 40 as a percentage.

Summary

- ☐ I can calculate an unknown percentage.
- ☐ I can explain different expressions for calculating an unknown percentage.

desmos

Unit 6.3, Lesson 12: Notes Name _____

My Notes

On Thursday, Alejandro rode 21 km. His goal was 25 km.
Here is how he calculated the percentage of his goal that he rode.

Distance (km)	Percent of Goal
25	100
1	$\frac{100}{25}$
21	$\frac{100}{25} \cdot 21$

1. 1 kilometer is what percent of Alejandro's goal?

   $\frac{100}{25} = 4\%$

2. What percent of his goal did he ride?

   $\frac{100}{25} \cdot 21 = 84\%$

3. Use Alejandro's strategy to calculate 17 out of 25 as a percentage.

   $\frac{100}{25} \cdot 17 = 68\%$

4. Write an expression that can be used to calculate 46 out of 40 as a percentage.

   $\frac{100}{40} \cdot 46$ or $\frac{46}{40} \cdot 100$

Summary

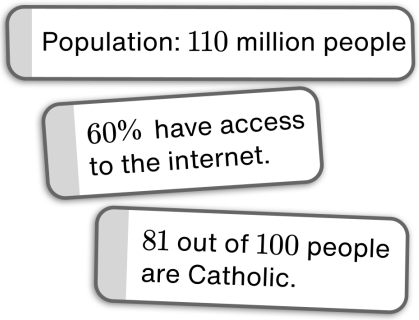
- ☐ I can calculate an unknown percentage.
- ☐ I can explain different expressions for calculating an unknown percentage.

Unit 6.3, Lesson 13: Notes Name _____

My Notes

Here are some facts about the Philippines.

1. How many people in the Philippines have access to the internet?



2. How many people practice Catholicism?

Imagine the Philippines were a village with just 100 people. How many people would have each of these characteristics?

3.1 Have access to the internet?

3.2 Practice Catholicism?

4. What are some things that are important to remember when working with percentages?

Summary

☐ I can use rates and percentages to analyze characteristics of a country's population.

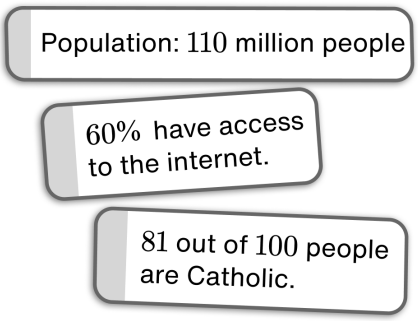
desmos

Unit 6.3, Lesson 13: Notes Name _____

My Notes

Here are some facts about the Philippines.

1. How many people in the Philippines have access to the internet?



66 **million**

2. How many people practice Catholicism?

89.1 **million**

Imagine the Philippines were a village with just 100 people. How many people would have each of these characteristics?

3.3 Have access to the internet?

60 **people**

3.4 Practice Catholicism?

81 **people**

4. What are some things that are important to remember when working with percentages?

***Responses vary*. It is important to know which of your numbers represents a part, a whole, or a percentage. The whole always corresponds to 100%. I can use a double number line or table to compare parts, wholes, and percentages.**

Summary

☐ I can use rates and percentages to analyze characteristics of a country's population.

Unit 7.4, Lesson 2: Notes Name _____

My Notes

Kwasi is making banana bread.

1. He only has a $\frac{1}{4}$ cup measuring scoop. How many scoops of sugar and flour does he need?

Kwasi's Recipe

Number of servings: 6

- 2 lb. of bananas
- $\frac{1}{2}$ cup of butter
- $\frac{3}{4}$ cup of sugar
- $2\frac{1}{2}$ cups of flour
- 1 tsp. of baking soda

2. A person Kwasi is planning to share his banana bread with wants to know how much sugar there is per serving in his recipe. What should Kwasi tell them?

3. Kwasi wants to make a larger loaf to serve 10 people. How much of each ingredient will he need?

Summary

☐ I can use the constant of proportionality to solve problems that involve fractions.

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Unit 7.4, Lesson 2: Notes Name _____

My Notes

Kwasi is making banana bread.

1. He only has a $\frac{1}{4}$ cup measuring scoop. How many scoops of sugar and flour does he need?

   3 **scoops of sugar**

   10 **scoops of flour**

Kwasi's Recipe

Number of servings: 6

- 2 lb. of bananas
- $\frac{1}{2}$ cup of butter
- $\frac{3}{4}$ cups of sugar
- $2\frac{1}{2}$ cups of flour
- 1 tsp. of baking soda

2. One person Kwasi is planning to share his banana bread with wants to know how much sugar there is per serving in his recipe. What should Kwasi tell them?

   There is $\frac{1}{8}$ of a cup of sugar in each serving.

3. Kwasi wants to make a larger loaf to serve 10 people. How much of each ingredient will he need?
   - $3\frac{1}{3}$ lb. of bananas
   - $\frac{5}{6}$ cup of butter
   - $1\frac{1}{4}$ cups of sugar
   - $4\frac{1}{6}$ cups of flour
   - $1\frac{2}{3}$ tsp. of baking soda

Summary

☐ I can use the constant of proportionality to solve problems that involve fractions.

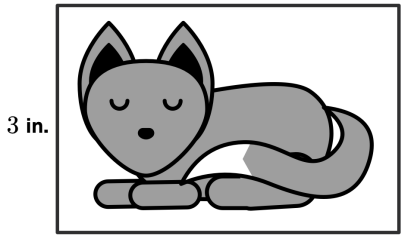
Unit 7.4, Lesson 3: Notes Name _____

My Notes

StuckStickers makes pins in addition to stickers.

1. Here is Cho's design and thinking for a pin that is $\frac{3}{4}$ inches wide.

Cho's Design

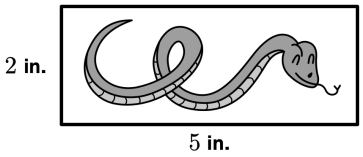


Cho's Thinking

Height (in.)	Width (in.)
3 $\cdot 1\frac{1}{2}$ →	$4\frac{1}{2}$
← $\div 1\frac{1}{2}$	$\frac{3}{4}$

Explain how Cho figured out how tall the pins should be.

2. Hamza wants to create pins with his design as well. Hamza's pins will be $\frac{4}{5}$ inches tall. What will the width of his pin be?



Summary

☐ I can use a table to determine an unknown value in a proportional relationship.

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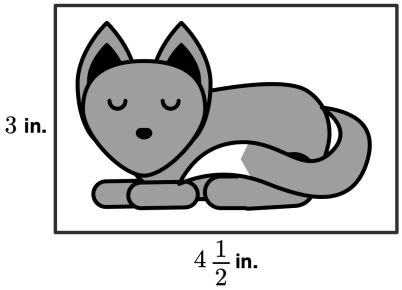
Unit 7.4, Lesson 3: Notes Name _____

My Notes

StuckStickers makes pins in addition to stickers.

1. Here is Cho's design and thinking for a pin that is $\frac{3}{4}$ inches wide.

Cho's Design



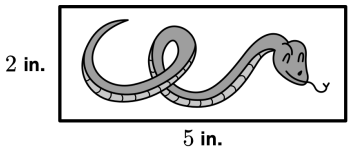
Cho's Thinking

Height (in.)	Width (in.)
3	$4\frac{1}{2}$
	$\frac{3}{4}$

Explain how Cho figured out how tall their pins should be.

Responses vary. **Cho made a table with the height and width. Then, they figured out what the constant of proportionality is between height and width ($1\frac{1}{2}$). Since they knew the width, they needed to divide by $1\frac{1}{2}$ to figure out the height.**

2. Hamza wants to create pins with his design as well. Hamza's pins will be $\frac{4}{5}$ inches tall. What will the width of his pin be?



$2 \cdot \frac{5}{2} = 5$ **inches**

$\frac{4}{5} \cdot \frac{5}{2} = 2$ **inches**

His pin will be 2 inches wide.

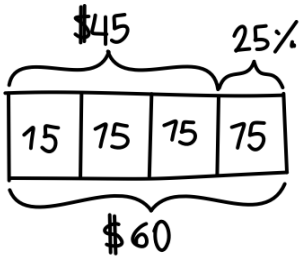
Summary

☐ I can use a table to determine an unknown value in a proportional relationship.

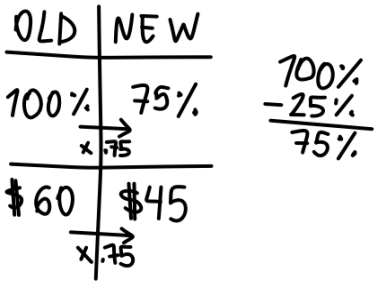
Unit 7.4, Lesson 4: Notes Name _____

My Notes

Here are two different representations Pablo used to figure out the new price of a pair of headphones after using a coupon.



TAPE DIAGRAM



TABLE

1. What was the original price of the headphones? Circle where you see it in each representation.

2. What is the **percent increase** or **percent decrease**? Star where you see it in each representation.

3. Choose one representation and explain how Pablo used it to figure out the new price of the headphones.

Summary

- ☐ I can use tape diagrams and tables to represent adding or subtracting a percentage from 100%.
- ☐ I can determine the new amount if I know the original amount and the percent change.

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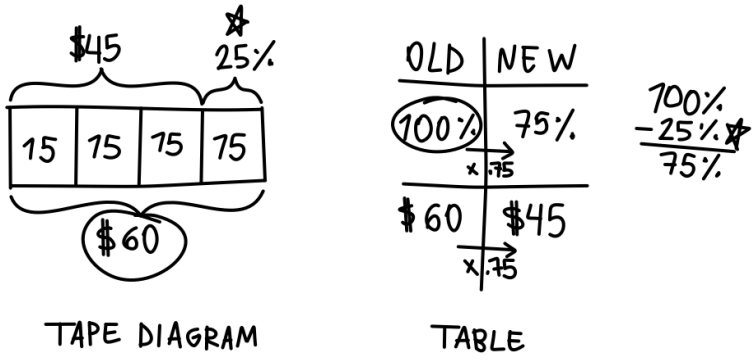
Unit 7.4, Lesson 4: Notes Name _____

My Notes

Here are two different representations Pablo used to figure out the new price of a pair of headphones after using a coupon.



1. What was the original price of the headphones? Circle where you see it in each representation.

   $60

2. What is the **percent increase** or **percent decrease**? Star where you see it in each representation.

   25% **decrease**

3. Choose one representation and explain how Pablo used it to figure out the new price of the headphones. ***Responses vary.***

   - **Tape Diagram: Pablo broke the tape diagram into four sections that were each 25%. Then, he figured out that each 25% represented $\$15$. Since the coupon was 25% off, he counted the rest as the new price, which was $3 \cdot 15 = 45$ dollars.**
   - **Table: Pablo figured out that a coupon for 25% off means that there is 75% left. He used the constant of proportionality 0.75 to figure out that the new price was $0.75 \cdot 60 = 45$ dollars.**

Summary

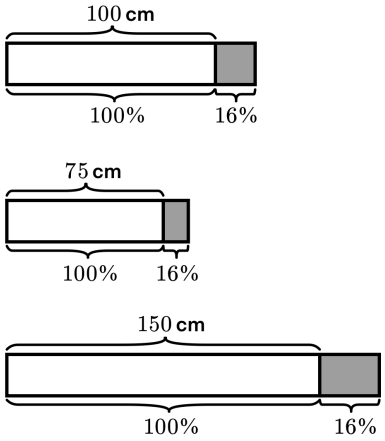
- ☐ I can use tape diagrams and tables to represent adding or subtracting a percentage from 100%.
- ☐ I can determine the new amount if I know the original amount and the percent change.

Unit 7.4, Lesson 5: Notes Name _____

My Notes

1. Each rectangle is 16% longer than the original. Complete the table with the length of each new rectangle.

Original Rectangle Length (cm)	New Rectangle Length (cm)
100	
75	
150	



2. Write at least two different equations that represent the relationship between the length of the original rectangle, b, and the length of new rectangle, c.

3. Write at least one equation for the relationship between the length of an original rectangle and the length of a new rectangle that is 16% **shorter**.

Summary

☐ I can write an equation to represent adding or subtracting a percentage from 100%.

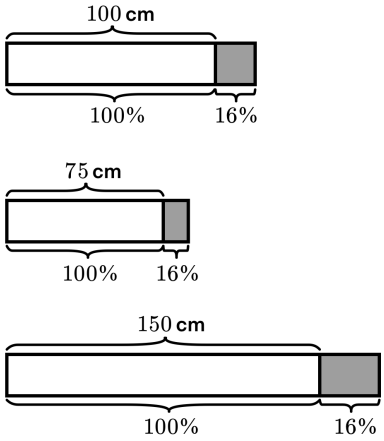
desmos

Unit 7.4, Lesson 5: Notes Name _____

My Notes

1. Each rectangle is 16% longer than the original. Complete the table with the length of each new rectangle.

Original Rectangle Length (cm)	New Rectangle Length (cm)
100	116
75	87
150	174



2. Write at least two different equations that represent the relationship between the length of the original rectangle, b, and the length of new rectangle, c. ***Responses vary.***

   - $c = 1.16b$
   - $c = (1 + 0.16)b$
   - $c = 1b + 0.16 \cdot b$

3. Write at least one equation for the relationship between the length of an original rectangle and the length of a new rectangle that is 16% **shorter**. ***Responses vary.***

   - $c = 0.84b$
   - $c = (1 - 0.16)b$
   - $c = 1b - 0.16 \cdot b$

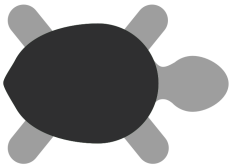
Summary

☐ I can write an equation to represent adding or subtracting a percentage from 100%.

Unit 7.4, Lesson 6: Notes Name _____

My Notes

At a turtle sanctuary, the number of nesting turtles decreased by 20% compared to last year.



This year, there are 180 nesting turtles.

1. Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line

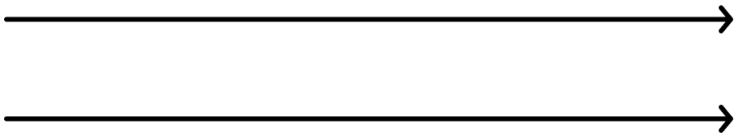


Table	**Equation**

2. How many nesting turtles were at the sanctuary last year?

Summary

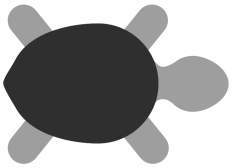
- ☐ I can use double number lines to represent adding or subtracting a percentage from 100%.
- ☐ I can determine the original amount if I know the new amount and the percent change.

desmos

Unit 7.4, Lesson 6: Notes Name _____

My Notes

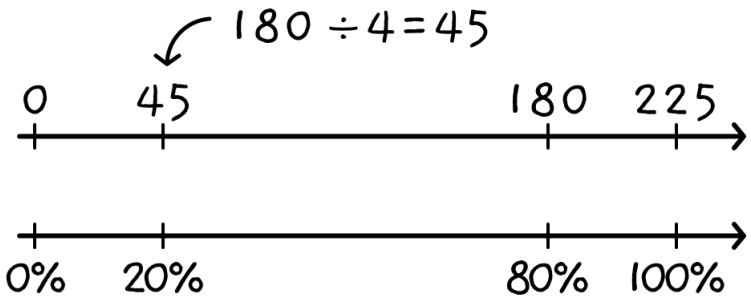
At a turtle sanctuary, the number of nesting turtles decreased by 20% compared to last year.



This year, there are 180 nesting turtles.

1. Create each representation to show how many nesting turtles were at the sanctuary last year.

Double Number Line



Table

Last Year		This Year
100%	×0.8 →	80%
180	÷0.8 ←	225

Equation

$180 = 0.8 \cdot x$

$225 = x$

2. How many nesting turtles were at the sanctuary last year?

There were 225 nesting turtles last year.

Summary

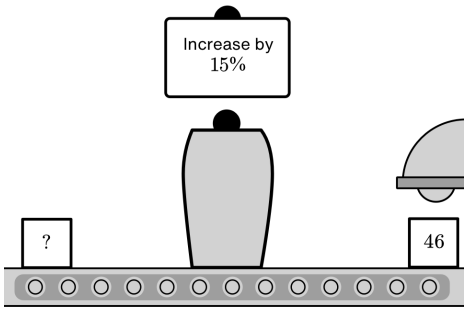
- ☐ I can use double number lines to represent adding or subtracting a percentage from 100%.
- ☐ I can determine the original amount if I know the new amount and the percent change.

Unit 7.4, Lesson 7: Notes Name _____

My Notes

1. A number went into this machine and 46 came out.

   What number went in? Explain your strategy.



2. 50 went into a different machine and 46.5 came out. What percent increase or decrease did this machine use?

3. What are some important things to remember about figuring out the original value given the new value and a percent increase or decrease?

Summary

☐ I can determine the original amount if I know the new amount and the percent change for one-step and multistep problems.

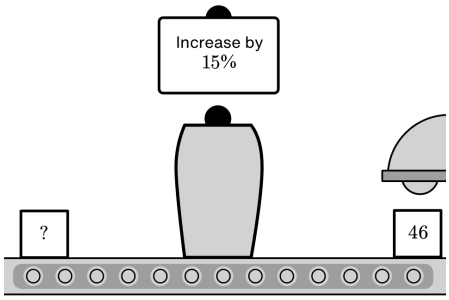
desmos

Unit 7.4, Lesson 7: Notes Name _____

My Notes

1. A number went into this machine and 46 came out.

   What number went in? Explain your strategy.



Explanations vary.

Since this machine increases every input by 15%, every number that goes in gets multiplied by 1.15. In order to figure out what number went in, I worked backwards and divided 46 by 1.15 and got 40.

2. 50 went into a different machine and 46.5 came out. What percent increase or decrease did this machine use?

   The number decreased by 7%. $\frac{3.5}{50} = 0.07$.

3. What are some important things to remember about figuring out the original value given the new value and a percent increase or decrease? ***Responses vary.***

   - **Figure out the constant of proportionality using the percent increase or decrease first.**
   - **Undoing an increase of 10% is not the same as decreasing by 10%.**
   - **You can divide by the constant of proportionality in order to work backwards.**

Summary

☐ I can determine the original amount if I know the new amount and the percent change for one-step and multistep problems.

Unit 7.4, Lesson 8: Notes Name _____

My Notes

1. What are **sales tax** and **tip**?

2. Use this receipt to figure out the total amount this customer paid for their $\$20$ meal after an 18% off coupon and 7.5% sales tax.

Original Cost	$20.00
18% Off Coupon	$
Subtotal	$
7.5% Tax	$
Total	$?.??

3. Which would result in the greatest total amount?

- ☐ Tax first, then coupon.
- ☐ Coupon first, then tax.
- ☐ They are the same.
- ☐ Not enough information.

Explain your thinking.

Summary

☐ I can solve multistep problems about sales tax and tip.

desmos

Unit 7.4, Lesson 8: Notes Name _____

My Notes

1. What are **sales tax** and **tip**? ***Responses vary.***

   - **Sales tax is a fee (an amount of money) paid to the government, usually a percentage of the price of the item. Different states charge different percentages. Additionally, some local governments, like counties and cities, also charge a sales tax.**
   - **Tip is an amount that you add onto a bill to pay the waiter or other people who help you at a store or a restaurant. Tips at a restaurant are usually between 10% and 20%.**

2. Use this receipt to figure out the total amount this customer paid for their $\$20$ meal after an 18% off coupon and 7.5% sales tax.

Original Cost	$20.00
18% Off Coupon	$
Subtotal	$
7.5% Tax	$
Total	$?.??

   Coupon:
   $\$20.00 \cdot 0.82 = \$16.40$

   Tax:
   $\$16.40 \cdot 1.075 = \$17.63$

   This customer paid $\$17.63$ for their meal.

3. Which would result in the greatest total amount?

   - ☐ Tax first, then coupon.
   - ☐ Coupon first, then tax.
   - ✓ They are the same.
   - ☐ Not enough information.

   Explain your thinking.

   Explanations vary. **You are multiplying by two numbers, and you can multiply in either order and get the same answer.**

Summary

☐ I can solve multistep problems about sales tax and tip.

Unit 7.4, Lesson 9: Notes Name _____

My Notes

Adrian is a 25-year-old who plays in a band and works 30 hours per week as a server. He makes minimum wage, which is $\$5.45$ per hour in his town. Adrian also collects tips. The average tip he receives is 15% of the bill. The typical bill is $\$25$ per table, and he serves 70 tables in an average week.

1. How much money does Adrian make in a typical week?

Imagine that the average tip Adrian receives is 20% instead of 15%.

2.1 How much money would he make now?

2.2 By what percent would his pay increase?

Summary

☐ I can use proportional relationships and percent change to analyze an issue in society.

desmos

Unit 7.4, Lesson 9: Notes Name _____

My Notes

Adrian is a 25-year-old who plays in a band and works 30 hours per week as a server. He makes minimum wage, which is $\$5.45$ per hour in his town. Adrian also collects tips. The average tip he receives is 15% of the bill. The typical bill is $\$25$ per table, and he serves 70 tables in an average week.

1. How much money does Adrian make in a typical week?

$$30 \cdot 5.45 + (70 \cdot 25 \cdot 0.15) = \$426$$

Imagine that the average tip Adrian receives is 20% instead of 15%.

2.1 How much money would he make now?

$$30 \cdot 5.45 + (70 \cdot 25 \cdot 0.20) = \$513.50$$

2.2 By what percent would his pay increase?

$\$513.50$ **is about a** 20.5% **increase compared to** $\$426$**.**

Summary

☐ I can use proportional relationships and percent change to analyze an issue in society.

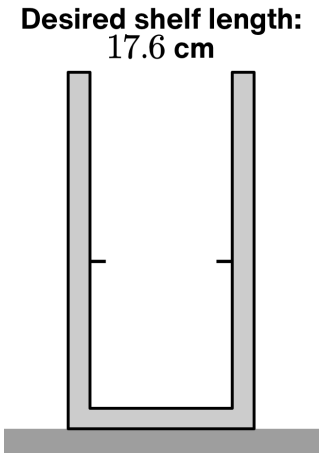
Unit 7.4, Lesson 11: Notes Name _____

My Notes

1. What is **percent error**? Create your own example.

2. Diamond is making a bookshelf with shelves that are supposed to be 17.6 centimeters long. Complete the table with the percent error of each shelf that Diamond builds.

Shelf Width (cm)	Percent Error
17.1	
18.25	
16.5	



3. The acceptable percent error is 5% for a shelf to fit. Will all of the shelves fit? Why or why not?

Summary

- ☐ I can explain what percent error is and how to calculate it.
- ☐ I can decide whether a value is within an acceptable percent error.

desmos

Unit 7.4, Lesson 11: Notes Name _____

My Notes

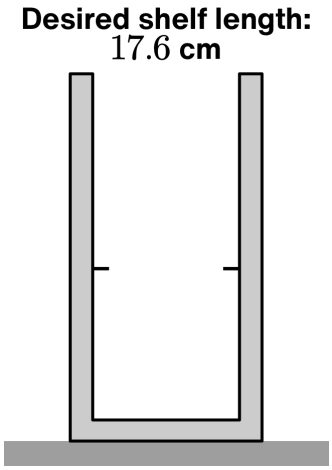
1. What is **percent error**? Create your own example.

   Responses vary. **Percent error is how far away the value you have is from the value you wanted, written as a percent.**

   Example: I wanted to grow my hair exactly 12 **inches long. Right now, my hair is only** 11.5 **inches. The percent error is** $\frac{0.5}{12} \approx 0.042$**, which is** 4.2%**.**

2. Diamond is making a bookshelf with shelves that are supposed to be 17.6 centimeters long. Complete the table with the percent error of each shelf that Diamond builds.

Shelf Width (cm)	Percent Error
17.1	$\frac{0.5}{17.6} \approx 2.8\%$
18.25	$\frac{0.65}{17.6} \approx 3.7\%$
16.5	$\frac{1.1}{17.6} = 6.25\%$



3. The acceptable percent error is 5% for a shelf to fit. Will all of the shelves fit? Why or why not?

   No. ***Explanations vary.*** **The smallest shelf will be too short because it has a percent error of** 6.25%**.**

Summary

- ☐ I can explain what percent error is and how to calculate it.
- ☐ I can decide whether a value is within an acceptable percent error.

Unit 7.4, Lesson 12: Notes Name _____

My Notes

Here is information about the wage gap.

> In 1963, when the Equal Pay Act was passed, women were paid 41% less than what men were paid on average, which was about $\$5\ 978$ per year. By 2004, women were paid $\$29\ 900$ per year on average, which is about 23% less than what men were paid.
>
> *Source: National Organization for Women*

1. Write at least two questions that you could figure out using this information and whose answer is not already given.

2. Answer one of the questions that you asked.

3. What are some characteristics of a good question you could ask using a set of information?

Summary

- ☐ I can write a question about a real-world situation that involves percent increase or decrease.
- ☐ I can use what I know to answer questions about the world we live in.

desmos

Unit 7.4, Lesson 12: Notes Name _____

My Notes

Here is information about the wage gap.

> In 1963, when the Equal Pay Act was passed, women were paid 41% less than what men were paid on average, which was about $\$5\,978$ per year. By 2004, women were paid $\$29\,900$ per year on average, which is about 23% less than what men were paid.
>
> *Source: National Organization for Women*

1. Write at least two questions that you could figure out using this information and whose answer is not already given.

   Responses vary.
   - **How much were women paid on average in 1963?**
   - **How much were men paid on average in 2004?**

2. Answer one of the questions that you asked.

   Responses vary based on the questions asked.
   - **Women were paid $\$5\,978 \cdot 0.59 \approx \$3\,527$ on average, which is $\$5\,978 - \$3\,527 = \$2\,451$ less than men were paid in the same year.**
   - **Men were paid $\frac{29\,900}{0.77} \approx \$38\,831$ on average, which is $\$38\,831 - \$29\,900 = \$8\,931$ more than women were paid in the same year.**

3. What are some characteristics of a good question you could ask using a set of information?

   Responses vary.
   - **You can answer it with only the information you know.**
   - **It is interesting or provides insight into the situation.**
   - **The answer isn't already available in the information you have.**

Summary

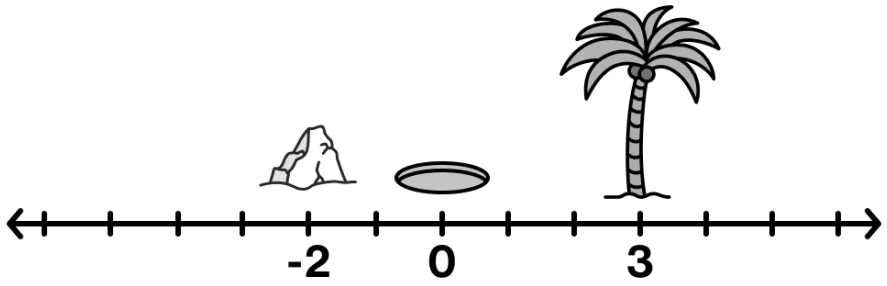
- ☐ I can write a question about a real-world situation that involves percent increase or decrease.
- ☐ I can use what I know to answer questions about the world we live in.

Unit 6.7, Lesson 1: Notes Name _____

My Notes

1. Explain what *negative numbers* are in your own words. Give at least one example.

2.1 Draw a star at -3 on the number line below.
Explain your thinking.



2.2 Label each of the remaining tick marks on the number line.

2.3 A sand dollar is 3 units away from the rock.

Where could it be? Explain your thinking.

Summary

- ☐ I can explain what positive and negative numbers are.
- ☐ I can use the symbol ($-$) and the word *negative* to describe numbers that are less than 0.

desmos

Unit 6.7, Lesson 1: Notes Name _____

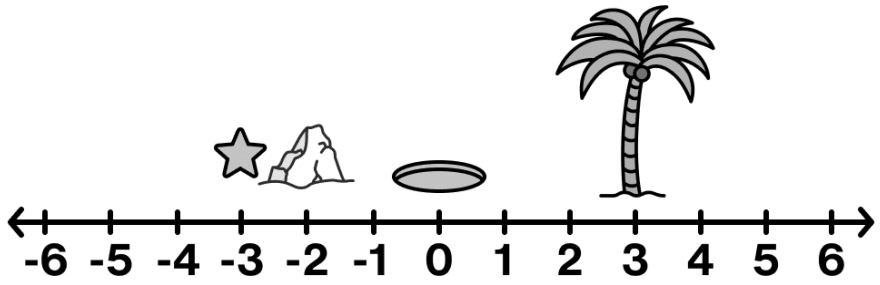
My Notes

1. Explain what *negative numbers* are in your own words. Give at least one example.

Responses vary. **Negative numbers are numbers less than 0. They are to the left of 0 on the number line.**

2.1 Draw a star at -3 on the number line below.
Explain your thinking. ***Responses vary.***

- **-3 is 1 unit left of the rock, which is at -2.**
- **It is the same distance away from the hole as the tree but to the left of the hole.**



2.2 Label each of the remaining tick marks on the number line.

2.3 A sand dollar is 3 units away from the rock.

Where could it be? Explain your thinking.

-5 or 1. *Explanations vary.* -5 is to the left of the rock and 1 is to the right of the rock. Don't forget to count 0!

Summary

- ☐ I can explain what positive and negative numbers are.
- ☐ I can use the symbol ($-$) and the word *negative* to describe numbers that are less than 0.

desmos Science Mom Lesson 92

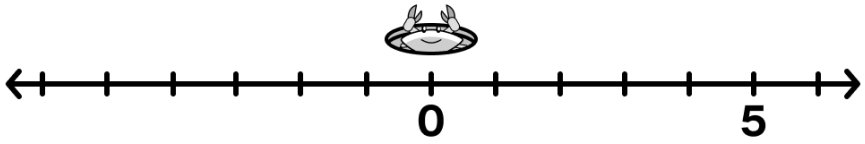
Unit 6.7, Lesson 2: Notes Name _____

My Notes

1. What does it mean for two numbers to be *opposites*? Give at least one example.

2.1 Plot and label each number on the number line.

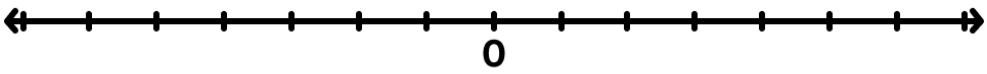
2.5 $-\frac{3}{4}$ $-\frac{7}{3}$



2.2 What is the opposite of 2.5? _____

2.3 What is the opposite of $-\frac{3}{4}$? _____

3. Draw a star at $-(-2)$. Explain your thinking.



Summary

- ☐ I can identify and plot positive and negative numbers on the number line.
- ☐ I know what opposite numbers are and can use the symbol (–) to represent them.
- ☐ I know what the opposite of the opposite of a number is.

desmos

Unit 6.7, Lesson 2: Notes Name _____

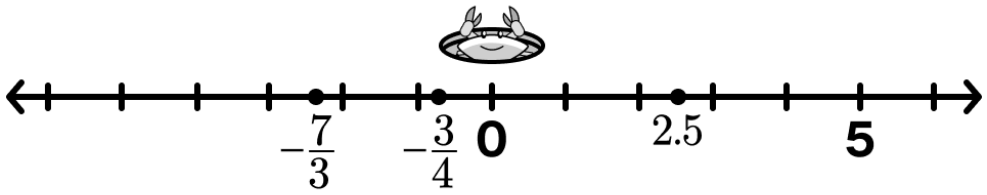
My Notes

1. What does it mean for two numbers to be *opposites*? Give at least one example.

   Responses vary. **Two numbers are opposites if they are the same distance from 0 and on different sides of the number line. For example, -4 is the opposite of 4, and 3 is the opposite of -3.**

2.1 Plot and label each number on the number line.

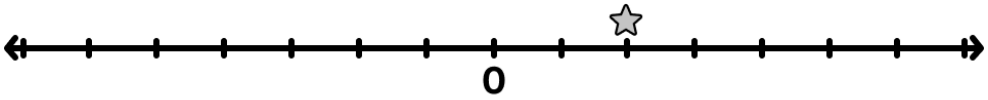
2.5 $-\frac{3}{4}$ $-\frac{7}{3}$



2.2 What is the opposite of 2.5? -2.5

2.3 What is the opposite of $-\frac{3}{4}$? $\frac{3}{4}$

3. Draw a star at $-(-2)$. Explain your thinking.



Explanations vary. **Another way of saying $-(-2)$ is "the opposite of -2." The opposite of a negative number is a positive number, so $-(-2) = 2$.**

Summary

- ☐ I can identify and plot positive and negative numbers on the number line.
- ☐ I know what opposite numbers are and can use the symbol (–) to represent them.
- ☐ I know what the opposite of the opposite of a number is.

Unit 6.7, Lesson 3: Notes Name _____

My Notes

Here are some numbers from the lesson.

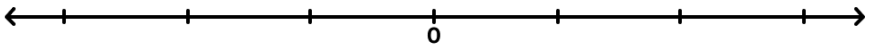
-0.4 $-\frac{5}{4}$ $-2\frac{2}{3}$ 2.5

1.1 Use these numbers to create true sentences. You can use numbers more than once.

_____ is greater than _____. _____ is less than _____.

_____ > _____ _____ < _____ _____ > _____

1.2 Plot and label these numbers on the number line.



1.3 Order these numbers from least to greatest.

Least _____ _____ _____ _____ **Greatest**

2. What advice would you give another student about ordering positive and negative numbers?

Summary

- ☐ I can compare positive and negative numbers using words and symbols.
- ☐ I can use a number line to order positive and negative numbers.

desmos

Unit 6.7, Lesson 3: Notes Name _____

My Notes

Here are some numbers from the lesson.

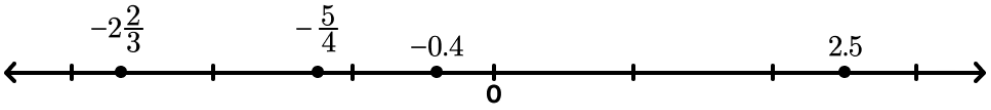
-0.4 $-\frac{5}{4}$ $-2\frac{2}{3}$ 2.5

1.1 Use these numbers to create true sentences. You can use numbers more than once. ***Responses vary.***

-0.4 is greater than $-\frac{5}{4}$. $-2\frac{2}{3}$ is less than $-\frac{5}{4}$.

$2.5 > -2\frac{2}{3}$ $-\frac{5}{4} < -0.4$ $2.5 > -0.4$

1.2 Plot and label these numbers on the number line.



1.3 Order these numbers from least to greatest.

Least $-2\frac{2}{3}$ $-\frac{5}{4}$ -0.4 2.5 **Greatest**

2. What advice would you give another student about ordering positive and negative numbers? ***Responses vary.***

- **Positive numbers are greater than negative numbers.**
- **Numbers farther to the left on the number line are less than numbers farther to the right.**

Summary

☐ I can compare positive and negative numbers using words and symbols.

☐ I can use a number line to order positive and negative numbers.

Unit 6.7, Lesson 4: Notes Name _____

My Notes

The record low temperature in Damascus, Syria, is -11.1 °C.

1.1 Write two temperatures that are warmer than -11.1 °C.

1.2 Write two temperatures that are colder than -11.1 °C.

1.3 Imagine the temperature is -11 °C.

Is that a new record low? Explain your thinking.

2. Order these cities in California from lowest to highest elevation.

City	Coachella	El Centro	Imperial	Niland
Elevation (ft.)	-72	-39	-59	-141

Lowest _____ _____ _____ _____ **Highest**

3. What concepts besides temperature and elevation include both positive and negative numbers?

Summary

- ☐ I can explain what positive numbers, negative numbers, and 0 mean in a context.
- ☐ I can compare negative numbers in context using words and symbols.

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Unit 6.7, Lesson 4: Notes Name _____

My Notes

The record low temperature in Damascus, Syria, is -11.1 °C.

1.1 Write two temperatures that are warmer than -11.1 °C.

Responses vary. **-10 °C and 20 °C.**

1.2 Write two temperatures that are colder than -11.1 °C.

Responses vary. **-12 °C and -20 °C.**

1.3 Imagine the temperature is -11 °C.

Is that a new record low? **No.** Explain your thinking.

Explanations vary. **-11 °C is to the right of -11.1 °C on a number line, so -11 °C is warmer than -11.1 °C.**

2. Order these cities in California from lowest to highest elevation.

City	Coachella	El Centro	Imperial	Niland
Elevation (ft.)	–72	–39	–59	–141

Lowest Niland Coachella Imperial El Centro **Highest**

Lowest -141 -72 -59 -39 **Highest**

3. What concepts besides temperature and elevation include both positive and negative numbers? ***Responses vary.***

- **Spending money and debt**
- **Negative scores in games (like golf)**

Summary

- ☐ I can explain what positive numbers, negative numbers, and 0 mean in a context.
- ☐ I can compare negative numbers in context using words and symbols.

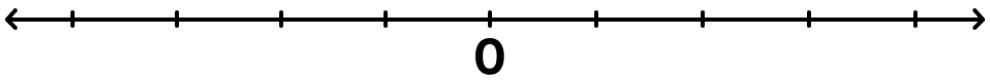
Unit 6.7, Lesson 5: Notes Name _____

My Notes

1. What does *absolute value* mean? Give at least one example of a number and its absolute value.

2. Determine the value of each expression. Use the number line if it helps you with your thinking.

Expression	Value
$\lvert -4 \rvert$	
$\lvert 2.5 \rvert$	
$\left\lvert -\frac{7}{20} \right\rvert$	



Decide if each statement is true or false.

3.1 $\lvert -3 \rvert < \lvert -2.5 \rvert$ True False

3.2 $-3 < -2.5$ True False

3.3 $\lvert 5 \rvert = -5$ True False

3.4 Choose one of the statements above. Explain your thinking.

Summary

- ☐ I understand what absolute value is and how to write it in symbols.
- ☐ I can compare numbers and absolute values.

desmos

Unit 6.7, Lesson 5: Notes Name _____

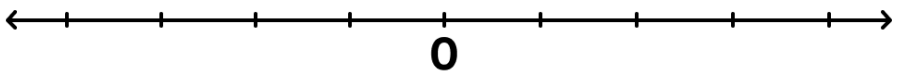
My Notes

1. What does *absolute value* mean? Give at least one example.

   Responses vary. **The absolute value of a number is its distance from** 0 **on the number line.** $|-3| = 3$ **because** -3 **is** 3 **units away from** 0**.** $|4| = 4$ **and** $|-4| = 4$**.**

2. Determine the value of each expression. Use the number line if it helps you with your thinking.

Expression	Value
$\|-4\|$	4
$\|2.5\|$	2.5
$\left\|-\frac{7}{20}\right\|$	$\frac{7}{20}$



Decide if each statement is true or false.

3.1 $|-3| < |-2.5|$ True **False**

3.2 $-3 < -2.5$ **True** False

3.3 $|5| = -5$ True **False**

3.4 Choose one of the statements above. Explain your thinking.

- $|-3| < |-2.5|$ **is false.** -3 **is farther from** 0 **than** -2.5**.**
- $-3 < -2.5$ **is true.** -3 **is to the left of** -2.5 **on the number line.**
- $|5| = -5$ **is false.** 5 **is** 5 **units from** 0**, not** -5 **units.**

Summary

- [ ] I understand what absolute value is and how to write it in symbols.
- [ ] I can compare numbers and absolute values.

Unit 7.5, Lesson 1: Notes Name _____

My Notes

This submarine's position is controlled by floats and anchors.

1. Enter the missing information in the table.

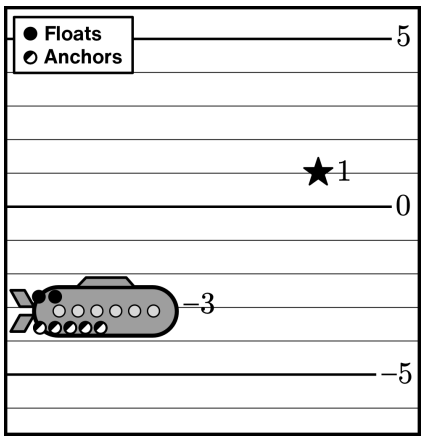
Start	Action	Final
–3	Add 2 floats	–1
–3	Remove 2 anchors	
–3	Add 11 floats	
–3		–7

2. The submarine starts at -3 units. List three different actions that would move it to 1 unit.

Action 1:

Action 2:

Action 3:



Summary

- ☐ I can use floats and anchors to solve problems.
- ☐ I can identify different ways to represent the same change.

desmos

Unit 7.5, Lesson 1: Notes Name _____

My Notes

This submarine's position is controlled by floats and anchors.

1. Enter the missing information in the table.

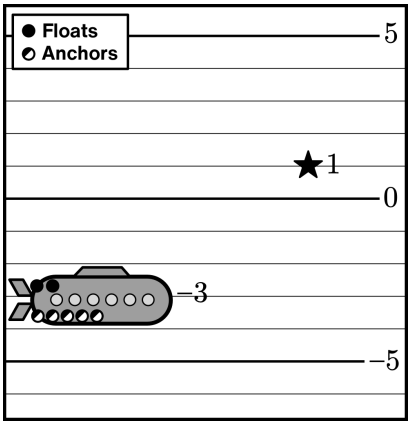
Start	Action	Final
-3	Add 2 floats	-1
-3	Remove 2 anchors	-1
-3	Add 11 floats	8
-3	Add 4 anchors or Remove 4 floats	-7

2. The submarine starts at -3 units. List three different actions that would move it to 1 unit.

Action 1: **Add 4 floats**

Action 2: **Remove 4 anchors**

Action 3: **Add 2 floats and remove 2 anchors**



Summary

- ☐ I can use floats and anchors to solve problems.
- ☐ I can identify different ways to represent the same change.

Unit 7.5, Lesson 2: Notes Name _____

My Notes

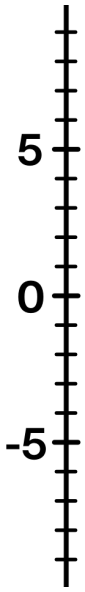
1. Complete the table for these four submarine scenarios.

Start	Action	Final Expression	Final Value
-2	Add 6 floats	$-2+6$	4
	Remove 5 anchors	$1-(-5)$	
3		$3-7$	
		$-1+(-4)$	

Describe your strategy for calculating the value of each expression. Use the number line if it helps you with your thinking.

2.1 $-4-(-2)$

2.2 $-4+(-2)$



Summary

- ☐ I can connect adding and removing floats and anchors to adding and subtracting integers.
- ☐ I can identify different expressions that have the same value.

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Unit 7.5, Lesson 2: Notes Name _____

My Notes

1. Complete the table for these four submarine scenarios.

Start	Action	Final Expression	Final Value
-2	Add 6 floats	$-2+6$	4
1	Remove 5 anchors	$1-(-5)$	6
3	Remove 7 floats	$3-7$	-4
-1	Add 4 anchors	$-1+(-4)$	-5

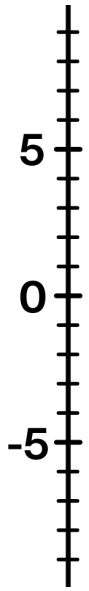
Describe your strategy for calculating the value of each expression. Use the number line if it helps you with your thinking.

2.1 $-4-(-2)$

***Responses vary*. Start at -4 and remove 2 anchors. This is like going up by 2, so the value is -2.**

2.2 $-4+(-2)$

***Responses vary*. Start at -4 and add 2 anchors. This is like going down by 2, so the value is -6.**



Summary

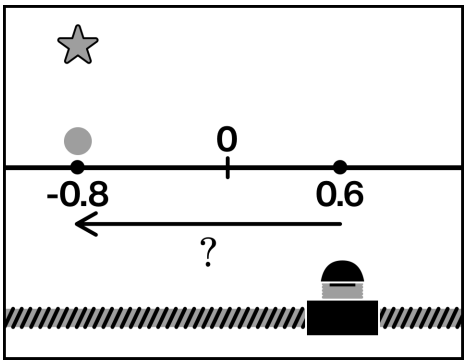
- ☐ I can connect adding and removing floats and anchors to adding and subtracting integers.
- ☐ I can identify different expressions that have the same value.

Unit 7.5, Lesson 3: Notes Name _____

My Notes

1.1 Select all the equations that represent this challenge.

- ☐ $0.6 + x = -0.8$
- ☐ $-0.8 + x = 0.6$
- ☐ $x = -0.8 - 0.6$
- ☐ $x - 0.6 = -0.8$



1.2 What is the value of x that makes this equation true? Explain your strategy.

Determine the value of the variable that makes each equation true.

2.1 $-1.3 + x = 7.2$

2.2 $\frac{3}{4} - \left(-\frac{5}{4}\right) = x$

Summary

- ☐ I can add and subtract integers, decimals, and fractions on a number line.
- ☐ I can determine the value of a variable that makes an equation true.

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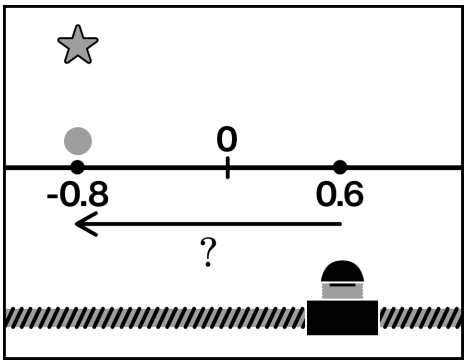
Unit 7.5, Lesson 3: Notes Name _____

My Notes

1.1 Select all the equations that represent this challenge.

- ✓ $0.6 + x = -0.8$
- ☐ $-0.8 + x = 0.6$
- ✓ $x = -0.8 - 0.6$
- ☐ $x - 0.6 = -0.8$



1.2 What is the value of x that makes this equation true?

-1.4

Explanations vary. **I know it is -0.6 to change from 0.6 to 0 and then another -0.8 to change from 0 to -0.8.**

Determine the value of the variable that makes each equation true.

2.1 $-1.3 + x = 7.2$

8.5

2.2 $\frac{3}{4} - \left(-\frac{5}{4}\right) = x$

$\frac{8}{4}$ **(or equivalent)**

Summary

- ☐ I can add and subtract integers, decimals, and fractions on a number line.
- ☐ I can determine the value of a variable that makes an equation true.

Unit 7.5, Lesson 4: Notes Name _____

My Notes

For each expression, draw a number line diagram and determine its value.

1.1 $(-5)-(2)=$ _____

1.2 $(2)-(-5)=$ _____

1.3 What is similar and different about your diagrams?

2. The statement below is (always / sometimes / never) true.

$x-1$ is greater than $x-4$.

My reasoning:

Summary

- ☐ I can draw a number line to add and subtract positive and negative numbers.
- ☐ I can compare and contrast similar expressions (e.g., $2.5-3.5$ and $3.5-2.5$).
- ☐ I can make arguments about addition and subtraction with variables.

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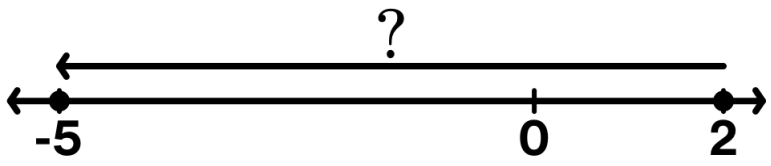
Unit 7.5, Lesson 4: Notes Name _____

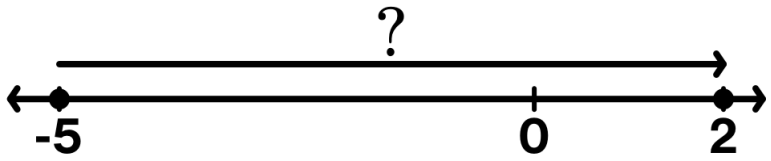
My Notes

For each expression, draw a number line diagram and determine its value.

1.1 $(-5)-(2)=$ -7



1.2 $(2)-(-5)=$ 7



1.3 What is similar and different about your diagrams?

Responses vary.

Similar: The diagrams have the same values, so the arrows are the same length.

Different: The start and the end are switched, so the change arrow is going in the opposite direction.

2. The statement below is (**always** / sometimes / never) true.

$x-1$ is greater than $x-4$.

My reasoning: $x-1$ **is one to the left of** x **and** $x-4$ **is** 4 **to the left of** x**.** $x-4$ **will always be further to the left, so it will always be less than** $x-1$.

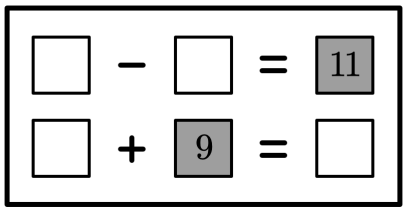
Summary

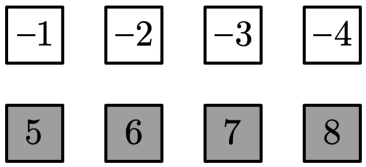
- ☐ I can draw a number line to add and subtract positive and negative numbers.
- ☐ I can compare and contrast similar expressions (e.g., $2.5-3.5$ and $3.5-2.5$).
- ☐ I can make arguments about addition and subtraction with variables.

Unit 7.5, Lesson 5: Notes Name _____

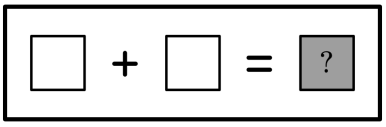
My Notes

1. Fill in the blanks using these numbers to make the equations true.





2. Imagine adding a pair of numbers. Describe how you can tell whether its value will be positive, negative, or zero.



Summary

☐ I can add and subtract positive and negative numbers in complicated expressions.

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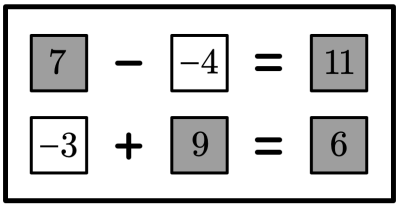
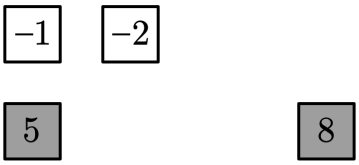
Unit 7.5, Lesson 5: Notes Name _____

My Notes

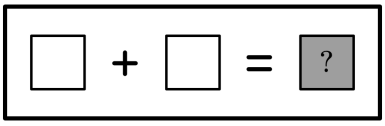
1. Fill in the blanks using these numbers to make the equations true.





Responses vary.

2. Imagine adding a pair of numbers. Describe how you can tell whether its value will be positive, negative, or zero.



Responses vary. **The value will be zero if the numbers are opposites, like -5 and 5. It will be negative if both numbers are negative, or if the negative number is farther from zero than the positive number, like -5 and 2. The value will be positive if both numbers are positive, or if the positive number is farther from zero than the negative number, like -2 and 5.**

Summary

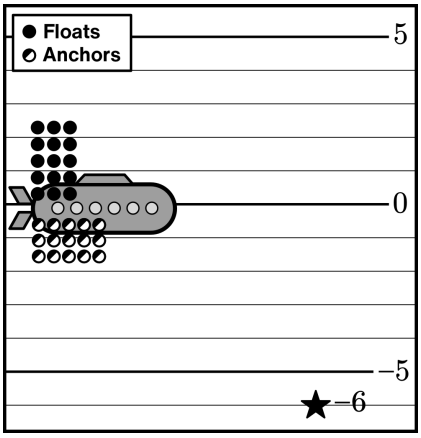
☐ I can add and subtract positive and negative numbers in complicated expressions.

Unit 7.5, Lesson 6: Notes Name _____

My Notes

This submarine is controlled by groups of 5 floats and groups of 3 anchors. The submarine starts at 0 units.

1.1 Explain why adding 2 groups of 3 anchors moves the submarine to -6 units.



1.2 Where will the submarine end up after . . .

. . . removing 3 groups of 5 floats? _____

. . . removing 3 groups of 3 anchors? _____

3. Calculate the value of $(-2)(-7)$. Explain your strategy.

Summary

- ☐ I can use floats and anchors to represent multiplying positive and negative numbers.
- ☐ I can explain why the product of two numbers will be positive or negative.

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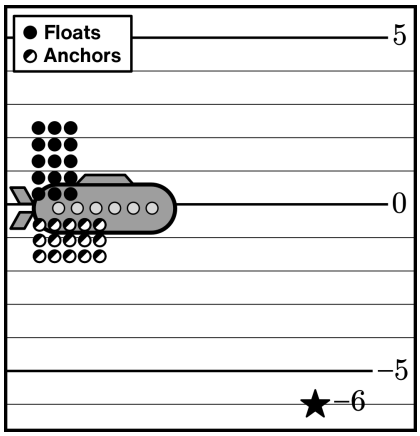
Unit 7.5, Lesson 6: Notes Name _____

My Notes

This submarine is controlled by groups of 5 floats and groups of 3 anchors. The submarine starts at 0 units.

1.1 Explain why adding 2 groups of 3 anchors moves the submarine to -6 units.

***Responses vary*. Adding 2 groups of 3 anchors moves the submarine down 6 units. Since it starts at 0, it will go down to -6.**



1.2 Where will the submarine end up after . . .

. . . removing 3 groups of 5 floats? -15 **units**

. . . removing 3 groups of 3 anchors? 9 **units**

3. Calculate the value of $(-2)(-7)$. Explain your strategy.

14. *Explanations vary*. The -2 is like removing 2 groups, and the -7 is like 7 anchors). If you remove anchors, the sub goes up, so if you remove 2 groups of 7 anchors, the sub goes up by 14.

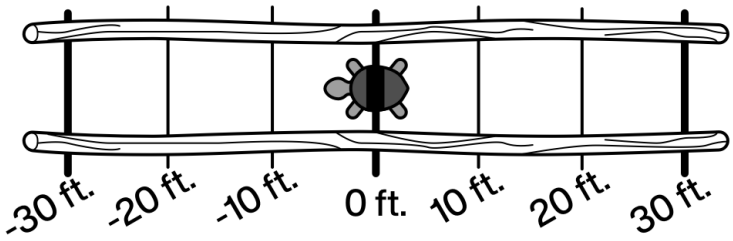
Summary

- ☐ I can use floats and anchors to represent multiplying positive and negative numbers.
- ☐ I can explain why the product of two numbers will be positive or negative.

Unit 7.5, Lesson 7: Notes Name _____

My Notes

This is Mat, Tam's twin turtle. Assume Mat walks at a constant rate.



1.1 Complete the table.

Time (min.)	Position (ft.)
0	0
1	-4
5	
	-28

1.2 What is Mat's rate of change?

1.3 Where was Mat 5 minutes ago?

2. Use the turtle scenario to explain why it makes sense that $(-5)(-4)$ is positive.

Summary

- ☐ I can use position, rate, and time to represent multiplying positive and negative numbers.
- ☐ I can explain why multiplying two negative numbers has a positive value.

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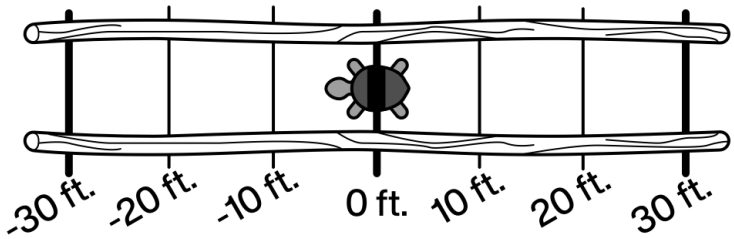
Unit 7.5, Lesson 7: Notes Name _____

My Notes

This is Mat, Tam's twin turtle. Assume Mat walks at a constant rate.



1.1 Complete the table.

Time (min.)	Position (ft.)
0	0
1	-4
5	-20
7	-28

1.2 What is Mat's rate of change?

-4 **ft./min.**

1.3 Where was Mat 5 minutes ago?

20 **feet**

2. Use the turtle scenario to explain why it makes sense that $(-5)(-4)$ is positive.

Responses vary. -4 **is like moving to the left and** -5 **is like** 5 **minutes ago. So we are asking about where the turtle was** 5 **minutes ago, which was to the right. The right is toward the positive numbers.**

Summary

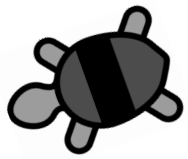
- ☐ I can use position, rate, and time to represent multiplying positive and negative numbers.
- ☐ I can explain why multiplying two negative numbers has a positive value.

Unit 7.5, Lesson 8: Notes Name _____

My Notes

The table shows three different turtle scenarios.

Each turtle is traveling at a constant rate.



1.1 Complete the table.

Turtle	Rate (ft./min.)	Time (min.)	Position (ft.)
A	–3	2.5	
B	–2		–23
C		–2	11

1.2 Describe your strategy for calculating Turtle B's time.

2. Do $-\frac{8}{2}$ and $\frac{-8}{-2}$ have the same value? Why or why not?

Summary

- ☐ I can multiply and divide positive and negative numbers.
- ☐ I can identify different expressions that have the same value.

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Unit 7.5, Lesson 8: Notes Name _____

My Notes

The table shows three different turtle scenarios.

Each turtle is traveling at a constant rate.

1.1 Complete the table.

Turtle	Rate (ft./min.)	Time (min.)	Position (ft.)
A	-3	2.5	-7.5
B	-2	11.5	-23
C	-5.5	-2	11

1.2 Describe your strategy for calculating Turtle B's time.

***Responses vary*. I know that $rate \cdot time = position$, so this is like asking: what number times -2 equals -23? To figure out that number you have to divide. I know the time is positive because the rate and position are both negative.**

2. Do $-\frac{8}{2}$ and $\frac{-8}{-2}$ have the same value? Why or why not?

No. *Explanations vary*. The first one is like the opposite of 4, which is -4. The second one is like walking at a rate of -2 and ending up at -8, which would mean the time was positive 4.

Summary

- ☐ I can multiply and divide positive and negative numbers.
- ☐ I can identify different expressions that have the same value.

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Unit 7.5, Lesson 10: Notes Name _____

My Notes

1. What is the value of this expression? Show all of your thinking.

$$\frac{3 + -5 \times -3}{4 - -2} = ?$$

2.1 Fill in the blanks to make an expression with a negative value.

$$\square \times \square + \square = ?$$

2.2 What is the value of your expression?

1	−2	−3	4
5	−6	−7	8

3. Use the numbers from Problem 2 to make a new expression. Write the value of your expression.

Summary

☐ I can add, subtract, multiply, and divide integers in complicated expressions.

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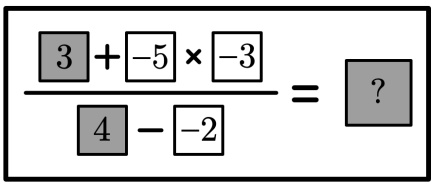
Unit 7.5, Lesson 10: Notes Name _____

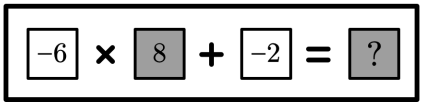
My Notes

1. What is the value of this expression? Show all of your thinking.

$$\frac{3+(-5)\times(-3)}{4-(-2)}$$
$$= \frac{3+15}{6}$$
$$= \frac{18}{6}$$ **or equivalent**

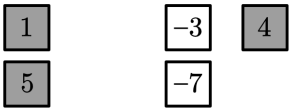


2.1 Fill in the blanks to make an expression with a negative value.



2.2 What is the value of your expression?

–50



3. Use the numbers from Problem 2 to make a new expression. Write the value of your expression.

Expression: $(-6) \times (-3) - (-2)(-7)$

Value: 4

Summary

☐ I can add, subtract, multiply, and divide integers in complicated expressions.

Unit 7.5, Lesson 11: Notes Name _____

My Notes

1.1 This table shows how the average temperature in different places around the world have changed from 1900 to 2014.

Enter the missing values.

Location	Average Temperature in 1900 (°C)	Average Temperature in 2014 (°C)	Change From 1900 to 2014 (°C)
Ulaanbaatar, Mongolia	–3.16	–1.71	
Khabarovsk, Russia		1.35	1.57
Punta Arenas, Chile	6.03		0.96
Greenland	–21.64	–19.26	

1.2 Describe a strategy you used for deciding whether a missing value was positive or negative.

1.3 Which location had the largest change in temperature from 1900 to 2014? What might the impact of this change be?

Summary

☐ I can apply what I've learned to solve problems about changing temperatures.

My Notes

1.1 This table shows how the average temperature in different places around the world have changed from 1900 to 2014.

Enter the missing values.

Location	Average Temperature in 1900 (°C)	Average Temperature in 2014 (°C)	Change From 1900 to 2014 (°C)
Ulaanbaatar, Mongolia	–3.16	–1.71	1.45
Khabarovsk, Russia	–0.22	1.35	1.57
Punta Arenas, Chile	6.03	6.99	0.96
Greenland	–21.64	–19.26	2.38

1.2 Describe a strategy you used for deciding whether a missing value was positive or negative.

***Responses vary*. I estimated where each number or change would be on a number line.**

1.3 Which location had the largest change in temperature from 1900 to 2014? What might the impact of this change be?

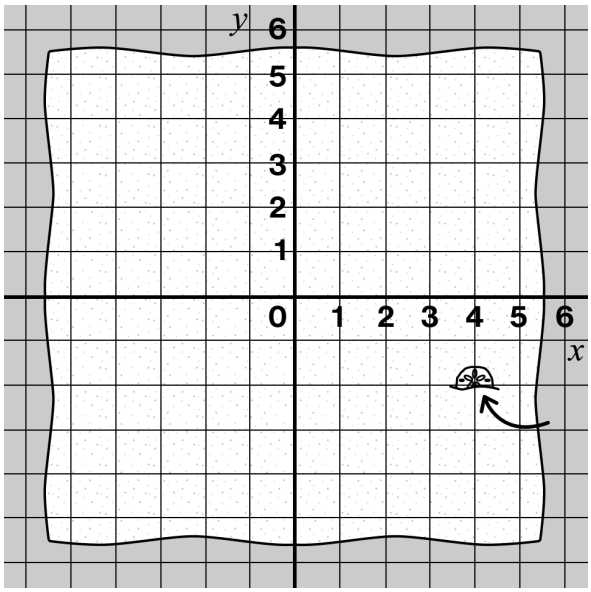
Greenland. *Responses vary*. Hotter temperatures may lead to ice melting more quickly and sea levels rising, which could impact plants and animals.

Summary

☐ I can apply what I've learned to solve problems about changing temperatures.

Unit 6.7, Lesson 9: Notes Name _____

My Notes



1. What are the coordinates of the sand dollar? _____

   Explain how you know.

2. A new sand dollar is also buried in the bottom-right quarter of the graph. What do we know about its coordinates?

3. Plot and label each point in the coordinate plane above.

   $(-4, 1)$ $(-1, -2)$ $(0, -3)$ $(-5, 0)$

Summary

- ☐ I can explain what the coordinate plane looks like with positive and negative numbers.
- ☐ I can write coordinates for points in the coordinate plane.
- ☐ I can estimate the location of a point in the coordinate plane using the signs of its coordinates.

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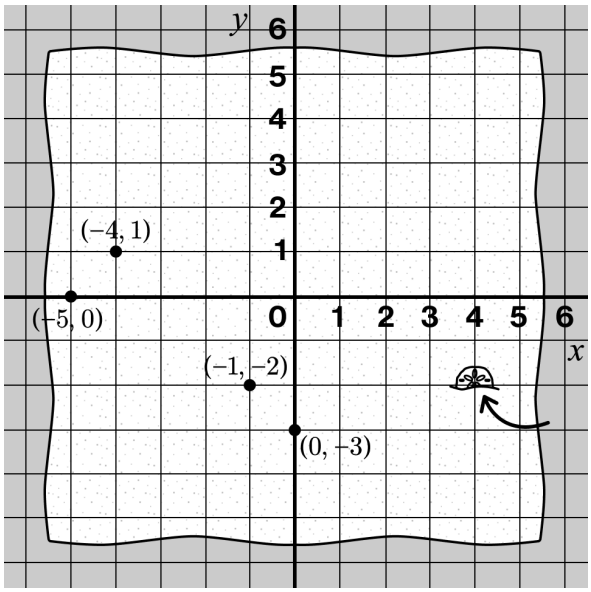
Unit 6.7, Lesson 9: Notes Name _____

My Notes



1. What are the coordinates of the sand dollar? $(4, -2)$

   Explain how you know. ***Explanations vary.***
   - **It is 4 units to the right of the y–axis and 2 units below the x–axis .**
   - **If this were two number lines, then it would be at 4 on the horizontal one and -2 on the vertical one.**

2. A new sand dollar is also buried in the bottom-right quarter of the graph. What do we know about its coordinates?

   Responses vary. **The x–coordinate is positive because it is to the right of the vertical axis. The y–coordinate is negative because it is below the horizontal axis.**

3. Plot and label each point in the coordinate plane above.
   See graph above.

   $(-4, 1)$ $(-1, -2)$ $(0, -3)$ $(-5, 0)$

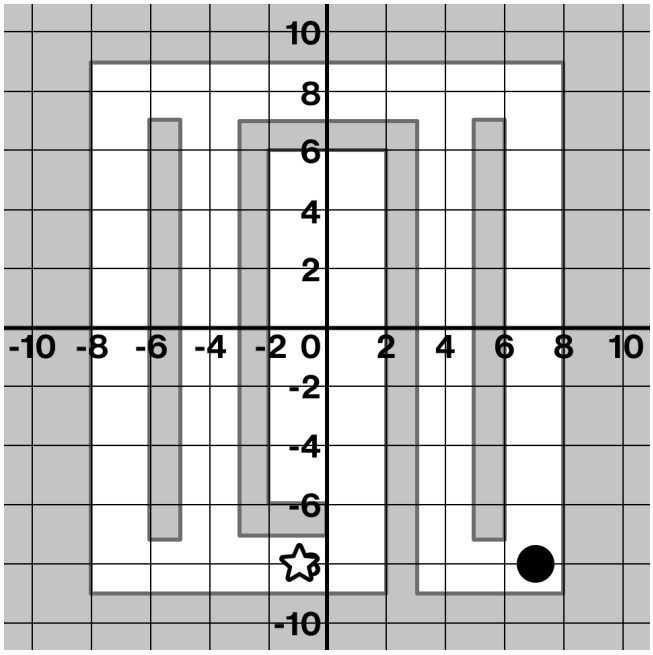
Summary

- ☐ I can explain what the coordinate plane looks like with positive and negative numbers.
- ☐ I can write coordinates for points in the coordinate plane.
- ☐ I can estimate the location of a point in the coordinate plane using the signs of its coordinates.

Unit 6.7, Lesson 10: Notes Name _____

My Notes

1. What are the coordinates of the star? _____
2. Sketch a path to get from the ball to the star.
3. Write coordinates for each stop the ball makes on the path.



Your Path

$(7, -8)$

_____

_____

_____

_____

_____

_____

4. Abdel included the point $(-3, 4)$ on his path.

   Will that hit a barrier? _____ Explain how you know.

5. Diamond included both $(7, 8)$ and $(-7, 8)$ on her path. How are the positions of these points related?

Summary

- ☐ I can plot points in coordinate planes with different scales.
- ☐ I can explain how the locations of points that differ only by one sign are related.

desmos

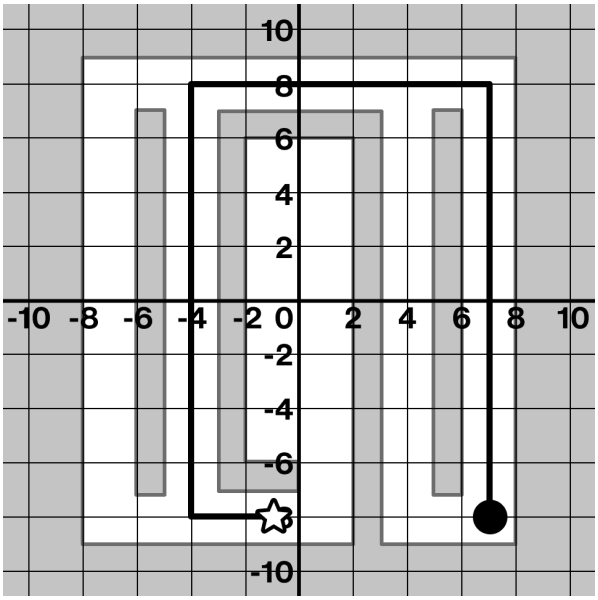
Unit 6.7, Lesson 10: Notes Name _____

My Notes

1. What are the coordinates of the star? $(-1, -8)$

2. Sketch a path to get from the ball to the star. ***Paths vary.***

3. Write coordinates for each stop the ball makes on the path.



Your Path

$(7, -8)$

$(7, 8)$

$(-4, 8)$

$(-4, -8)$

$(-1, -8)$

4. Abdel included the point $(-3, 4)$ on his path.

   Will that hit a barrier? **Yes. *Explanations vary.* Abdel may have counted the number of boxes to figure out his point but the scale is by 2 s. $(-3, 4)$ would hit the edge of the barrier.**

5. Diamond included both $(7, 8)$ and $(-7, 8)$ on her path. How are the positions of these points related? ***Responses vary.*** **These points are a mirror image across the y –axis. $(7, -8)$ is on the right side of the graph. $(-7, -8)$ is a reflection on the left side.**

Summary

- ☐ I can plot points in coordinate planes with different scales.
- ☐ I can explain how the locations of points that differ only by one sign are related.

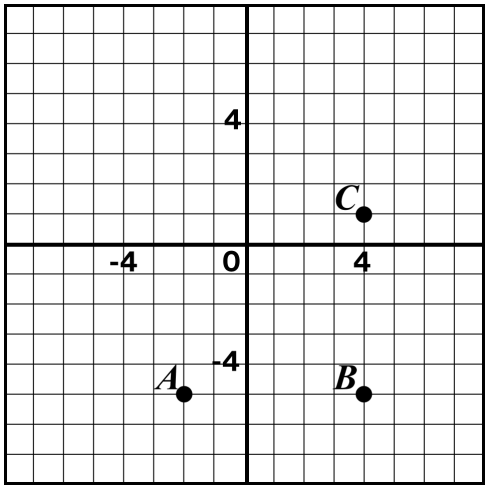
Unit 6.7, Lesson 11: Notes Name _____

My Notes

Here are three of the four coordinates that make a square.

1.1 Write the coordinates of point D.

Point	Coordinates
A	$(-2, -5)$
B	$(4, -5)$
C	$(4, 1)$
D	

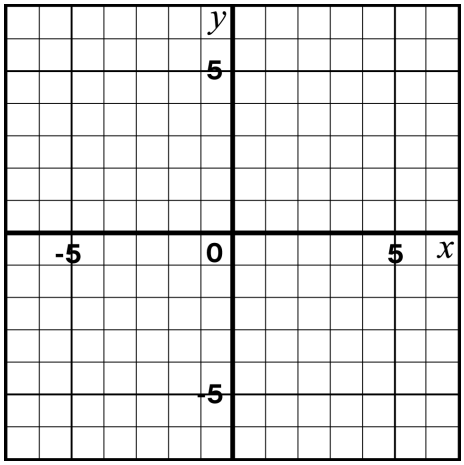


1.2 What is the side length of the square? _____

Explain how you know.

2.1 Plot and label the coordinates of a polygon that looks like a house.

2.2 How long is the longest horizontal or vertical segment in your polygon?



Summary

- ☐ I can draw a polygon in the coordinate plane.
- ☐ I can determine horizontal and vertical side lengths of a polygon in a coordinate plane.

desmos

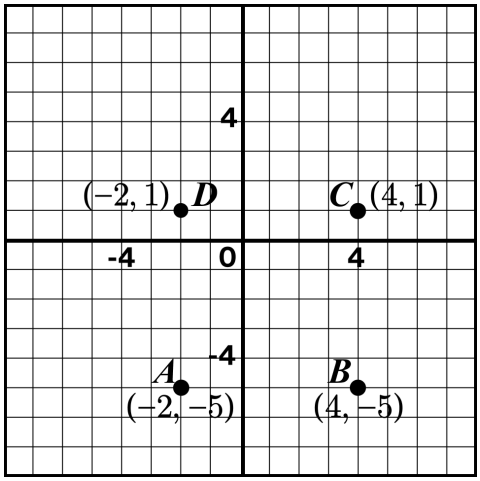
Unit 6.7, Lesson 11: Notes Name _____

My Notes

Here are three of the four coordinates that make a square.

1.1 Write the coordinates of point D.

Point	Coordinates
A	$(-2, -5)$
B	$(4, -5)$
C	$(4, 1)$
D	$(-2, 1)$

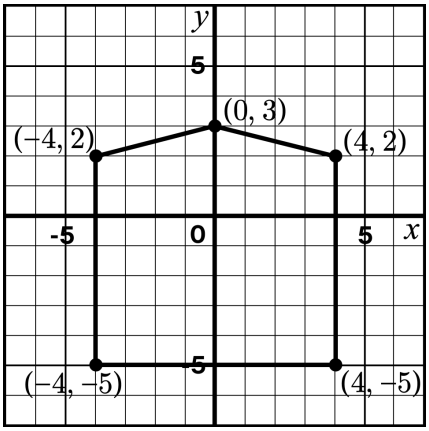


1.2 What is the side length of the square? 6 **units.**

Explanations vary. **For the top side of the square, it is 2 units from -2 to 0 and another 4 units from 0 to 4.**

2.1 Plot and label the coordinates of a polygon that looks like a house. ***Points vary.***

2.2 How long is the longest horizontal or vertical segment in your polygon? ***Responses vary.*** 10 **units.**



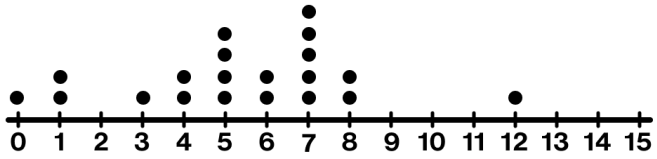
Summary

- ☐ I can draw a polygon in the coordinate plane.
- ☐ I can determine horizontal and vertical side lengths of a polygon in a coordinate plane.

Unit 6.8, Lesson 2: Notes Name _____

My Notes

This dot plot shows the number of books that students in a sixth-grade class read in one month.



Number of Books Read This Month

1.1 There are 2 dots plotted at 4. What does this tell us about the situation?

1.2 Julian said that most students read 6 books or less this month. Do you agree with him? Explain your thinking.

A statistical question is a question that requires more than one piece of data to answer it.

Question A	Question B
What is the typical height of a building in NYC?	How tall is the Empire State Building?

2. Explain why Question A is a statistical question but Question B is not.

Summary

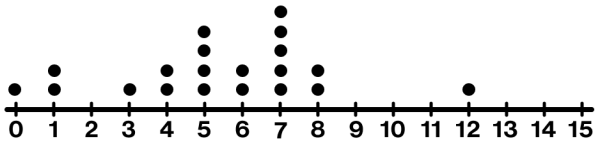
- ☐ I can describe and interpret a dot plot to help answer a statistical question.
- ☐ I can describe the advantages and disadvantages of using a dot plot to visualize data.

desmos

Unit 6.8, Lesson 2: Notes Name _____

My Notes

This dot plot shows the number of books that students in a sixth-grade class read in one month.



Number of Books Read This Month

1.1 There are 2 dots plotted at 4. What does this tell us about the situation?

This tells us that there are 2 students in the class who read 4 books this month.

1.2 Julian said that most students read 6 books or less this month. Do you agree with him? Explain your thinking.

I agree with Julian because 12 out of the 20 students read 6 books or less, and that is more than half.

A statistical question is a question that requires more than one piece of data to answer it.

Question A	**Question B**
What is the typical height of a building in NYC?	How tall is the Empire State Building?

2. Explain why Question A is a statistical question but Question B is not.

Question A is a statistical question because you will have to collect the heights of many buildings to determine what a typical height is. Question B is not statistical because you only need the height of one building to answer it.

Summary

- ☐ I can describe and interpret a dot plot to help answer a statistical question.
- ☐ I can describe the advantages and disadvantages of using a dot plot to visualize data.

Unit 6.8, Lesson 5: Notes Name _____

My Notes

Here is a histogram of minimum wages in the western United States.

1.1 How many states have a minimum wage **less** than $\$10.00$?

1.2 Michigan has a minimum wage of $\$9.65$.
Which bin should it go into? Put a star on that rectangle.

1.3 Adriana says that this histogram represents the minimum wages of 4 different states.

What advice would you give Adriana to better understand the histogram?

Summary

- ☐ I can describe and interpret a histogram that represents a data set.
- ☐ I can compare and contrast dot plots and histograms to visualize data.

desmos

Unit 6.8, Lesson 5: Notes Name _____

My Notes

Here is a histogram of minimum wages in the western United States.

1.1 How many states have a minimum wage **less** than $\$10.00$?

15 **states**

1.2 Michigan has a minimum wage of $\$9.65$.
Which bin should it go into? Put a star on that rectangle.

$\$8.00$ **to less than** $\$10.00$ **(rectangle with the star)**

1.3 Adriana says that this histogram represents the minimum wages of 4 different states.

What advice would you give Adriana to better understand the histogram?

The 4 rectangles do not each represent a state, they represent bins that organize the data. The height of each rectangle tells you how many states are in each bin.

Summary

- ☐ I can describe and interpret a histogram that represents a data set.
- ☐ I can compare and contrast dot plots and histograms to visualize data.

Unit 6.8, Lesson 7: Notes Name _____

My Notes

1. In your own words, explain what the *mean* tells you about a data set.

Six friends played games together at the arcade.
Here are the number of tickets that each friend won.

7	3	4	6	8	2

2.1 Calculate the mean number of tickets for this data. Show your calculations.

2.2 What does the mean tell us about this situation?

3. Describe how to determine the mean of any data set.

Summary

- ☐ I can describe what the *mean* of a data set is.
- ☐ I can calculate the mean of a data set.

desmos

Unit 6.8, Lesson 7: Notes Name _____

My Notes

1. In your own words, explain what the *mean* tells you about a data set.

   The *mean* is like an average. It tells you how much data would be in each group if all of the data were shared equally.

Six friends played games together at the arcade.
Here are the number of tickets that each friend won.

7	3	4	6	8	2

2.1 Calculate the mean number of tickets for this data.
Show your calculations.

$$\frac{7+3+4+6+8+2}{6} = 5$$

The mean is 5 tickets

2.2 What does the mean tell us about this situation?

The mean in this situation tells us how many tickets each friend would get if they shared all of the tickets equally.

3. Describe how to determine the mean of any data set.

To find the mean of any data set, you should add all of the data together, then divide by the total number of data points.

Summary

- ☐ I can describe what the *mean* of a data set is.
- ☐ I can calculate the mean of a data set.

Unit 6.8, Lesson 9: Notes Name _____

My Notes

1. Does the *mean absolute deviation (MAD)* tell us about the **center** of a data set or the **spread** of a data set.
   Circle your answer.

   Center Spread

Here is Marco's work for calculating the MAD of a data set.

Data Values	5	7	7	9	12
Absolute Deviation (distance from __8__) **mean**	3	1	1	1	4

2. Explain what Marco did to calculate the MAD.

$3+1+1+1+4=10$

$10 \div 5 = 2$

MAD: 2

3. Calculate the mean and MAD of this data set.
   Use the table to help you organize your thinking.

Data Values	1	4	5	6
Absolute Deviation (distance from ____) **mean**				

Mean: MAD:

Summary

- ☐ I can describe what the *mean absolute deviation* (MAD) is.
- ☐ I can calculate the mean absolute deviation of a data set.

desmos

Unit 6.8, Lesson 9: Notes Name _____

My Notes

1. Does the *mean absolute deviation* (MAD) tell us about the **center** of a data set or the **spread** of a data set.
   Circle your answer.

   Center | Spread

Here is Marco's work for calculating the MAD of a data set.

Data Values	5	7	7	9	12
Absolute Deviation (distance from __8__ mean)	3	1	1	1	4

2. Explain what Marco did to calculate the MAD.

   3+1+1+1+4=10

   10÷5=2

   MAD: 2

   Explanations vary. **Marco found the mean of the deviations. He added all of the deviations together and then divided by the number of data points.**

3. Calculate the mean and MAD of the data set.
   Use the table to help you organize your thinking.

Data Values	1	4	5	6
Absolute Deviation (distance from __4__ mean)	3	0	1	2

Mean:

$$\frac{1+4+5+6}{4} = 4$$

Mean: 4

MAD:

$$\frac{3+0+1+2}{4} = 1.5$$

MAD: 1.5

Summary

- ☐ I can describe what the *mean absolute deviation* (MAD) is.
- ☐ I can calculate the mean absolute deviation of a data set.

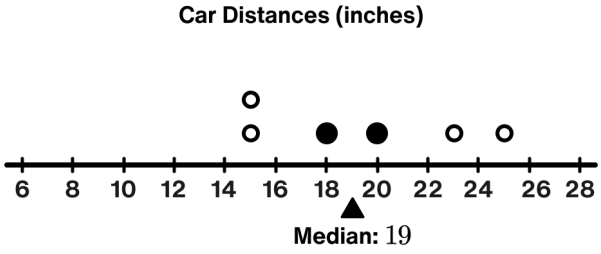
Unit 6.8, Lesson 11: Notes Name _____

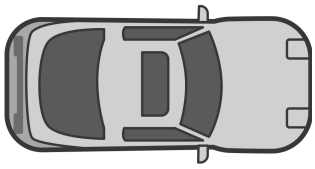
My Notes

1. In your own words, what is the *median* of a data set?

2. What is the median of this data set?

3. Explain why the median of Amoli's car distances is 19 inches.





4. Write your own set of at least 6 distances that have a median of 18 inches.

Summary

- ☐ I can describe what the median is.
- ☐ I can determine and interpret the median of a data set.

desmos

Unit 6.8, Lesson 11: Notes Name _____

My Notes

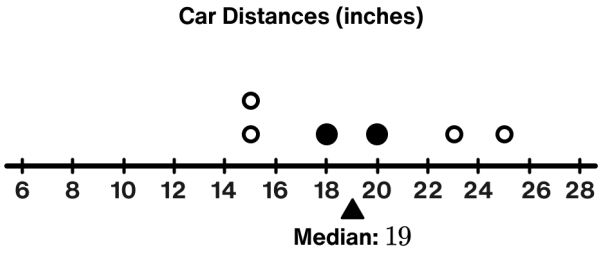
1. In your own words, what is the *median* of a data set?

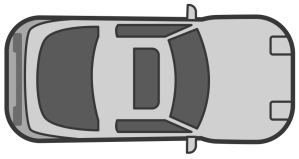
   ***Responses vary*. The median is the middle value of the data set when the values are written in order.**

2. What is the median of this data set?

   The median is 17**.**

3. Explain why the median of Amoli's car distances is 19 inches.





   ***Explanations vary*. When there's an even number of data points, the median is the average of the middle two numbers. The average of** 18 **and** 20 **is** 19**.**

4. Write your own set of at least 6 distances that have a median of 18 inches.

   Data sets vary. $5, 6, 9, 18, 19, 20, 21$ **inches**

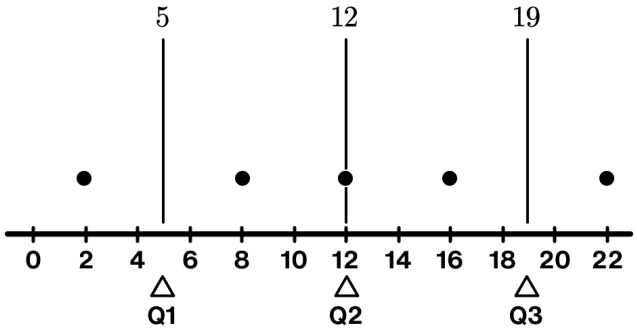
Summary

- ☐ I can describe what the median is.
- ☐ I can determine and interpret the median of a data set.

Unit 6.8, Lesson 13: Notes Name _____

My Notes

This dot plot shows the weight in pounds of 5 pumpkins.



1.1 Explain why the median is 12.

1.2 Explain why Q1 is 5.

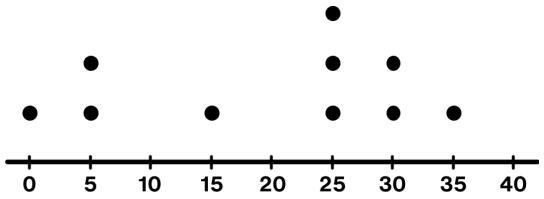
1.3 Explain why Q3 is 19.

2. Here is a data set with 10 data points. Determine the value of each of the following statistics.

Q1:

Median:

Q3:



Summary

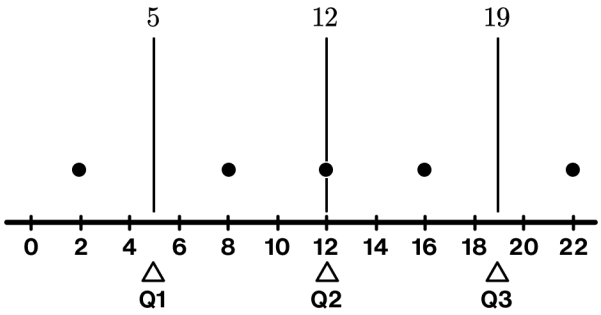
☐ I can determine and interpret the quartiles of a data set.

desmos

Unit 6.8, Lesson 13: Notes Name _____

My Notes

This dot plot shows the weight in pounds of 5 pumpkins.



1.1 Explain why the median is 12.

***Explanations vary*. The median is 12 because it is the middle value of the data set.**

1.2 Explain why Q1 is 5.

***Explanations vary*. The lower half of the data includes 2 and 8. The median of these numbers is 5.**

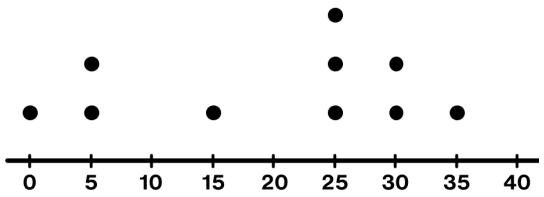
1.3 Explain why Q3 is 19.

***Explanations vary*. The upper half of the data includes 16 and 22. The median of these numbers is 19.**

2. Here is a data set with 10 data points. Determine the value of each of the following statistics.

Q1: 5

Median: 25



Q3: 30

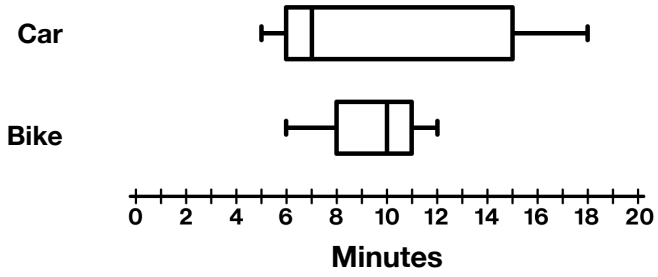
Summary

☐ I can determine and interpret the quartiles of a data set.

Unit 6.8, Lesson 14: Notes Name _____

My Notes

Here are box plots that show how long it takes for Jacy to get to school by car and by bike.



1. For each box plot, determine these statistics.

	Car		Bike
Q1		**Q1**	
Median		**Median**	
Q3		**Q3**	
Range		**Range**	
IQR		**IQR**	

2. If Jacy prefers a mode of transportation that's more predictable, should they go by car or by bike? Explain your reasoning.

Summary

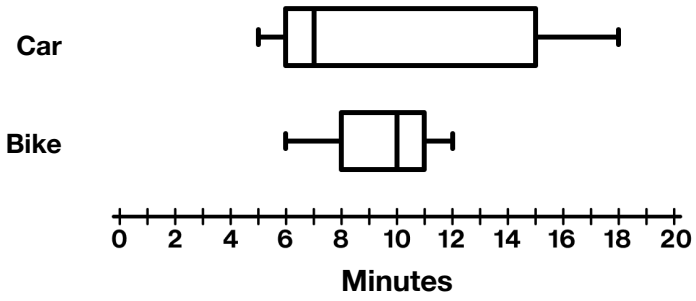
- ☐ I can create a box plot to visualize a data set.
- ☐ I can describe what *range* and *interquartile range (IQR)* are.
- ☐ I can determine the range and IQR of a data set.

desmos

Unit 6.8, Lesson 14: Notes Name _____

My Notes

Here are box plots that show times it takes for Jacy to get to school by car and by bike.



1. For each box plot, determine these statistics.

	Car		Bike
Q1	6 minutes	**Q1**	8 minutes
Median	7 minutes	**Median**	10 minutes
Q3	15 minutes	**Q3**	11 minutes
Range	13 minutes	**Range**	6 minutes
IQR	9 minutes	**IQR**	3 minutes

2. If Jacy prefers a mode of transportation that's more predictable, should he go by car or by bike? Explain your reasoning.

   By bike. *Explanations vary*. Jacy should go by bike because the range of times by car is a lot greater than the range of times by bike.

Summary

- ☐ I can create a box plot to visualize a data set.
- ☐ I can describe what *range* and *interquartile range (IQR)* are.
- ☐ I can determine the range and IQR of a data set.

Unit 7.8, Lesson 10: Notes Name _____

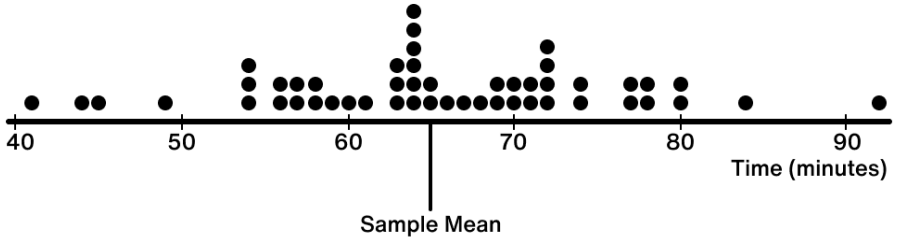
My Notes

Alisha wants to know how many minutes 7th graders at her school spend on their cell phone each day.

1. What is the **population** for Alisha's question?

2. What is a **sample** Alisha could use to help answer this question?

Alisha asked 50 random 7th graders how many minutes they spend on their phone per day and calculated a sample mean of 65 minutes.



3. Why would Alisha decide to collect a sample to answer her question rather than use the population?

Summary

- ☐ I can explain what a sample is and when it is useful.
- ☐ I can compare the means of samples to the mean of the population.

desmos

Unit 7.8, Lesson 10: Notes Name _____

My Notes

Alisha wants to know how many minutes 7th graders at her school spend on their cell phone each day.

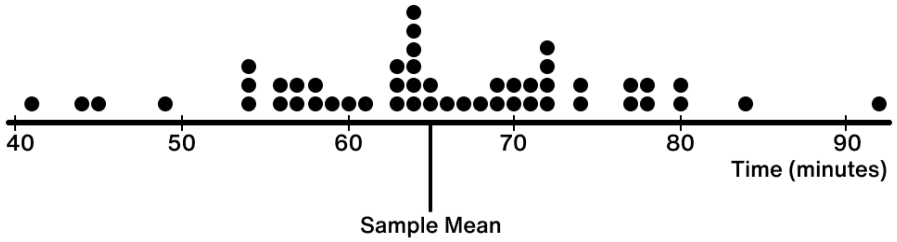
1. What is the **population** for Alisha's question?

   The population is all the 7th graders at Alisha's school.

2. What is a **sample** Alisha could use to help answer this question?

   A sample could be all the 7th graders in Alisha's first class.

Alisha asked 50 random 7th graders how many minutes they spend on their phone per day and calculated a sample mean of 65 minutes.



3. Why would Alisha decide to collect a sample to answer her question rather than use the population?

   ***Responses vary*. It will take a lot of time and effort to ask all of the 7th graders.**

Summary

- ☐ I can explain what a sample is and when it is useful.
- ☐ I can compare the means of samples to the mean of the population.

Unit 7.8, Lesson 11: Notes Name _____

My Notes

1. In your own words, explain what it means for a sample to be *representative* of a population.

2. Match each headline with the sampling method that most likely produced it.

Headline	Sampling Method
____ One Quarter of Working Americans Spend Time Working From Home!	A. Ask all 100 employees at one technology company.
____ Most Americans Spend Time Working From Home!	B. Ask all the employees at 100 random grocery stores.
____ Almost No One Works From Home!	C. Call random phone numbers until you ask 100 people.

3. Which sampling method above is most likely to produce a representative sample? Explain your thinking.

Summary

☐ I can explain why a sampling method is or is not likely to produce a biased sample.

desmos

Unit 7.8, Lesson 11: Notes Name _____

My Notes

1. In your own words, explain what it means for a sample to be *representative* of a population. ***Responses vary.***

   - **There is data in your sample from many parts of the population. For example, it is not only people from one grade or class.**
   - **A sample is representative if it looks like a smaller version of the population. If there are half dogs and half cats in the population, then there should be about half dogs and half cats in the sample.**

2. Match each headline with the sampling method that most likely produced it.

Headline	Sampling Method
C. One Quarter of Working Americans Spend Time Working From Home!	A. Ask all 100 employees at one technology company.
A. Most Americans Spend Time Working From Home!	B. Ask all the employees at 100 random grocery stores.
B. Almost No One Works From Home!	C. Call random phone numbers until you ask 100 people.

3. Which sampling method above is most likely to produce a representative sample? Explain your thinking.

   C. *Explanations vary.* A and B could both be biased because employees at a technology company or at grocery stores aren't representative of all working Americans.

Summary

☐ I can explain why a sampling method is or is not likely to produce a biased sample.

Unit 7.8, Lesson 12: Notes Name _____

My Notes

Cameron bought a bag of White Flower Seed Mix and is curious how many flowers of each type there are. Cameron planted 25 seeds, and these were the results.

Flower Type	Count	Percentage
Daisy	14	
White Zinnia	5	
Aster	6	
Total	25	

1. Complete the table with the percentage of each flower type.

2.1 Estimate how many of the 600 seeds in the bag will be asters. Organize your calculations so others can follow them.

2.2 What could you do to be more confident in your estimate?

Summary

☐ I can use proportional reasoning and a sample to estimate information about a population.

desmos

Unit 7.8, Lesson 12: Notes Name _____

My Notes

Cameron bought a bag of White Flower Seed Mix and is curious how many flowers of each type there are. Cameron planted 25 seeds, and these were the results.

Flower Type	Count	Percentage
Daisy	14	56%
White Zinnia	5	20%
Aster	6	24%
Total	25	100%

1. Complete the table with the percentage of each flower type.

2.1 Estimate how many of the 600 seeds in the bag will be asters. Organize your calculations so others can follow them.
Calculations vary.

- 24% **of** $600 = 0.24 \cdot 600 = 144$ **asters**
- $25 \cdot 24 = 600$ **and** $6 \cdot 24 = 144$ **asters**

2.2 What could you do to be more confident in your estimate?
Responses vary.

- **You could plant more samples of** 25 **seeds and see if the results are similar between the samples.**
- **You could plant a larger sample, like** 100 **seeds. A larger sample might be more accurate.**

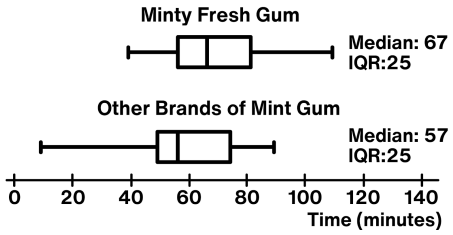
Summary

☐ I can use proportional reasoning and a sample to estimate information about a population.

Unit 7.8, Lesson 14: Notes Name _____

My Notes

The Minty Fresh company collects data to see how many minutes it takes for their mint gum to lose flavor compared to other brands.



Based on this data . . .

1.1 Why might someone believe this headline?

1.2 Why might someone not believe this headline?

2. How many IQRs is the difference between the medians?

3. Do your calculations make you believe the headline more or less? Explain your thinking.

Summary

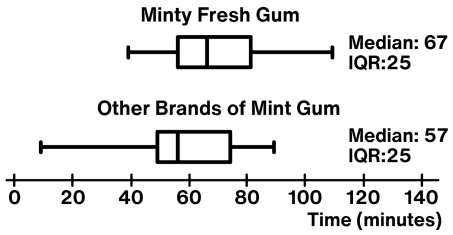
- ☐ I can use measures of center and the variability of two samples to decide if two populations are very different.
- ☐ I can use a measure of variability to explain the difference between measures of center.

desmos

Unit 7.8, Lesson 14: Notes Name _____

My Notes

The Minty Fresh company collects data to see how many minutes it takes for their mint gum to lose flavor compared to other brands.



Based on this data . . .

1.1 Why might someone believe this headline?

Responses vary. **The median of Minty Fresh is higher than other brands. Also, it's more consistent.**

1.2 Why might someone not believe this headline?

Responses vary. **There are lots of times where the other brands of gum last longer than Minty Fresh.**

2. How many IQRs is the difference between the medians?

The difference between the medians is $\frac{67-57}{25} = \frac{10}{25}$ **or about** 0.4 **IQRs.**

3. Do your calculations make you believe the headline more or less? **Less**

Explanations vary. **If there really was a big difference, I would expect the difference between the medians to be more than the IQR. The difference isn't even one IQR, so the difference between Minty Fresh and other gums isn't that big.**

Summary

- ☐ I can use measures of center and the variability of two samples to decide if two populations are very different.
- ☐ I can use a measure of variability to explain the difference between measures of center.

Unit 7.8, Lesson 2: Notes Name _____

My Notes

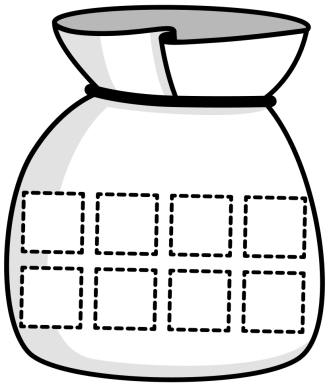
The letters PROBABILITY are in a bag. In an experiment, one letter is picked at a time and returned to the bag.

1. What is the sample space for this experiment?

2. Describe how to determine the probability of picking a Y from the bag on the next pick.

Write the probability of each event happening on the next pick.

3. Picking the letter P from the bag. _____
4. Picking the letter B from the bag. _____
5. Picking the letters B or I from the bag. _____
6. Picking the letter S from the bag. _____

7. 

Label the pieces in the bag so that it has these probabilities on the next pick:

- The probability of picking a P is $\frac{1}{4}$.
- The probability of picking a B is 0.
- The probability of picking a G is equal to the probability of picking an R.

Summary

- ☐ I can determine the probability of an event using its sample space.
- ☐ I can compare probabilities written as fractions, decimals, and percentages.

desmos

Unit 7.8, Lesson 2: Notes Name _____

My Notes

The letters PROBABILITY are in a bag. In an experiment, one letter is picked at a time and returned to the bag.

1. What is the sample space for this experiment?

   The sample space is the letters P, R, O, B, A, B, I, L, I, T, Y.

2. Describe how to determine the probability of picking a Y from the bag on the next pick.

   Responses vary. **Count the letters in the sample space (11) and see how many are a Y (1). The probability is $\frac{1}{11}$.**

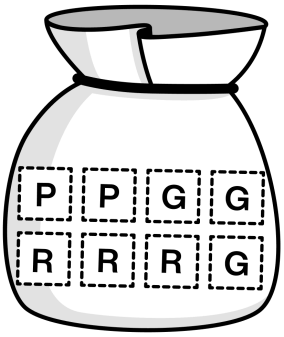
Write the probability of each event happening on the next pick.

3. Picking the letter P from the bag. $\frac{1}{11}$

4. Picking the letter B from the bag. $\frac{2}{11}$

5. Picking the letters B or I from the bag. $\frac{4}{11}$

6. Picking the letter S from the bag. 0

7. 

   Label the pieces in the bag so that it has these probabilities on the next pick:

   - The probability of picking a P is $\frac{1}{4}$.
   - The probability of picking a B is 0 .
   - The probability of picking a G is equal to the probability of picking an R.

Summary

- ☐ I can determine the probability of an event using its sample space.
- ☐ I can compare probabilities written as fractions, decimals, and percentages.

Unit 7.8, Lesson 3: Notes Name _____

My Notes

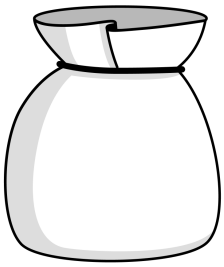
There are 6 blocks in a bag. The table shows results from 100 picks.

Block Color	Number of Picks
Purple	32
Red	68

1. Based on these results, how many of the 6 blocks are red?

   Explain your thinking.

2.1 Design a bag where the probability of picking a green block is 60%.



2.2 About how many times out of 50 picks do you expect to pick a green block?

Explain how you know.

Summary

- ☐ I know that sometimes outcomes of an experiment are not equally likely.
- ☐ I can use proportional reasoning with data from a repeated experiment to make predictions.

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Unit 7.8, Lesson 3: Notes Name _____

My Notes

There are 6 blocks in a bag. The table shows results from 100 picks.

Block Color	Number of Picks
Purple	32
Red	68

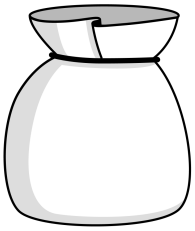
1. Based on these results, how many of the 6 blocks are red?

   4 blocks

   Explain your thinking.

   Explanations vary. $\frac{68}{100}$ **is** 68%**, and** 68% **of** 6 **blocks is about** 4 **blocks.**

2.1 Design a bag where the probability of picking a green block is 60%.



Bags vary.

- 3 **green blocks and** 2 **red blocks**
- 6 **green blocks and** 4 **blue blocks**

2.2 About how many times out of 50 picks do you expect to pick a green block?

About 30 **times.**

Explain how you know. ***Explanations vary.*** **Since** 60% **of the blocks are green, I would expect to pick a green block close to** 60% **of the time.** 60% **of** 50 **is** 30 **times.**

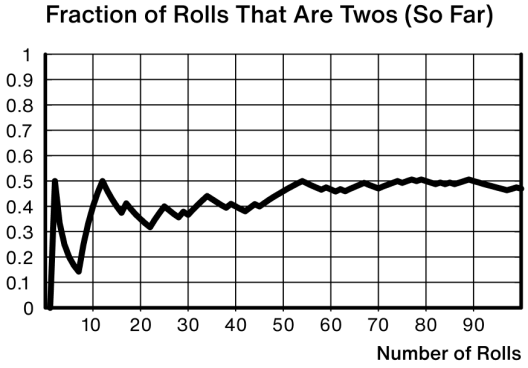
Summary

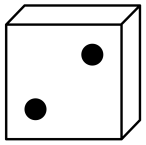
- [ ] I know that sometimes outcomes of an experiment are not equally likely.
- [ ] I can use proportional reasoning with data from a repeated experiment to make predictions.

Unit 7.8, Lesson 5: Notes Name _____

My Notes

Here is a graph of the results of 100 rolls of a number cube.





1. What is the probability of rolling a 2 with a **standard number cube**?

2. Based on these results, what is the probability of rolling a 2 with **this number cube**?

3. Explain how you know this number cube is unfair.

4. Describe or draw what this number cube could look like.

Summary

- ☐ I can decide whether or not something is fair based on the results of a repeated experiment.
- ☐ I can use the results from a repeated experiment to approximate the probability of an event.

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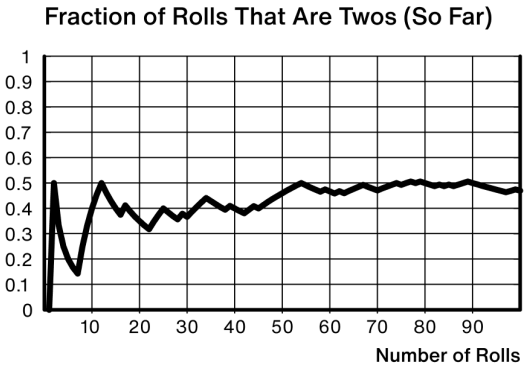
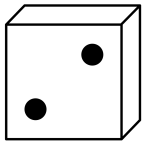
Unit 7.8, Lesson 5: Notes Name _____

My Notes

Here is a graph of the results of 100 rolls of a number cube.





1. What is the probability of rolling a 2 with a **standard number cube**?

$$\frac{1}{6}$$

2. Based on these results, what is the probability of rolling a 2 with **this number cube**?

$$0.5 \text{ or } \frac{1}{2}$$

3. Explain how you know this number cube is unfair.

Explanations vary. **If the number cube were fair, the graph would be getting closer to $\frac{1}{6}$. This graph got closer to $\frac{1}{2}$, which means that rolling a 2 is more likely than it should be.**

4. Describe or draw what this number cube could look like.
Responses vary.
   - **Half of the sides are 2s. The other half are 3s.**
   - **The cube has the numbers 1, 2, 2, 2, 5, and 6 on it.**

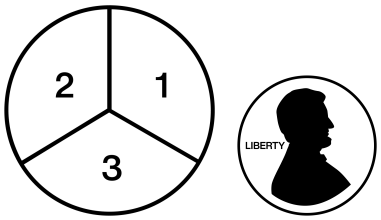
Summary

- ☐ I can decide whether or not something is fair based on the results of a repeated experiment.
- ☐ I can use the results from a repeated experiment to approximate the probability of an event.

Unit 7.8, Lesson 6: Notes Name _____

My Notes

Here is a game involving a spinner and a fair coin.

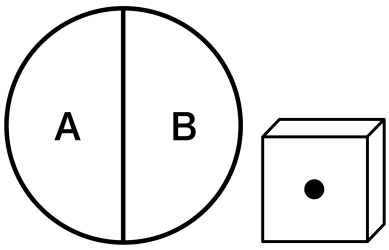


1.1 How many outcomes are in the sample space?

1.2 What is the probability of getting an odd number and tails?

1.3 Describe your strategy.

A new game is played with a spinner and a number cube.



2.1 Make a tree, table, or list to represent the sample space.

2.2 What is the probability of getting an “A” and an even number?

Summary

- ☐ I can write out the sample space for a multistep experiment using a list, table, or tree diagram.
- ☐ I can calculate the probability of a multistep event.

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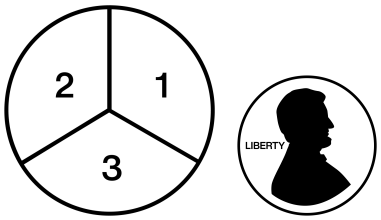
Unit 7.8, Lesson 6: Notes Name _____

My Notes

Here is a game involving a spinner and a fair coin.



1.1 How many outcomes are in the sample space?

6

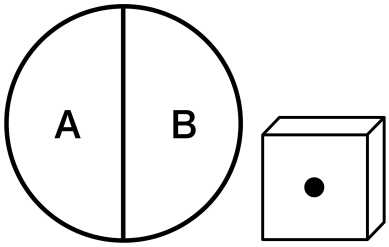
1.2 What is the probability of getting an odd number and tails?

$\frac{2}{6}$ (or equivalent)

1.3 Describe your strategy.

***Responses vary*. I made a list of all the outcomes. You can roll a 1 or 3 with tails, which is 2 out of the 6 total outcomes.**

A new game is played with a spinner and a number cube.



2.1 Make a tree, table, or list to represent the sample space.

Responses vary.

	1	2	3	4	5	6
A						
B						

2.2 What is the probability of getting an "A" and an even number?

$\frac{3}{12}$ (or equivalent)

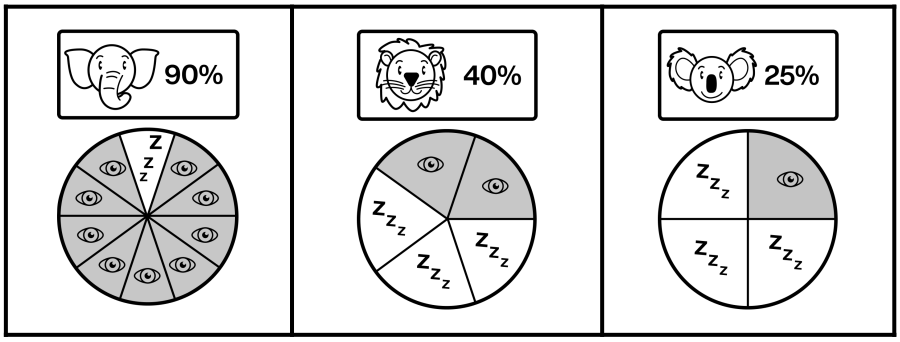
Summary

- ☐ I can write out the sample space for a multistep experiment using a list, table, or tree diagram.
- ☐ I can calculate the probability of a multistep event.

Unit 7.8, Lesson 7: Notes Name _____

My Notes

Brianna designed a simulation to help her estimate the probability of seeing her three favorite animals awake when she visits the zoo.



1. Describe how Brianna could use these spinners to estimate the probability that at least two of her favorite animals will be awake when she visits the zoo.

The table shows the results of 300 experiments with the spinners.

Experiments with . . .	Count	Percentage
No animals awake	12	4%
1 animal awake	171	57%
2 animals awake	105	35%
3 animals awake	12	4%

2. Estimate the probability that at least 2 of Brianna's favorite animals will be awake when she visits the zoo.

Summary

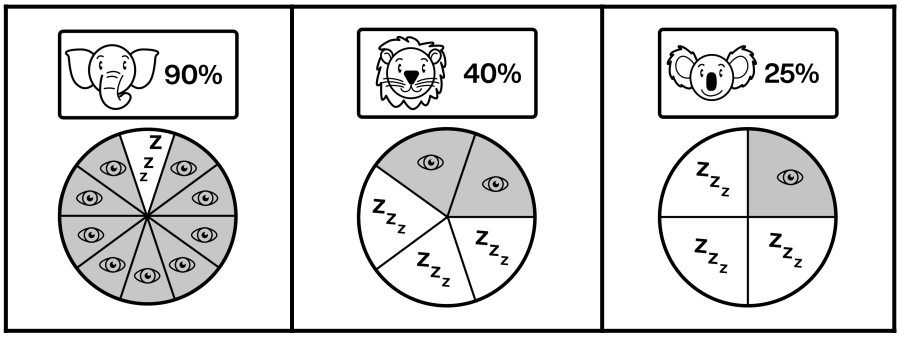
- ☐ I can use a simulation to estimate the probability of a multistep real-world event.
- ☐ I can connect real-world situations and the probability tools I could use to simulate those situations.

desmos

Unit 7.8, Lesson 7: Notes Name _____

My Notes

Brianna designed a simulation to help her estimate the probability of seeing her three favorite animals awake when she visits the zoo.



1. Describe how Brianna could use these spinners to estimate the probability that at least two of her favorite animals will be awake when she visits the zoo.

   ***Responses vary*. Briana could run a lot of experiments and record how many of the experiments had at least two spinners land on an open eye.**

The table shows the results of 300 experiments with the spinners.

Experiments with . . .	Count	Percentage
No animals awake	12	4%
1 animal awake	171	57%
2 animals awake	105	35%
3 animals awake	12	4%

2. Estimate the probability that at least 2 of Brianna's favorite animals will be awake when she visits the zoo.

   39%

Summary

- ☐ I can use a simulation to estimate the probability of a multistep real-world event.
- ☐ I can connect real-world situations and the probability tools I could use to simulate those situations.