# Math Distance Learning Packet

Grade 8

Student Version

## **Square Roots and Cube Roots**

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## Prerequisite: Understand Solutions to Equations

Study the example problem showing how to write and solve an equation. Then solve problems 1-7.

## Example

Isabella has filled 3 album pages with photos. Each page has the same number of photos. Isabella has 24 photos. Write and solve an equation to find how many photos are on one album page.

Choose a variable to represent the number of photos on one page.

p

Write an expression to describe the total number of photos on the pages.

3*p* 

Write an equation to compare the

3p = 24

expression and the number of photos

Isabella has.

Draw a bar model to represent

the equation.

You multiply 3 by 8 to get 24.

There are 8 photos on one album page.

- What does the variable p represent in the example problem?
- What is the solution to the equation 3p = 24?
- Then isabella filled 3 more pages with 36 photos which she evenly divided between the pages. Is the number of photos on one of these pages more or less than the number on one page in the example problem? Explain.



## Vocabulary

equation a statement that tells you two expressions are equivalent.

4+5=9 2b=14



- Alberto is saving money to buy a pair of shoes that cost \$58. He has already saved \$32. He still needs to save d dollars.
  - **a.** Write an equation so that one side of the equation represents the cost of the shoes.
  - **b.** Explain how to solve your equation to find how much more money Alberto needs to save. How much more does he need to save?

The bar model illustrates a division equation. What is the equation? Explain how you know.

5								
8	8	8	8	8				

- In the equation 10n = 120, is n = 10? How do you know?
- Write an equation that has a solution of 7, includes a variable, and uses multiplication. Write a real-world problem that you could represent with your equation. Show how you know that 7 is the solution.

## 

Study the example problem showing how to find a cube root. Then solve problems 1–8.

## Example

Each edge of a cube is x centimeters long. The volume of the cube is 343 cm<sup>3</sup>. What is the length of each edge of the cube?

Use the formula for the volume of a cube.

$$\chi^3 = V$$

Write the formula.

$$x^3 = 343$$

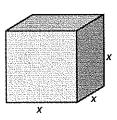
Substitute 343 for V.

$$x = \sqrt[3]{343}$$

Find the cube root of 343.

$$x = 7$$

Simplify.



Volume =  $343 \text{ cm}^3$ 

Each edge of the cube is 7 centimeters long.

- What is the relationship of the volume of the cube to its edge length?
- What is the relationship of the edge length of the cube to its volume?
- The volume of a cube is 8 ft<sup>3</sup>. What is the length of each edge of the cube?
- Explain the difference between a number that is a cube and a number that is a cube root.



## Vocabulary

cube root any number that is multiplied together three times to get the original number.

$$\sqrt[3]{8} = 2$$

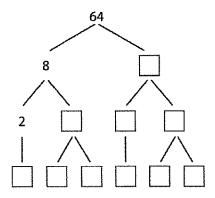
2 is the cube root of 8.

perfect cube the product of an integer multiplied together three times.

$$3^3 = 27$$

27 is a perfect cube.

a. Complete the prime factorization of 64.



**b.** Show the prime factors as 3 equal groups of 2 factors.

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**c.** What is  $\sqrt[3]{64}$ ?

Is 48 a perfect cube? Explain your reasoning.

Explain how a cube root is different from a square root.

The volume of Cube A is 216 cubic inches. The length of each edge in Cube B is 2 inches longer than the length of each edge in Cube A. How much greater is the volume of Cube B than the volume of Cube A?

Show your work.

## Salvalyara Problems

Study the example problem showing how to use square roots and cube roots to solve word problems. Then solve problems 1–6.

### Example

Markus walked halfway around a square park that has an area of 90,000 square meters. How many meters did Markus walk?

Use the formula for the area of a square to find the length of one side. Markus walked halfway around, so find the total length of two sides of the park to find the distance he walked.

 $s^2 = A$  Write the formula.

 $s^2 = 90,000$  Substitute 90,000 for A.

 $s = \sqrt{90,000}$  Find the square root of 90,000.

s = 300 The length of each side is 300 m.

The length of 2 sides =  $300 \cdot 2 = 600$ 

Markus walked 600 meters.

- A smaller square park has an area of 3,600 square meters. What is the length of one side of the park?
- When completely full, a cube-shaped container will hold 8,000 cubic centimeters of water. What is the length of an edge of the container?
- A planter in the shape of a cube has a volume of 1,000 in.<sup>3</sup>. Is the area of the base of the cube greater than or less than 1 square foot? Explain.



The distance d in feet that a dropped object falls in t seconds is given by the equation  $d \div 16 = t^2$ . How long does it take a dropped object to fall 64 feet?

Show your work.

Solution:
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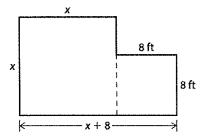
The area of the top face of a cube is 9 square centimeters.
Use 9 of these cubes to make a rectangular prism. What is the volume of the rectangular prism?

Show your work.

Calutian		
Solution:		

The diagram shows the dimensions of Taylor's deck. The area of the deck is 233 square feet. Taylor is going to put a railing along the longest edge. How many feet of railing will she need?

Show your work.



## Square Rooks and Cube Rooks

## Solve the problems.

The formula for the surface area of a cube is  $S = 6x^2$ , where x is the length of one side. Find the length of the side of a cube with a surface area of 150 square inches.

A 5 inches

C 30 inches

B 25 inches

**D** 900 inches

Jack chose **C** as the correct answer. How did he get that answer?

How do you find the value of x2?



Choose Yes or No to tell whether the number is a perfect cube.

**a.** 27

Yes

No

**b.** 100

Yes

No

c. 125d. 1,000

\_\_\_ No

Remember that a perfect cube is the product of three equal factors.



The formula for the volume of a square pyramid is  $V = (b^2h) \div 3$ , where b is the length of one side of the square base and h is the height of the pyramid. Find the length of a side of the base of a square pyramid that has a height of 3 inches and a volume of 25 cubic inches.

Show your work.

What is 3 ÷ 3?

The area of a square is a perfect square between 100 and 250 square centimeters. Which could be the area of the square? Select all that apply.

A 102 square centimeters

**B** 121 square centimeters

C 125 square centimeters

D 144 square centimeters

E 225 square centimeters

F 240 square centimeters

Remember that a perfect square is the product of two equal factors.



The base of a cube is shown. The area of the base is  $\frac{1}{4}$  ft<sup>2</sup>. What is the volume of the cube?



Show your work.

What is the square root of the numerator of  $\frac{1}{4}$ ? What is the square root of the denominator?



# *Understand*Functions

Name:

Prerequisite: How can you use an equation to represent a proportional relationship?



Study the example showing how to write equations for proportional relationships. Then solve problems 1–8.

## Example

Kata is making pizza dough. For every 4 cups of flour, she needs 2 cups of water. Represent this relationship using a table and an equation.

The table represents this proportional relationship. All of the ratios are equivalent to  $\frac{4}{2} = \frac{2}{1}$ .

Flour, f	2	3	4	5	6	7	8
Water, w	1	1.5	2	2.5	3	3.5	4

You can also use an equation. The ratio of flour to water is  $\frac{4}{2} = \frac{2}{1}$ , so the constant of proportionality is  $\frac{2}{1}$ , or 2.

- What does the constant of proportionality represent in terms of the problem?
- Use the equation in the example to find the number of cups of water you need if you have 12 cups of flour.
- For a different pizza dough recipe, the equation f = 2.5w represents the number of cups of flour, f, that you need for w cups of water. What is the constant of proportionality? Explain what it means in this context.



## Vocabulary

constant of proportionality the unit rate in a proportional relationship.

- Basir buys 4 small drinks for \$6. Write an equation to represent the cost, c, for d small drinks.
- A horse ran 800 meters in 40 seconds, 1,200 meters in 60 seconds, and 480 meters in 24 seconds. Is this a proportional relationship? If so, what is the constant of proportionality? What does it represent? Write an equation to represent the distance d, in meters, that the horse runs in t seconds.
- The equation c = 6.4w represents the cost c for w pounds of walnuts. Does a value of 2.5 for w make sense in this situation? Explain your reasoning.
- Lina and Michele studied the data in the table. They each wrote an equation to represent the relationship between the number of miles and the number of hours ridden by a bicyclist.

Lina's equation: m = 9h

Michele's equation:  $h = \frac{1}{9}m$ 

The teacher said that both equations were correct.

Explain why.

Miles, m	Hours, h
27	3
45	5
18	2
54	6

Zach's car travels 21 miles on 1 gallon of gas. Write an equation to represent the relationship between the gas Zach's car uses and the distance he travels. Then solve the equation to see how far Zach travels on a trip if he uses 16 gallons of gas.

## idandiyameddis

Study the example problem showing how to determine whether a relationship is a function. Then solve problems 1–7.

#### Example

Describe the relationship shown in each table. Is the relationship a function? Explain.

The input identifies the hours, and the output gives the cost for those hours. The relationship is a function because there is only one output for each input.

	Table A							
Hours (input)	1	2	3	4	5			
Cost (output)	\$3	\$6	\$9	\$12	\$15			

The input identifies the week and the output gives the growth for each week. The relationship is a function because there is only one output for each input.

Table B							
Week (input)	1	2	3	4	5		
Plant Growth in Inches (output)	4	3.25	2	2	1.75		

- Can you represent either of the functions in the example problem with an equation? Explain.
- Suppose you reverse the inputs and outputs in Table B. Would the relationship be a function? Explain.
- The table shows the number of concert tickets sold by five students. Is the relationship a function? Explain.

Student (input)	1	2	3	4	5
Tickets (output)	12	18	12	22	16



Vocabulary

**function** a rule that produces exactly one output for each input.

### Use the following situation to solve problems 4-5.

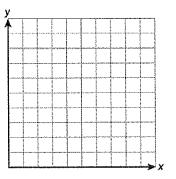
The table shows the number of calories in different numbers of servings of blueberries.

Servings (input)	1	2	3	4	5
Calories (output)	21	42	63	84	105

- On the blank graph to the right, add a title and then label and number the axes. Then plot the ordered pairs on the graph.
- Explain whether the relationship is a function.

  Can you represent the data with an equation?

  If so, write the equation.



Substitute values into the equation y = x - 3 to complete the table. Then state whether the equation represents a function. Explain your reasoning.

x (input)	-2	1	0	1	2	
y (output)						

Complete the table to show a relationship that is a function that you haven't used yet. Be sure that you can represent your function with an equation.

x (input)	1	2	3	4	5
y (output)					

Describe the relationship between the input and output values of your function. Then represent your function with an equation.

## Reconstitution

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

## Example

An object traveling at the speed of sound at sea level travels about 20 kilometers in 1 minute. Write equations that can be used to find the following:

- the distance when given the time
- the time when given the distance

Use a table, diagram, or graph to show the two relationships. Then describe the relationships. Explain whether or not the relationships are functions.

**Show your work.** Use a table, diagram, or graph as well as words and numbers to explain your answer.

Possible answer: Let d = distance and t = time.

An equation for the distance given the time is d=20t and an equation for the time given the distance is  $t=\frac{1}{20}d$ .

The distance is 20 times the time, and the time is  $\frac{1}{20}$  of the distance.

In both relationships, there is only one possible output for each input, so both are functions.

Where does the example . . .

- answer all of the parts of the problem?
- use a table, diagram, or graph to explain?
- use words to explain?
- · use numbers to explain?



### Solve the problem. Use what you learned from the model.

Each molecule of carbon dioxide contains 2 oxygen atoms and 1 carbon atom. Write equations that can be used to find the following:

- the number of oxygen atoms when given the number of carbon atoms
- the number of carbon atoms when given the number of oxygen atoms

Use a table, diagram, or graph to show the two relationships. Then describe the relationships. Explain whether or not the relationships are functions.

Show your work. Use tables, diagrams, or graphs as well as words and numbers to explain your answer.

## Did you ...

- · answer all of the parts of the problem?
- · use a table, diagram, or graph to explain?
- · use words to explain?
- · use numbers to explain?



## **Compare Functions**

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## Prerequisite: Identify Functions

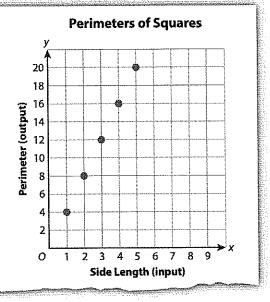
Study the example showing a function. Then solve problems 1-6.

#### Example

The table and graph show the relationship between the length of the sides of a square, in feet, and the perimeter of the square in feet.

Side Length (input)	1	2	3	4	5
Perimeter (output)	4	8	12	16	20

The relationship is a function because there is only one output value for each input value.



- Describe the relationship between the input and output values in the example.
- Can you represent the function in the example with an equation? If so, what equation can you write? If not, why not?

In the example function, could one side length ever produce two different perimeters? Explain.



## Vocabulary

function a rule that assigns exactly one output to each input.

input the number put into a function.

output the number that results from applying the function to the input.



Do the data in this table show a function? If you switch the input and the output values, would the data show a function? Explain.

Input	1	2	2	3	3
Output	6	9	11	12	14

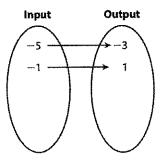
Substitute values into the equation to complete the table. Then state whether the equation represents a function. Explain your reasoning.

$$y = 5x + 1$$

x(input)	2	-1	0	1	2
y (output)					

A teacher wrote these numbers on the board: -5, -3, -1, 1, 1, 2, 3, 4, 4, 6. The input-output diagram has been started using the teacher's numbers to form ordered pairs of a function.

**Part A:** Put the remaining numbers in the ovals to complete the diagram.



**Part B:** If the input and output values were reversed, would the diagram still represent a function? Explain.

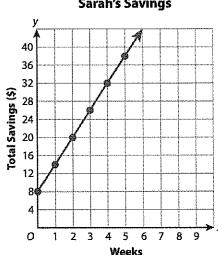
## Interpretand Compare Raises of Change

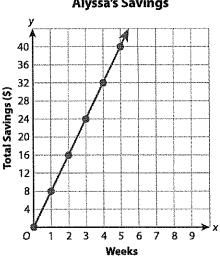
Study the example problem showing how to compare rates of change. Then solve problems 1-5.

## Example

Compare the rates of change for these two functions. Which function has a greater rate of change?

Sarah's Savings





 $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{6}{1} = 6$ 

 $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{8}{1} = 8$ 

Alyssa's rate of change is greater than Sarah's.

- What do the rates of change in the example represent?
- 2 What does it mean in the context of the example that Alyssa's rate of change is greater than Sarah's?
- Write ordered pairs for the initial values of each function in the example. Tell what the initial values represent.



## Vocabulary

rate of change the rate at which one quantity increases or decreases with respect to a change in the other quantity. It is the ratio of the vertical change to the horizontal change on a graph.

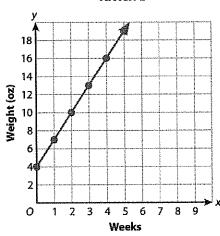
initial value the starting value of a function.

The table shows the weight gain of a kitten over a 5-week period. The graph shows the weight gain of a second kitten over the same period. Compare the rates of change for these two functions.

Kitten A

Week	Weight (oz)
0	3
1	7
2	11
3	15
4	19
5	23

Kitten B



Sonya sells bracelets once a month at a flea market. The table shows her profits for a 5-month period.

Sonya

Month	1	2	3	4	5
Total Profit (5)	30	60	90	120	150

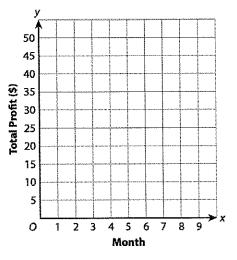
a. Kirsten sells bracelets once a month at a different flea market. The rate of change for her profits is \$10 per month. Complete the table and the graph to show her total profits.

Kirsten

Month	1	2	3	4	5
Total Profit (\$)	10				

**b.** Sonya says that her profit is increasing 4 times as fast as Kirsten's profit. Do you agree? Explain.





## Compare Negative and Positive Rates of Change

Study the example problem showing how to compare two functions. Then solve problems 1-6.

### Example

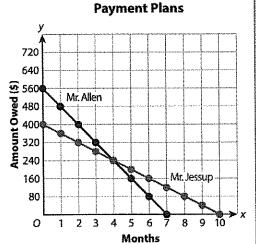
Mr. Allen bought a new computer. His monthly payment plan is shown in the table.

Month	0	1	2	3	4	5	6	7
Amount Mr. Allen Owes (\$)	560	480	400	320	240	160	80	0

Mr. Jessup buys a new computer for \$400. He makes monthly payments of \$40 until the computer is paid for. Compare the initial values and rates of change of each function.

You can graph both functions to show that the amount Mr. Allen owes starts at \$560 and decreases \$80 per month. The amount that Mr. Jessup owes starts at \$400 and decreases \$40 each month.

Mr. Allen's initial value is \$160 more than Mr. Jessup's. Mr. Allen's rate of change is greater than Mr. Jessup's rate of change.



- What do the initial values mean in the context of the example problem?
- Do the functions in the example show positive or negative rates of change? Explain.
- Write an equation for each function, where x is the number of months and y is the amount owed.

Mr. Allen's plan:

Mr. Jessup's plan:

Below are two companies' rates to rent a bicycle. How much does it cost per hour to rent a bicycle at Company A? What is the cost to rent a bicycle for 6 hours from each company?

Company A: c = 5h + 4, where c = total cost(in dollars) and h = number of hours

Company B: \$6 per hour per bicycle

Roy wants to buy a new television for \$300. Two stores offer different payment options. Compare the initial values and rates of change.

Store A Payment Plan

Month	0	1	2	3	4	5	6
Amount Owed (\$)	300	250	200	150	100	50	0

Show your work.

Solution

#### Store B Payment Plan

Pay \$100 at the time of purchase. Pay \$50 per month until the television is paid for.

Most plumbing companies charge a fee to come to your	Company A

O house plus a charge per hour of work. The fees and charges for two plumbing companies are shown.

Write an equation for each company, where c = total cost(in dollars) and h = number of hours. Explain what the initial values and rates of change mean in this context.

Company A:

Company B: \_\_

Fee: \$50

Charge per hour: \$40

**Company B** 

Fee: \$25

Charge per hour: \$50

## Company and And Company

## Solve the problems.

A hardware store charges a \$30 rental fee and \$15 per day to rent a power washer. Which equation correctly relates the total cost y to rent the washer for x days?

**A** 
$$y = 15 + 30x$$

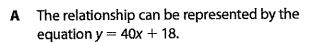
**c** 
$$y = 30 - \frac{x}{15}$$

**B** 
$$y = 30 + 15x$$

**B** 
$$y = 30 + 15x$$
 **D**  $y = 15 - \frac{x}{30}$ 

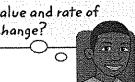
What do the parts of each equation represent?

Tony drives 18 miles to pick up his friend at his house. Then he drives at a constant speed of 40 miles per hour to a state park to go hiking. Let y represent the number of miles that Tony drives after x hours. Which of the following statements are true? Select all that apply.



- **B** If Tony travels for 1.5 hours, he will have driven a total of 60 miles.
- The initial value is 18 miles.
- The rate of change is negative.

How do you determine the initial value and rate of change?



Alma borrows money from her mom to buy a \$150 bike. She gives her mom \$40 at the time of purchase and continues to pay her \$10 each month until the bike is paid for in full. Alma wrote this equation to represent the amount y that she will have paid her mom after x months.

Equation: y = 40x + 10

Is her equation correct? How did she get that equation? If it is not correct, write a correct equation.

How does an equation show a rate of change?

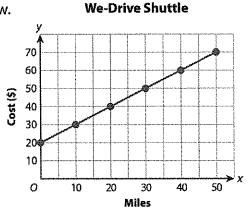


The rates for two airport shuttles are shown below.

### **Quick Shuttle**

Rates for shuttle

- \$30 for passenger pickup
- \$0.50 for each mile driven



#### Part A

Which shuttle service has a greater initial value? Which service has the greater rate of change? Explain what the greater initial value and greater rate of change mean.

Show your work.

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Solution	

#### Part B

Which shuttle company would cost less for a 25-mile trip?

Show your work.

Solution: \_\_



## **Represent Proportional Relationships**

Name:

## Prerequisite: Identify Proportional Relationships

Study the example showing how to tell whether a relationship is proportional. Then solve problems 1-7.

### Example

Suppose you are buying grapes at a farmers' market. The cost of the grapes you buy depends on how many pounds you get. Two different stalls sell grapes at the market. Find the ratio of the cost to weight for each pair of values in both tables.

Stall A						
Weight, in Pounds 2 4 6 8						
Total Cost (\$)	4	8	12	16		

Stall B					
Weight, in Pounds	2	4	6	8	
Total Cost (\$)	8	10	12	14	

$$\frac{4}{2} = 2$$
  $\frac{8}{4} = 2$   $\frac{12}{6} = 2$   $\frac{16}{8} = 2$ 

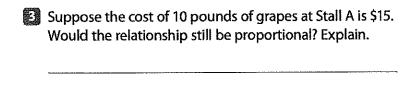
$$\frac{4}{2} = 2$$
  $\frac{8}{4} = 2$   $\frac{12}{6} = 2$   $\frac{16}{8} = 2$   $\frac{8}{2} = 4$   $\frac{10}{4} = 2.5$   $\frac{12}{6} = 2$   $\frac{14}{8} = 1.75$ 

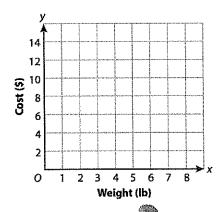
If a group of ratios are equivalent, they are part of a proportional relationship.

The relationship of total cost to weight in Stall A is proportional.

The relationship of total cost to weight in Stall B is not proportional.

- Plot a point for each of the first three ordered pairs in each table. Connect the points for each relationship by drawing a line through the points to the y-axis.
- 2 Look at your graph in problem 1. Does the line for either the proportional relationship or the relationship that is not proportional go through the origin? If so, which relationship?





## Vocabulary

proportional relationship a numerical relationship that can be represented by equivalent ratios.

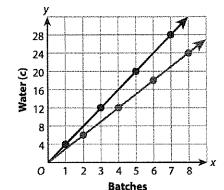
The number of cups of water used in two different soup recipes depends on the number of batches of the recipe you make. The tables show the number of cups of water used in the two soup recipes.

Recipe A					
Batches	2	4	6	8	
Water (c)	6	12	18	24	

Recipe B					
Batches	1	3	5	7	
Water (c)	4	12	20	28	

Do the ratios of cups of water to batches of soup in each table represent a proportional relationship? Explain.

The graph shows the data from the tables in problem 4. Which line represents Recipe B? Explain how you know.



- Use the graph that you identified in problem 5 for Recipe B to find how much water is needed for 4 batches of soup. Is the ratio of water to batches equivalent to the ratios you found for Recipe B in problem 4?
- Tomás collects sports cards. The number of baseball cards he buys each week is proportional to the number of football cards he buys.
  - a. Fill in the missing numbers in the table.

Week	1	2	3	4
Number of Baseball Cards	9	15		6
Number of Football Cards	6		8	

**b.** Suppose Tomás buys a total of 30 baseball and football cards in Week 5. How many of each would he have to buy to keep the same proportional relationship?

## llse ables Gaples and Equations

Study the example problem showing how to use a table and a graph to find a unit cost. Then solve problems 1-6.

### Example

The table shows the costs for different numbers of tickets for the band concert. Find the unit cost.

Band Concert Tickets							
Number of Tickets 2 4 6 8							
Cost (S)	12	24	36	48			

#### Use a Table

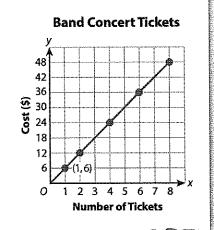
The ratios in the table are all equivalent, so you can divide the cost by the number of tickets in any of the ratios to find the unit cost.

$$\frac{$24}{4 \text{ tickets}} = \frac{$6}{1 \text{ ticket}}$$
, or \$6 for 1 ticket

The unit cost is 6.



The graph of the data shows that the cost of one ticket, is \$6, so the unit cost is 6.



- Explain what the unit cost means in the context of the example problem.
- Use two points on the graph to find the slope. How does the slope relate to the unit cost?
- Use the slope you found in problem 2 to write an equation for finding the cost y of x tickets.

The table shows the distance Nikki travels on her bike as a function of how many hours she rides at a constant rate. Use the information in the table to make a graph, using the coordinate plane to the right. Find the slope of the graph and explain what it means in this situation.

Number of Hours	2	4	6	8
Number of Miles	16.5	33	49.5	66

The table below shows the cost *c* for different numbers of binders *b*. Is the relationship proportional? If so, represent it with an equation. If not, explain why not.

Number of Binders (b)	4	8	12	16
Cost (c)	\$5,40	\$10.80	\$16.20	\$21.60

represent it with an equation. If not, explain why not.

Number of Binders (b) 4 8 12 16

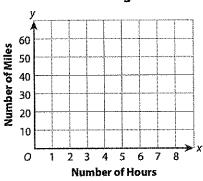
Sean wrote the equation 9.25 = 5m, where m is the cost per pound, to show the relationship between the total cost, \$9.25, and the number of pounds of pears, 5, he bought at Quick Mart. Find the unit cost of the pears, write an equation to show the cost y of x pounds of pears, and use the equation to complete the table. Then use the information in your table to make a graph.

Unit cost:

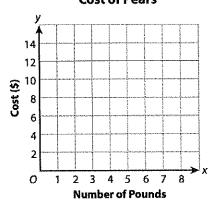
Equation:

Number of Pounds	5	
Cost (5)	9.25	

#### **Bike Riding Pace**







## Compare Proportional Relationships

Study the example problem showing how to compare proportional relationships. Then solve problems 1-6.

### Example

The table and the equation show the rates at which two different students read in words per minute. Which student reads faster?

Student A

Prement V						
Number of Minutes	1	2	3	4		
Number of Words Read	150	300	450	600		

Student B

y = 158x, where x is the number of minutes and y is the number of words read.

For Student A use the table to find the number of words read in 1 minute, and for Student B use the slope in the equation.

Student A: 150 words per minute Student B: 158 words per minute

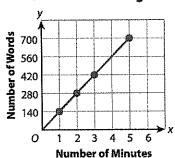
Compare the rates: 158 > 150.

Student B reads faster.

- How much faster does Student B read than Student A?
- The graph shows the rate at which Student C reads. Explain how to find the reading rate for Student C from the graph.

List the three students and their reading rates in order from fastest reader to slowest reader.

**Student C Reading Rate** 



- The price of strawberries at Fine Foods is shown in the graph. At Best Market, the price y for x pounds of strawberries is given by y = 2.9x. Which store sells strawberries at a higher unit price? How much more will you pay for 6 pounds of strawberries at that store than the other store?
- The price y for x pounds of nails at U-Fix-It is represented by y = 4.4x. The unit price for the same type of nails at Just Hardware is \$0.30 per pound greater than the unit price at U-Fix-It. Complete the table to show the costs for 1, 2, 3, and 4 of pounds of nails at Just Hardware.

Number of Pounds	1	2	3	4
Price (\$)				

The table and the equation show the approximate speeds for a roadrunner and a coyote running at top speed. Which animal runs faster? How much faster per minute? (1 mile =5,280 feet, 1 minute = 60 seconds)

#### Roadrunner

Number of Seconds	1	2	3	4
Number of Feet	29	58	87	116

Show your work.

Solution: \_

#### 15)

y = 0.7x, where x is the number of minutes and y is the number miles

Coyote

**Strawberries Prices** 

at Fine Foods

Number of Pounds

12 10

Price (\$)

# **Understand** the Slope-Intercept Equation for a Line

Name:

Prerequisite: How can you represent and interpret proportional relationships?



Study the example problem showing how to represent and interpret a proportional relationship. Then solve problems 1–5.

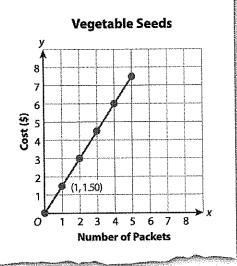
## Example

The table shows the costs for 2, 3, 4, and 5 vegetable seed packets. What is the unit rate?

Vegetable Seeds					
Number of Packets	2	3	4	5	
Cost (\$)	3.00	4.50	6.00	7.50	

Use the data to make a graph. Find the cost of 1 seed packet.

The unit rate is the cost in dollars for 1 packet. The graph shows that the unit rate is 1.50.



- How you can use the table to find the unit rate in the example problem?
- What is the constant of proportionality in the example? What is the slope of the graph? What do they represent in the context of this problem? How do the constant of proportionality and slope relate to the unit rate?

a Line 133

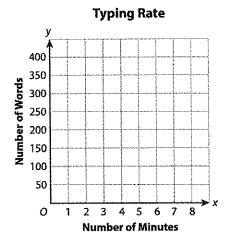
The table shows how many words Julian can type if he types at a steady rate. Use the information in the table to make a graph. Find the slope of the graph and explain what it means in this situation.

Typing Rate

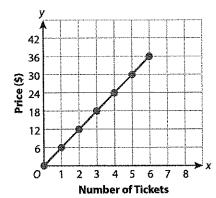
Number of Minutes	2	4	6	8
Number of Words	80	160	240	320

- The price for movie tickets at Town Theater is shown in the graph. The price of 5 movie tickets at Center Theater is \$3.75 greater than the price of 5 movie tickets at Town Theater. What is the price per ticket at each theater?
- A hardware store buys 300 feet of nylon rope. The store sells the rope by the inch. A customer can purchase 40 inches of the rope for \$1.60. The store sells all of the rope and makes a profit of \$54. How much did the store pay for the rope in dollars per inch?

Show your work.



#### **Town Theater Tickets**



Solution: \_

## Writing a Linear Equation in Slope-Intercept Form

Study the example problem showing how to write an equation in slope-intercept form. Then solve problems 1–6.

## Example

Write an equation for the line shown in the diagram.

Find the slope of the line.

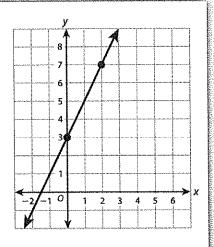
$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 3}{2 - 0}$$
 Use the slope formula.  
Substitute 7 for  $y_2$ , 3 for  $y_1$ , 2 for  $x_2$ , and 0 for  $x_1$ .

$$m = \frac{4}{2}$$
, or 2 Simplify. The slope is 2.

The line passes through (0, 3), so the y-intercept is 3. Use the slope-intercept form y = mx + b to write an equation.

$$y = mx + b$$
  
 $y = 2x + 3$  Substitute 2 for m and 3 for b.

An equation for the line is y = 2x + 3.



- How is the equation y = 2x similar to the equation y = 2x + 3 in the example problem? How is it different?
- Graph y = 2x in the diagram above. Compare the graphs. Does either graph represent a proportional relationship? Explain.

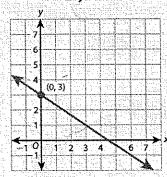
What value of b makes y = 2x + b the same as y = 2x? What does that value mean?



## Vocabulary

slope the ratio of the vertical change (rise) to the horizontal change (run) between any two points on a line.

**y-intercept** the y-coordinate of the point where a graph intersects the y-axis.



The y-intercept is 3.

4 Andy uses the table below to write a linear equation.

х	-1	0	1	2
у	2	4	6	8

He says he can write an equation of the form y = mx for the given values. Is he correct? Explain your reasoning.

Look at these equations. Write each equation in slope-intercept form. Are the equations the same or different? Explain.

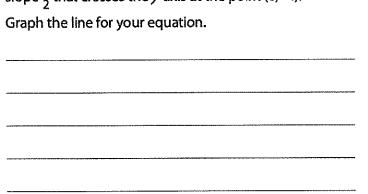
$$y + 1 = 2x - 3$$

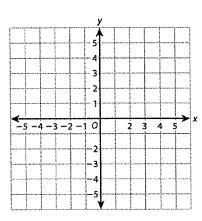
$$2x - 3 = y + 1$$

$$2y + 2 = 4x - 6$$

Explain how you can write an equation for a line with slope  $\frac{1}{2}$  that crosses the y-axis at the point (0, -1).

Graph the line for your equation.





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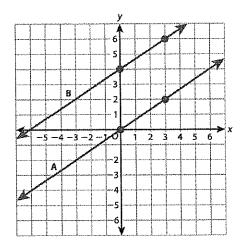
Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

## Example

Draw two lines that have the same slope on the coordinate grid. Let one represent a proportional relationship and one represent a relationship that is not proportional. Label one line A and the other B.

Predict how you expect the slope-intercept equations of your lines to be similar and different. Then write the equations to check your predictions.

**Show your work.** Use graphs, words, and numbers to explain your answer.



I predict that the slope-intercept equations will have the same value for *m* because the lines have the same slope. The equations will have different values for *b*, because Line A crosses the *y*-axis at (0, 0) and Line B crosses the *y*-axis at (0, 3).

To write the equations, I first find the slope and y-intercept of

each line. Line A: slope 
$$=\frac{2-0}{3-0}=\frac{2}{3}$$
, y-intercept  $=0$ ;

Line B: slope 
$$=\frac{6-4}{3-0}=\frac{2}{3}$$
, y-intercept  $=4$ . Equation for

Line A: 
$$y = \frac{2}{3}x$$
. Equation for Line B:  $y = \frac{2}{3}x + 4$ .

My predictions were correct. The equations have the same value for m,  $\frac{2}{3}$ , and different values for b, 0 and 4.

## Where does the example ...

- answer each part of the problem?
- use a graph to explain.
- · use words to explain?
- · use numbers to explain?

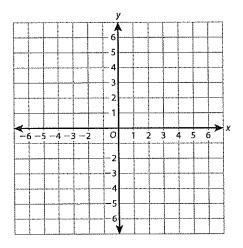


## Solve the problem. Use what you learned from the model.

Draw two lines that both represent proportional relationships but have different slopes. Label one line A and the other B.

Predict how you expect the slope-intercept equations of your lines to be similar and different. Then write the equations to check your predictions.

**Show your work.** Use graphs, words, and numbers to explain your answer.



Did you ...

- answer each part of the problem?
- use a graph to explain.
- · use words to explain?
- · use numbers to explain?



## Solve Linear Equations with Rational Coefficients

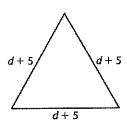
Name:

## Prerequisite: Solve Problems with Expressions

Study the example problem showing how to write equivalent expressions. Then solve problems 1–10.

## Example

The lengths of the sides of an equilateral triangle are shown. Write two different expressions for the perimeter of the triangle.



## **Expression 1**

Find the sum of the side lengths.

$$(d+5)+(d+5)+(d+5)$$

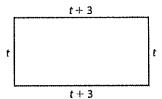
### **Expression 2**

Multiply the side length by 3.

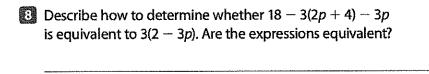
$$3(d + 5)$$

- Simplify Expression 1.
- Simplify Expression 2.
- What do you notice about the simplified expressions in problems 1 and 2?
- Jessica rewrites Expression 1 as d + d + d + 5 + 5 + 5. Why might she have done this?
- Is Jessica's expression equivalent to Expression 2? Explain how you know.

The lengths of the sides of a rectangle are shown. Write two equivalent expressions for the perimeter of the rectangle.



Write two different expressions that are equivalent to 12 - 16x. Use factoring to write one of the expressions.



- Tran says that  $-\frac{1}{4}x 7 + \frac{9}{4}x + 2x$  is equivalent to 4x 7. How can substituting any value for x help you determine whether Tran is correct? Is Tran correct? Use substitution to justify your answer.
- The perimeter of a square can be represented by the expression 8x 10 + 8x 10. Write an expression to represent the length of one side of the square. **Show your work.**

Solution:

# Solve Equations with Rational Coefficients

Study the example showing how to solve an equation with rational coefficients. Then solve problems 1-6.

#### Example

Solve the equation:  $4n = \frac{1}{2}(2n - 12)$ .

$$4n = \frac{1}{2}(2n - 12)$$

$$4n = n - 6$$

**Step 1:** Use the distributive property.

$$4n-n=n-6-1$$

4n - n = n - 6 - n **Step 2:** Subtract *n* from both sides.

$$3n = -6$$

Step 3: Simplify.

$$\frac{3n}{3} = \frac{-6}{3}$$

Step 4: Divide both sides by 3.

$$n = -2$$

Step 5: Simplify.

- Check the solution to the example problem by replacing n in the original equation with -2 and evaluating both sides. What true statement do you get?
- Suppose that you first want to eliminate the fraction in the example equation. What would your first step be? Is -2 still the solution when you start by eliminating the fraction first? Explain.
- Trey solved the equation  $\frac{1}{4}(8x + 16) = 4x$ , as shown at the right, Describe the error that he made. Then solve the problem.

$$\frac{1}{4}(8x + 16) = 4x$$
$$2x + 16 = 4x$$
$$\frac{16}{2} = \frac{2x}{2}$$
$$8 = x$$

Describe the first step you would use to solve the equation 20 = 7y + 2 - y. Is that the only possible first step?

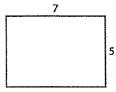
Solve the equation in two different ways: 6p = 0.6(5p + 15). **Show your work.** 

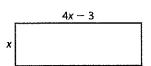
Solution:

The two rectangles shown below have the same perimeter. Write and solve an equation to find the value of x. Then find the measures of the length and width of Rectangle B. All measurements are in inches.

### Rectangle A

#### Rectangle B





Equation:

x ==

Length of Rectangle B: \_\_\_\_\_

Width of Rectangle B: \_\_\_\_\_

# Solve Linear Equations with Rational Coefficients

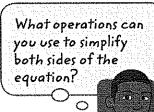
Solve the problems.

- Claire wants to solve the equation  $-\frac{1}{4}(x-1) = \frac{2}{3}x + 2$ . Which step would not be an appropriate first step for Claire to take to solve for x?
  - A Multiply both sides by -4.
  - **B** Use the distributive property to distribute  $-\frac{1}{4}$ .
  - C Add 1 to both sides.
  - **D** Multiply both sides by  $\frac{3}{2}$ .

What techniques can you use to simplify the equation?



Solve the equation for x:  $3x - 5 = \frac{1}{2}x + 2x$ . **Show your work.** 



Solution:

In the equation below, for what value of c does x = 4?  $\frac{1}{2}(2x + 4) = 3x - c$ 

C

В --3

**D** 6

Jenn chose **C** as the correct answer. How did she get that answer?

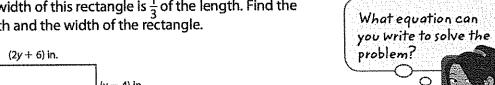
2				
4		oose <i>Yes</i> or <i>No</i> to tell whethe en solution.	er the equation	on has the
	a.	2x + 4 = 3x - 2; $x = 6$	Yes	☐ No
	b.	$\frac{1}{4}x + 3 = \frac{3}{4}x + 1; x = 8$	Yes	☐ No
	c.	3x - 5 = 0.5x; x = 2	Yes	No

Halicassia	
How can you	
substitution	<ul> <li>1. Turks 44 Sec</li> </ul>
this problem	?

	•		
d.	$\frac{2}{3}(3x+6)=3x-4; x=8$	Yes	

	The width of this rectangle is $\frac{1}{3}$ of the length. Find the length and the width of the rectangle.
-	length and the width of the rectangle.

(2y + 6) in.	
	(y — 4) in.



Show your work.

Solution:

# **Understand**Properties of Transformations

Name:

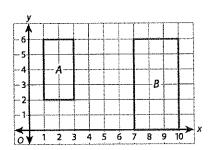
Prerequisite: What properties can you use to compare shapes?



Study the example problem showing how to compare the properties of two shapes. Then solve problems 1-6.

#### Example

Compare the properties of quadrilaterals A and B.



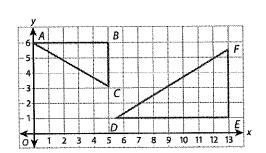
You can use a table to show the comparison.

	Parallel Sides	Perpendicular Sides	Lengths of Opposite Sides	Angles
A	2 pairs	4 pairs	equal	4 right
В	2 pairs	4 pairs	equal	4 right

What types of quadrilaterals are figures A and B in the example problem? Explain how you know.

Use  $\triangle ABC$  and  $\triangle DEF$  to answer problems 2–3.

In  $\triangle ABC$  the measure of angle A is 30°. In  $\triangle DEF$  the measure of angle F is 60°. Find the rest of the angle measures in each triangle and compare them.



What types of triangles are  $\triangle ABC$  and  $\triangle DEF$ ?

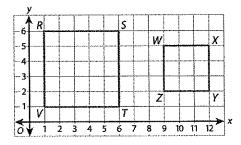
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Lesson 18 Understand Properties of Transformations



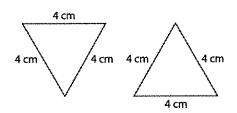
Consider quadrilaterals RSTV and WXYZ.

a.	Find the lengths of the sides of each quadrilateral.
	Explain how you got your answers.



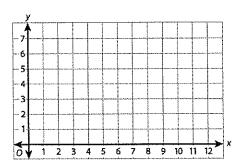
**b.** Compare the properties of the figures. What type of quadrilateral is each figure?

How are the triangles at the right alike? How are they different?



Draw two different quadrilaterals with the following properties on the coordinate plane.

- exactly 1 pair of parallel sides
- 2 pairs of perpendicular sides
- 2 right angles, 1 obtuse angle, 1 acute angle

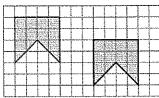


# Explore Properties of Transformations

Study the example problem showing how to analyze a figure and its image after a transformation. Then solve problems 1-6.

#### Example

The gray figure is a transformation of the green figure. Compare the figures. Tell what is the same and what is different about the original figure and its image. Identify the transformation.

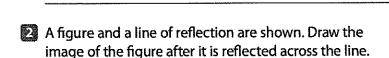


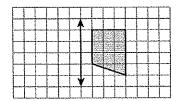
**Same:** The figures have the same shape and size. Parallel lines are still parallel and perpendicular lines are still perpendicular. The lengths of the sides are the same, and the measures of the angles are the same.

**Different:** The image is in a different location than the original figure.

The transformation is a translation.

Describe how the original figure in the example problem was moved to get the image.





Look at the image you drew in problem 2. Are the properties of the sides and angles in the image the same as the properties of the sides and angles in the original figure? Explain.



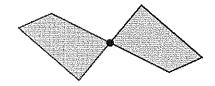
# Vocabulary

transformation a change in position or size of a figure.

translation a transformation that moves each point of a figure the same distance and in the same direction.

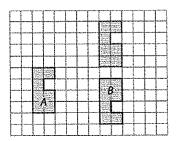
reflection a transformation that flips a figure over a line of reflection.

4	The gray figure is a transformation of the green figure.
	Identify the transformation and describe one way in
	which you could compare the properties of the lines and
	the angles in the original figure and its image.



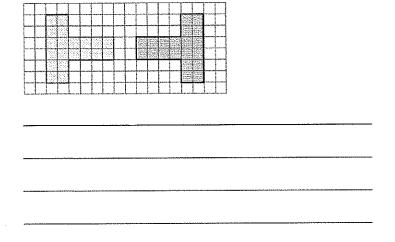
Consider the three figures on the grid.

a. How was the green figure transformed to get image A?



b. How was the green figure transformed to get image B?

Jarrod says that the gray figure is a rotation of the green figure. Imani says it is a reflection. Who is correct? Explain your reasoning. Draw any lines of reflection or centers of rotation on the grid.





# Vocabulary

rotation a transformation that turns a figure around a fixed point, or center of rotation.

# Kersonsind Vale

Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.

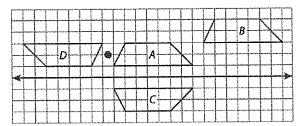
#### Example

Draw a trapezoid in the middle of the grid below. Label it A. Then draw the following transformations of your trapezoid.

- a translation 2 units up and 8 units right. Label this figure *B*.
- a reflection over a horizontal line of reflection. Label this figure C. Draw the line of reflection.
- a 180° counterclockwise rotation around a center of rotation. Label this figure D. Draw the point that is the center of rotation.

Explain how the properties of the lines and angles in your transformations are the same as the properties of the lines and angles in your original figure.

**Show your work.** Use words and drawings to explain your answer.



### After the figure is transformed:

- parallel lines are still parallel.
- the lengths of the sides are the same.
- the measures of the angles are the same.
- all the figures have the same shape and size.

# Where does the example ...

- answer all parts of the problem?
- use words to explain?
- use drawings to explain?





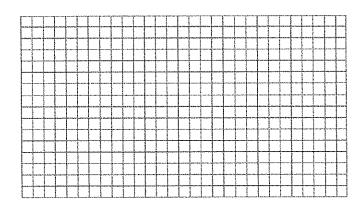
#### Solve the problem. Use what you learned from the model.

Draw a scalene right triangle in the middle of the grid below. Label it *J*. Then draw the following transformations of your triangle.

- a translation 3 units down and 9 units left.
   Label it K.
- a reflection over a vertical line of reflection.
   Label it L. Draw the line of reflection.
- a 90° clockwise rotation around a center of rotation. Label it M. Draw the point that is the center of rotation.

Explain how the properties of the lines and angles in your transformations are the same as the properties of the lines and angles in your original figure.

**Show your work.** Use words and drawings to explain your answer.



# Did you ...

- answer all parts of the problem?
- · use words to explain?
- · use drawings to explain?



# **Transformations and Congruence**

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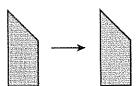
# Prerequisite: Recognize Translations, Reflections, and Rotations

Study the example showing three different transformations of a figure. Then solve problems 1-5.

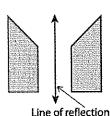
#### Example

Transformations change the location or size of a figure. Three types of transformations are shown below.

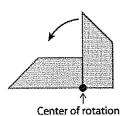
Translation



Reflection



Rotation



Every point of the figure moves the same distance and in the same direction.

The figure is flipped across a line of reflection.

The figure is turned clockwise or counterclockwise around a center of rotation.



Look at the figures in the example. Describe what
 happens to the size, shape, and location of a figure when
it is translated, reflected, or rotated.

The original green figure in the example has two right angles and one pair of parallel lines. Do the translation, reflection, and rotation produce images that have those same properties? Explain why or why not.

# Vocabulary

translation a transformation that moves each point of a figure the same distance and in the same direction.

reflection a transformation that flips a figure across a line of reflection.

rotation a transformation that turns a figure around a fixed point called the center of rotation.

Tell which of the gray figures, A, B, or C, appears to be a translation of the green figure. Explain your reasoning.

Quadrilateral WXYZ is a reflection of quadrilateral ABCD.

The lengths of the sides and the measures of the angles of quadrilateral ABCD are given below.

$$AB = 4 \text{ cm}$$

$$BC = 2 \text{ cm}$$

$$CD = 3 \text{ cm}$$

$$DA = 2 \text{ cm}$$

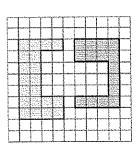
$$m \angle A = 82^{\circ}$$

$$m \angle B = 59^{\circ}$$

Predict the lengths of the sides and measures of the angles in quadrilateral WXYZ. Explain your reasoning.

$$WX =$$
  $XY =$   $YZ =$   $ZW =$   $ZW =$ 

$$m \angle W = \underline{\qquad} m \angle X = \underline{\qquad} m \angle Y = \underline{\qquad} m \angle Z = \underline{\qquad}$$



on the gray figure. Is Troy correct? Explain.

Troy says that the green figure is the result of a single transformation or combination of a series of transformations







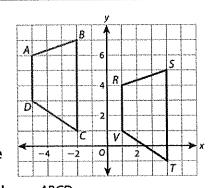
# Determine Whether Two Shapes Are Congruent

Study the example problem showing how to determine whether a shape and its image are congruent. Then solve problems 1-6.



Polygon ABCD is translated 2 units down and 6 units to the right. Are polygons ABCD and RSTV congruent?

Because polygon RSTV is the image of polygon ABCD after a translation, each of its sides is congruent to the corresponding side of polygon ABCD, and each of its angles is congruent to the corresponding angle of polygon ABCD.



$$\angle B \cong \angle S$$

$$\angle C \cong \angle T$$

$$\angle A \cong \angle R$$
  $\angle B \cong \angle S$   $\angle C \cong \angle T$   $\angle D \cong \angle V$ 

 $\overline{AB} \cong \overline{RS}$ 

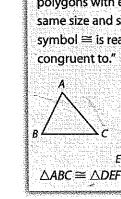
$$\overline{BC} \cong \overline{57}$$

$$\overline{CD} \cong \overline{TV}$$

$$\overline{BC} \cong \overline{ST}$$
  $\overline{CD} \cong \overline{TV}$   $\overline{DA} \cong \overline{VR}$ 

All of the corresponding sides and corresponding angles are congruent, so the polygons are congruent.

- The example shows that  $\angle A$  is congruent to  $\angle R$ . What does it mean to say that angles are congruent?
- Suppose you reflect polygon ABCD across the y-axis. Would the image be congruent to polygon ABCD? Explain.
- In the example, the length of  $\overline{BC}$  in polygon ABCD is 6 units. Without measuring or counting, tell which side in polygon RSTV has a length of 6 units. Explain how you know.



# Vocabulary

congruent polygons polygons with exactly the same size and shape. The symbol ≅ is read "is congruent to."

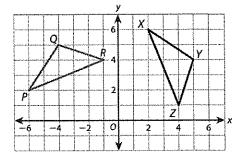




Triangle PQR is rotated 90° clockwise about the origin. The diagram shows the triangle and its image,  $\triangle XYZ$ . Complete the congruence statements.

 $\overline{PQ}\cong$   $\overline{QR}\cong$   $\overline{RP}\cong$ 

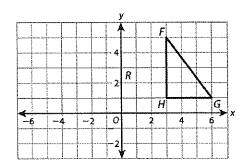
∠P≅\_\_\_\_ ∠Q≅\_\_\_\_ ∠R≅\_\_\_\_



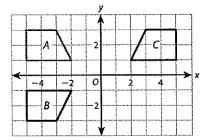
Sketch the image of  $\triangle FGH$  after a translation 2 units down and 5 units to the left. Label the vertices of the image K, L, and M. Then complete the congruence statements below.

 $\overline{GH} \cong \underline{\hspace{1cm}} \cong \overline{MK}$ 

\_\_\_≅∠K ∠H≅\_\_\_\_



Polygon B is a reflection of polygon A across the x-axis. Polygon C is a rotation of polygon B about the origin. Is polygon C congruent to polygon A? Explain why or why not.



# Conviered dinter

Study the example problem showing how to describe a transformation. Then solve problems 1-7.

#### Example

△ABC was transformed to produce a congruent triangle,  $\triangle A'B'C'$ . What transformation produced  $\triangle A'B'C'$ ?

Compare the corresponding vertices in A ARC and A A'R'C'

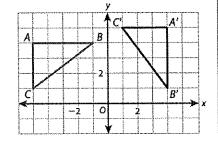
MADE and MADE.	
△ABC (Original)	$\triangle$ A'B'C' (Image)
A(-5,4)	AICA PI



A'(4, 5)B'(4, 1)

$$C(-5, 1)$$

C'(1, 5)



The x-coordinates in the image are the y-coordinates in the original figure. The y-coordinates in the image are the opposites of the x-coordinates in the original figure. The transformation was a 90° clockwise rotation about the origin.

Suppose the vertices of the original figure in the example were A(-6, 6), B(-2, 5), and C(-6, 2). What would be the vertices of the image after a 90° clockwise rotation about the origin?

C'(\_\_\_\_)

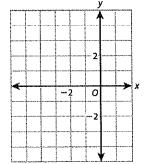
On the coordinate plane at the right, sketch  $\triangle ABC$  from the example above. Then sketch the triangle with the following vertices.

$$L(-5, -4)$$

$$M(-1, -4)$$

$$N(-5, -1)$$

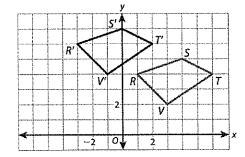
Is  $\triangle ABC$  congruent to  $\triangle LMN$ ? Explain how you know.



Compare the corresponding vertices in problem 2 and identify the transformation that produced  $\triangle LMN$  from  $\triangle ABC$ .

Use polygon RSTV and its congruent image polygon R'S'T'V' for problems 4-6.

Describe the transformation that maps Polygon RSTV to Polygon R'S'T'V'.



Write the coordinates of the vertices of the original polygon and its image. Then compare the corresponding vertices in the original polygon and its image.

- How is the comparison of the corresponding vertices related to your description of the translation?
- The coordinates of the vertices of  $\triangle XYZ$  and its image after a transformation are shown below.

 $\triangle XYZ: X(3, 4), Y(3, 1), Z(1, 1)$ 

 $\triangle X'Y'Z'$ : X'(-3, 4), Y'(-3, 1), Z'(-1, 1)

**a.** Describe the difference in the *x*-values and the *y*-values of the corresponding vertices. What transformation produced  $\triangle X'Y'Z'$ ?

**b.** Then use this information to find the coordinates of the vertices of  $\triangle P'Q'R'$  after the same transformation of  $\triangle PQR$ .

 $\triangle PQR$ : P(-5, 3), Q(-1, 2), R(-2, -2)

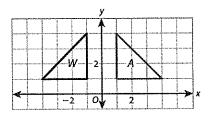
 $\triangle P'Q'R'$ :  $P'(\underline{\hspace{1cm}})$ ,  $Q'(\underline{\hspace{1cm}})$ ,  $R'(\underline{\hspace{1cm}})$ 

Is there more than one way in which triangle A could have been transformed to produce triangle W?

# Transformations and Congruence

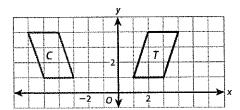
### Solve the problems.

Triangle A transforms to Triangle W.



Tell whether each statement is *True* or *False*.

- **a.** The transformation could be a reflection across the *y*-axis.
- True False
- **b.** The transformation could be a reflection across the *x*-axis.
- True False
- c. The transformation could be a 90° counterclockwise rotation about the origin.
- True False
- **d.** The transformation could be a translation 5 units to the left.
- True False
- Mica translated Polygon C two units to the right and then reflected the image across the y-axis to get Polygon T. Sasha used one transformation to transform Polygon C to Polygon T. Describe the transformation that Sasha used.

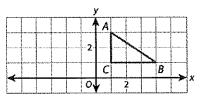


Does Polygon Tlook like a translation, reflection, or rotation of Polygon C?



Which graph shows the image of  $\triangle ABC$  after the following series of transformations?

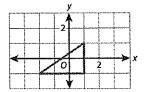
A translation 6 units left and 2 units down, followed by a reflection over the line x = -2.



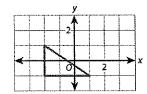
Make a sketch of the transformations before you choose.



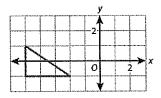
Α



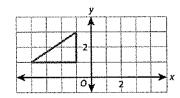
C



В

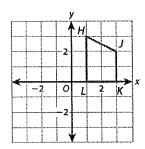


D



Tabatha chose **B** as her answer. How did she get that answer?

Rotate Polygon HJKL 180° about the origin, reflect it across the y-axis, and then reflect it across the x-axis. Write the coordinates of the vertices of the image Polygon H'J'K'L'. How do the vertices of Polygon H'J'K'L' compare to the corresponding vertices of Polygon HJKL?



Use the image from the first transformation as the original figure for the second transformation, and use the image from the second transformation as the original for the third.

# **Transformations and Similarity**

Name:

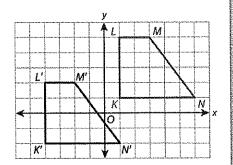
# Prerequisite: Use Transformations to Identify Congruent Figures

Study the example problem showing how to use transformations to identify two congruent figures. Then solve problems 1-6.



Polygon KLMN is translated 3 units down and 5 units to the left. Polygon K'L'M'N' is its image. Are Polygon KLMN and its image congruent?

Because Polygon K'L'M'N' is the image of Polygon KLMN after a translation, each of its sides is congruent to the corresponding side of Polygon KLMN, and each of its angles is congruent to the corresponding angle of Polygon KLMN.



$$\angle K \cong \angle K' \qquad \angle L \cong \angle L'$$

$$\angle M \cong \angle M'$$

$$\angle N \cong \angle N'$$

$$\overline{KL} \cong \overline{K'L'}$$

$$\overline{KL} \cong \overline{K'L'}$$
  $\overline{LM} \cong \overline{L'M'}$   $\overline{MN} \cong \overline{M'N'}$ 

$$\overline{NK}\cong \overline{N'K'}$$

All of the corresponding parts are congruent, so the polygons are congruent.

When Polygon KLMN in the example was translated, how did the angle and line properties change? Explain.

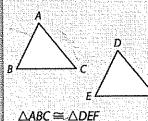
If you rotate Polygon KLMN 180° about the origin, how would the measures of the angles in the image compare to the measures of the corresponding angles in the original figure?



# Vocabulary

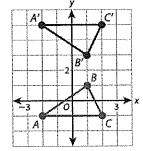
# congruent polygons

polygons with exactly the same size and shape. The symbol  $\cong$  is read "is congruent to."

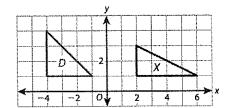




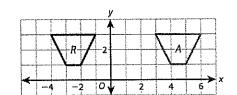
- Triangle ABC and its image are shown.
  - a. What type of transformation was used to transform  $\triangle ABC$  to  $\triangle A'B'C'$ ?



- **b.** Is  $\triangle A'B'C'$  congruent to  $\triangle ABC$ ? Explain why or why not.
- Consider Triangle D and Triangle X.
  - a. Is Triangle X the result of a reflection, translation, or rotation of Triangle D? Explain how you know.



- **b.** Are the triangles congruent? Explain why or why not.
- Polygon A was translated 7 units to the left to form Polygon R. Name another way to transform Polygon A to form Polygon R.



Polygon P is reflected to form Polygon S. Sasha says that the perimeter of Polygon S is the same as the perimeter of Polygon P. Do you agree with Sasha? Explain why or why not.

# Combine Dilations and Other Transformations

Study the example problem showing how to combine a dilation with other transformations. Then solve problems 1–6.



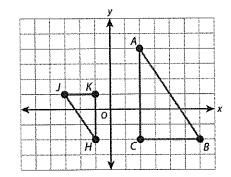
In the diagram,  $\triangle ABC$  is similar to  $\triangle HJK$ . A sequence of transformations was used to transform  $\triangle ABC$  to  $\triangle HJK$ .

Describe the change in the coordinates.

A(2, 4) was transformed to H(-1, -2).

B(6, -2) was transformed to J(-3, 1).

C(2, -2) was transformed to K(-1, 1).



Each x-coordinate has the opposite sign and was multiplied by  $\frac{1}{2}$ . Each y-coordinate has the opposite sign and was multiplied by  $\frac{1}{2}$ .

 $\triangle ABC$  was dilated about center O with a scale factor of  $\frac{1}{2}$  and rotated 180° about O.

Suppose the scale factor of the dilation in the example was 2 instead of  $\frac{1}{2}$ , but the dilation was still centered about O and  $\triangle ABC$  was still rotated 180° about O. What would the coordinates of the vertices of  $\triangle HJK$  be?

Explain how a dilation is different from a translation, a reflection, or a rotation.



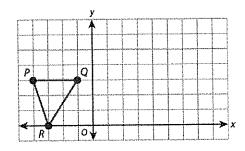
# Vocabulary

dilation a transformation in which the original figure and the image are similar.

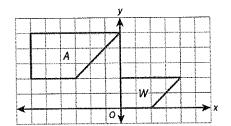
scale factor in a dilation, the ratio of the lengths of corresponding sides of the figure and its image.

center the center of a dilation is the point that is transformed onto itself by the dilation.

- The coordinates of the vertices of Polygon *RSTV* are R(2, 4), S(6, 4), T(6, 0), and V(2, 0). The Polygon is dilated with scale factor of  $\frac{3}{2}$  and center (0, 0). Explain how you can find the coordinates of the vertices of Polygon R'S'T'V' from the coordinates of the vertices of the Polygon *RSTV*.
- 4 Triangle PQR is shown at the right.
  - **a.** Reflect  $\triangle PQR$  across the *y*-axis and then dilate it about center *O* with a scale factor of 2. Sketch the final image.
  - **b.** Compare the coordinates of the corresponding vertices of the final image and  $\triangle PQR$ .



In the diagram at the right, Polygon A is similar to Polygon W. What sequence of transformations transformed Polygon A to Polygon W?

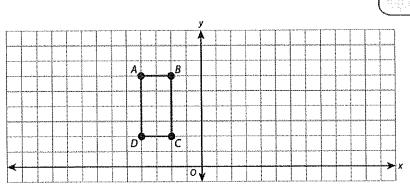


Tracy dilates a figure with a scale factor of  $\frac{3}{4}$  and center O and then dilates the image with a scale factor of 2 and center O. Carrie says that she can get the same final image using just one dilation. Is she correct? If so, how can she do that? If not, why not?

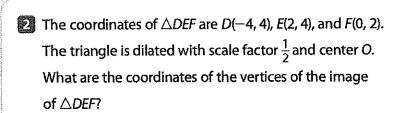
# Tansformations and Similarity

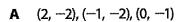
#### Solve the problems.

Polygon ABCD is shown on the coordinate plane. Sketch the image after it is rotated 90° clockwise about O and then dilated with scale factor 2 and center O.



Make sure you rotate the polygon clockwise.





**B** (-8, 8), (4, 8), (0, 4)

**C** (-2, 2), (1, 2), (0, 1)

(4, -4), (4, 2), (2, 0)

Sue chose A as the correct answer. How did she get that answer?

How do you use the scale factor to find the coordinates of the image?



a.	whether each statement is <i>True</i> A dilation image is always congruent to the original figure.	ue or False.  True False		What types of transformations keep the size and shape of the original figure?		
b.	A rotation image is always congruent to the original figure.	True	False			
c.	A reflection image is never congruent to the original figure.	True	False			
d.	A translation image is always congruent to the original figure.	True	False			
De	<b>rt A</b> scribe a sequence of transform aps Polygon <i>LMNP</i> to Polygon <i>V</i>		transformation can change the size of a figure?			
Fir Po pe Po	ort B  and the perimeters of Polygon W  lygon LMNP. Then write the rate  rimeter of Polygon WXYZ to the  lygon LMNP. How does this ration  e scale factor you found in Part	y  Z				
			P	N		

### Scatter Plots

# Prerequisite: Graph Points on the Coordinate Plane

Study the example showing how to graph points on the coordinate plane. Then solve problems 1-8.

### Example

Graph and label each of the points on the coordinate plane.

A(5, 3)

$$B(-4, -2)$$

$$C(-1, 3)$$

$$D(0, -1)$$

$$E(4, -4)$$

Start from the origin for each point.

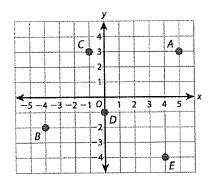
For point A: Move 5 units right and 3 units up.

For point B: Move 4 units left and 2 units down.

For point C: Move 1 unit left and 3 units up.

For point D: Move 1 unit down.

For point E: Move 4 units right and 4 units down.





- Point B in the example is in which quadrant?
- Suppose both coordinates of a point are positive. In which quadrant is the point located?\_
- Without graphing, in which quadrant is F(-2, 4) located? Explain.
- When a point is on the y-axis, like point D in the example, what do you know about the x-coordinate? What is the y-coordinate when a point is on the x-axis?

# Vocabulary

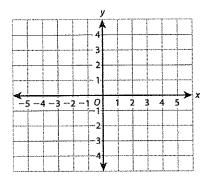
origin the point on the coordinate plane where the x-axis and y-axis intersect.

quadrants the four regions of the coordinate plane that are created by the x-axis and the y-axis.

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The table shows the locations of the exhibits at a science museum. Use the coordinate plane and the table for problems 5-6.

Exhibit	Coordinates
Flight	(4, 2)
Electricity	(-3, -3)
Space	(-2, 4)
Technology	(5, -2)



- Graph each exhibit at the science museum as a point on the coordinate plane and label it with the first letter of the exhibit name.
- Describe how you graphed each exhibit.

Give the coordinates of the points that are on the coordinate plane at the right.

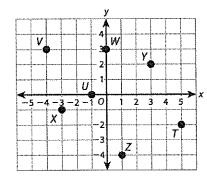
Point *U*: \_\_\_\_\_\_

Point W: \_\_\_\_\_

Point *X*: \_\_\_\_\_

Point Y:

Point *Z*: \_\_\_\_\_



Rachelle graphs a point at (4, 2). She says that she can move her point four or more units to the left and two or more units down to arrive at a point in the third quadrant. Is Rachelle correct? Explain why or why not.

# Identify Positive and Negative Associations:

Study the example showing how to analyze a scatter plot. Then solve problems 1-7.

#### Example

The scatter plot represents data comparing the incomes of a company's employees and the number of years of experience they have. What trends do you notice?

There appears to be a positive association between income and years of experience because there is an upward trend in the data. The income increases as the number of years of experience increases.



- Does the data seem to have a linear or non-linear association? Explain how you know.
- Are there any points that lie outside the general trend of the data and might be considered an outlier?
- Who would you expect to have a higher income: someone with 4 years of experience or 8 years? Why?

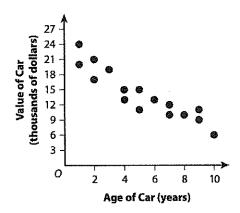
Would the gallons of gas a car uses and the distance it travels have a positive or negative association? Explain.



# Vocabulary

scatter plot a graph of ordered pairs in the coordinate plane that represents a set of data points.

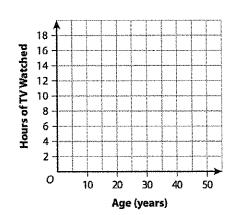
outlier a data value that is much greater or much less than most of the other values in the data set.



Describe any trend that you see in the scatter plot.

What type of association does there appear to be between the value of the car and the age of the car? Explain.

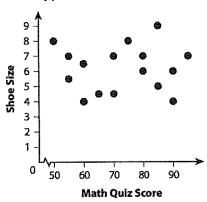
Graph 16 points on the scatter plot at the right that show no association between a person's age and how much television they watch per week. Explain how you know that there is no association.



Is there a trend in the shoe size as the math quiz score increases?

# Salton Plus

What type of association does the scatter plot show?



A positive

none

negative

True or False.

non-linear

2 Use the scatter plot in problem 1 to What does each point decide whether each statement is in the scatter plot

represent?

a.	There are no outliers.	Ш	True	False
b.	There are 10 data points.		True	False

c. The person with the highest False True score has a size 7 shoe.

**d.** The scatter plot shows that people with higher test scores have smaller feet.

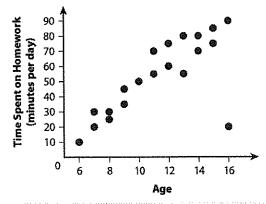
False True

Describe a situation in which there would be a positive association between two variables.

What does the graph of a positive association look like?



Use the scatter plot for problems 4-5.



- Which point appears to be an outlier?
  - **A** (6, 10)

**C** (16, 20)

**B** (13, 55)

**D** (16, 90)

Gary chose **A** as the correct answer. Why is choice **A** incorrect?

Remember that an outlier is a data value that is much greater or much less than most of the other values in the data set.



What type of association does there appear to be between the variables? Explain.

Is there a trend in the data?



Describe a situation in which there would be a negative association between two variables.

What does the graph of a negative association look like?



### **Scatter Plots and Linear Models**

Name:

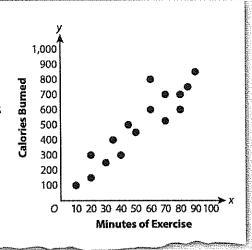
### Prerequisite: Analyze a Bivariate Data Set

Study the example showing how to analyze a bivariate data set in a scatter plot. Then solve problems 1–6.

#### Example

The scatter plot represents data comparing the number of Calories burned and the number of minutes of exercise for a group of fitness club members.

There appears to be a positive association between Calories burned and minutes of exercise because there is an upward trend in the data. The number of Calories burned increases as the number of minutes of exercise increases.



- Sarah exercised for 30 minutes. Kari exercised long enough to burn 800 Calories. Who exercised for a longer period of time, Sarah or Kari? Explain.
- Is there any point that lies outside the general trend of the data and might be considered an outlier? Explain.

Describe a situation in which bivariate data would have a negative association.



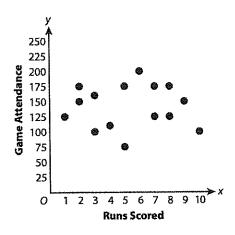
# Vocabulary

scatter plot a graph of ordered pairs in the coordinate plane that represents a set of data points.

bivariate data data involving two variables. A list of the heights and weights of the members of a basketball team is an example of a bivariate data set.



The scatter plot compares game attendance and runs scored by a softball team during one month. Use the scatter plot for problems 4–5.



- What type of association, if any, does there appear to be between game attendance and the number of runs scored? Explain.
- Molly says that game attendance increases as the number of runs scored increases. Is Molly correct? Explain why or why not.
- One of the variables in a bivariate data set is *driving* time. Write a possible second variable that would result in a situation that has each of the following types of association between the variables.

Positive association: \_\_\_

Negative association:

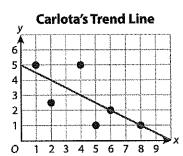
No association: \_\_\_

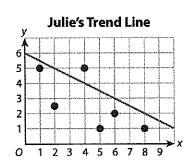
### Ealinegrand incr

Study the example problem showing how to evaluate a trend line. Then solve problems 1–5.

#### Example

The trend lines that Carlota and Julie drew for a data set are shown. Whose line seems to be a better fit for the data?



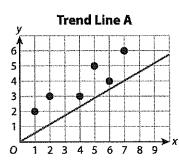


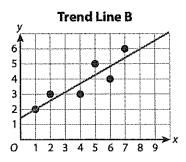
Carlota's line goes through two of the data points. There are the same number of data points above and below her line. Julie's line does not go through any of the data points. There are five values below the line and only one above it. So Carlota's line seems to be a better fit for the data.

- What type of association does there appear to be between the variables in the data in the example? Explain your reasoning.
- Emilio says that for a line to be a good fit for the data in a scatter plot, there should be roughly the same number of points above and below the line. Also you should be able to pair a point above the line with one below the line so that they are roughly the same distance from the line. Do you agree? Explain.

Lesson 29 Scatter Plots and Linear Models

Which line is a better fit for the data in the scatter plot? Explain your choice.





Consider the scatter plot shown. Draw a line that you think best fits the data. Describe the spread of the data and any clusters or outliers that you notice.

What does it mean if the trend line for a scatter plot of data is a horizontal line? Give an example of two variables that would have this type of association.

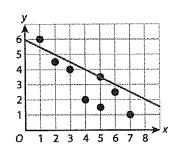


# Scatter Plots and Linear Models

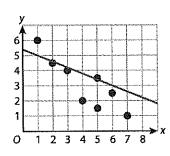
### Solve the problems.

Which line is the best fit for the data?

A



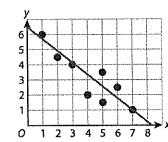
C



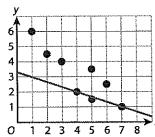
How do you draw a trend line?



В



D



- Tell whether each statement is *True* or *False*.
  - a. Data points that lie above the trend line should be about the same distance as data points below the line.

True

**b.** A line of best fit must go through at least one data point.

True False

c. A trend line is a good fit for the data if all of the data points are fairly close to it.

True False

**d.** A trend line must go through the origin.

True

False

False

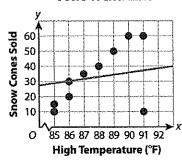
Remember that trend lines show the average values of all of the data.



The scatter plot compares ten daily high temperatures and the number of snow cones sold. Jon drew the following trend line to represent the data.

When drawing a trend line, be careful not to let an outlier pull the trend line in its direction.





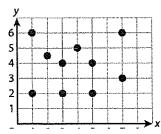
Mary thinks there is a better trend line. What might she be thinking?

Draw a trend line for each of the following scatterplots. If the data has no association, write no association.

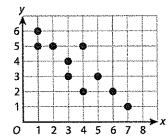
Look for a trend in each of the scatter plots.

plots

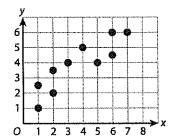
#### **Scatter Plot E**



Scatter Plot F



Scatter Plot G



## **Solve Problems with Linear Models**

Name:

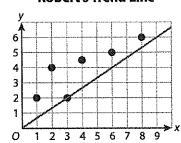
## Prerequisite: Use Trend Lines to Analyze Scatter Plots

Study the example problem showing how to fit a trend line to data in a scatter plot. Then solve problems 1-6.

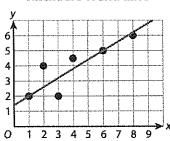
#### Example

The trend lines that Robert and Michael drew for the set of data are shown. Whose line seems to be a better fit for the data?

**Robert's Trend Line** 



Michael's Trend Line

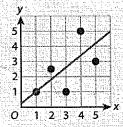


Robert's line goes through one of the data points, and all of the other data points lie above his line. Michael's line goes through two of the data points. There are the same number of data points above and below his line and they appear to be about the same distance away from his line. So Michael's line seems to be a better fit for the data.

- In the example, is there an association between the variables in the data? If so, what type of association?
- 23 Sheldon draws a trend line for the data in the example that goes through the points (1, 2) and (8, 6). is his trend line a better fit for the data than Michael's? Explain.



line that closely fits the data points in a graph.

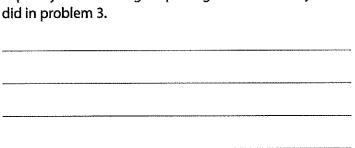


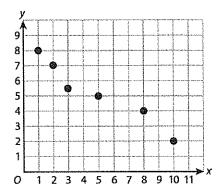




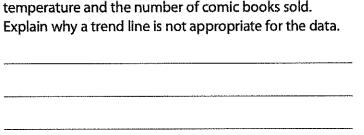
Draw a trend line for the data shown in the scatter plot.

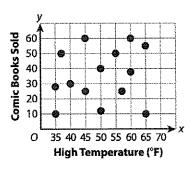
Explain your reasoning for placing the line where you did in problem 3.



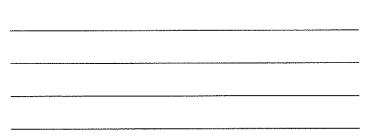


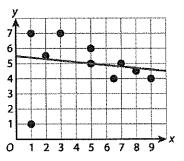
The scatter plot at the right compares the daily high temperature and the number of comic books sold. Explain why a trend line is not appropriate for the data.





Tiana drew the trend line shown to represent the data in the scatter plot. Explain Tiana's error. Draw a trend line that better fits the data. Explain why your line is a better fit for the data.





## the and quadion for the tire of Besid 10.

Study the example showing how to write an equation for the line of best fit to analyze data. Then solve problems 1-6.

#### Example

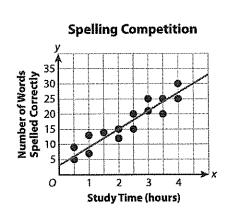
Devon is practicing for a spelling competition. The scatter plot at the right compares his study time and the number of words he spelled correctly. He drew a line to fit the data. Write an equation for the line.

You can write an equation of the form y = mx + b. The points (2, 15) and (3, 21) are on the line. Use the points to find the slope m:  $m = \frac{21 - 15}{3 - 2} = \frac{6}{1} = 6$ .

Substitute the slope into the equation to get y = 6x + b. Use this equation and either one of the points, say (2, 15), to find the y-intercept.

$$15 = 6(2) + b$$
  
 $3 = b$ 

The equation of the line is y = 6x + 3.



What do the slope and y-intercept mean as they relate to the study time and the number of words spelled correctly?

Use the graph in the example to estimate how many words Devon will spell correctly if he studies for 4.5 hours. Then use the equation to estimate how many words he will spell correctly if he studies for 4.5 hours. How do the estimates compare?

## Use the scatter plot and the information below for problems 3-6.

The scatter plot shows the results of a survey of students about how long it took them to write their most recent research report.

Write an equation for the line of best fit.

Show your work.



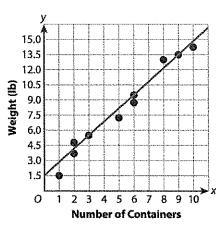
	Solution:
	What does the slope tell you about how the time to write a research report changes as the number of pages increases?
7	Micah's next research report needs to be 9 pages long. Use your equation to find out how long it will take Micah to write the report.
6	Rita spent 10 hours writing a research report. Use two different methods to estimate the number of pages in her report. Explain your methods.

## Solve Problems with Linear Models

#### Solve the problems.

The table and scatter plot show the total weight for quart containers of strawberries at Marty's Market.

Number of	THE RESERVE THE PARTY OF THE PA
Containers	(lb)
1	1.5
2	3.7
2	4.8
3	5.5
5	7,25
6	8.75
6	9.5
8	13
9	13.5
10	14.25



What is the y-intercept shown by the trend line?



The points (3, 5.5) and (9, 13.5) lie on the line of best fit. Which of the following is the equation of the line?

**A** 
$$y = \frac{3}{4}x + 1.5$$

**C** 
$$y = \frac{4}{3}x - 1.5$$

**A** 
$$y = \frac{3}{4}x + 1.5$$
 **C**  $y = \frac{4}{3}x - 1.5$  **B**  $y = \frac{4}{3}x + 1.5$  **D**  $y = \frac{4}{3}x$ 

**D** 
$$y = \frac{4}{2}x$$

Yoshi chose A as the correct answer. How did he get that answer?

Estimate the weight of 15 containers of strawberries at Marty's Market in problem 1.

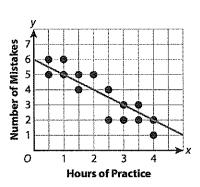
Show your work.

Use the equation from problem 1. The number of containers is the x-value.



Solution:

The scatter plot compares the number of mistakes Koby makes playing a song on his trumpet and the number of hours he practices the song. A line of best fit is shown.



When interpreting the slope, think about the meaning of a change in y for each one unit increase in x.



Tell whether each statement is True or False.

- **a.** The equation of the line of best fit is y = x + 6.
- **b.** The slope means that you can expect the number of mistakes Koby makes to decrease by 1 for every 1-hour increase in practice time.
- c. The y-intercept means that you can expect that even if Koby does not practice he would only make about 6 mistakes.

True

\_\_\_ False

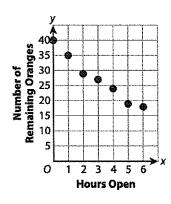
True

False

True

False

The scatter plot compares the number of oranges remaining at a fruit stand to the amount of time that the stand has been open.



The oranges will sell out when y = 0.



Draw a line of best fit for the scatter plot. Write an equation to represent the line. How many hours after opening would you predict that the fruit stand will sell out of oranges?

## **Categorical Data in Frequency Tables**

Name:

## Prerequisite: Express a Ratio as a Percent

Study the example showing how to express a ratio as a percent. Then solve problems 1-6.

#### Example

Team A won 18 out of the 25 games they played. Team B won 15 out of the 20 games they played. Which team won a greater percent of the games they played?

You can write ratios that compare the number of games won to the total number of games played by each team:

Team A:  $\frac{18}{25}$  Team B:  $\frac{15}{20}$ 

Next, make a table of equivalent ratios.

Team A

Wins	18	36	54	72
Total Games	25	50	75	100

Team B

Wins	15	30	45	60	75
Total Games	20	40	60	80	100

Last, you can use the table to write each ratio as a percent.

Team A: 
$$\frac{18}{25} = \frac{72}{100} = 72\%$$

Team B: 
$$\frac{15}{20} = \frac{75}{100} = 75\%$$

Compare the percents: 75% > 72%. So Team B won a greater percent of the games they played.

- Explain why the example showed how to find ratios of the number of wins out of 100 games played.
- Suppose Team C won 32 out of 50 games. What percent of the games they played did they win? How does this compare to the percents for Teams A and B?

Complete the tables and equations to write each ratio as a percent.

 8

 25
 50
 100

**b.** 23 50 100

$$\frac{23}{50} = \frac{23}{100} = \frac{3}{100}$$

- In Walter's class, 14 of the 25 students ride the bus. In Sasha's class, 11 of the 20 students ride the bus. Which class has a greater percent of students who ride the bus? Explain.
- At Anthony's school, the ratio of girls to total students is  $\frac{260}{500}$ . At Theresa's school, the ratio of girls to total students is  $\frac{360}{600}$ . Explain how you can find percents for each of the ratios. Then tell whose school has a greater percent of girls.

Emma's two methods for writing the ratio  $\frac{9}{40}$  as a percent are shown at the right. Use one of Emma's methods to write the ratio  $\frac{3}{8}$  as a percent. Compare your percent to 22.5%.

# methods to write the ratio $\frac{3}{8}$ as a percent. Compare your percent to 22.5%.

#### Method 1

$$\frac{9}{40} = \frac{9}{40} \times \frac{2.5}{2.5} = \frac{22.5}{100} = 22.5\%$$

#### Method 2

$$\frac{9}{40} = 9 \div 40 = 0.225 = 22.5\%$$

## ilising Two-Way Tables :

Study the example showing how to use the data in a two-way table to make a two-way relative frequency table. Then solve problems 1–6.

#### Example

A group of 118 students in Vermont were asked whether they prefer skiing or sledding in the winter. The results are shown below. Make a relative frequency table to show the preference based on gender.

Contracts Section 1	Skiing	Siedding	Total
Girls	34	26	60
Boys	23	35	58
Total	57	61	118

Find the percent of the girls and the percent of the boys who picked each activity. For example, of the 60 girls, 34 picked skiing

	Skiing	Sledding	Total
Girls	$\frac{34}{60} \approx 56.7\%$	$\frac{26}{60} \approx 43.3\%$	100%
Boys	23 58 ≈ 39.7%	35/ <sub>58</sub> ≈ 60.3%	100%

$$\frac{34}{60}$$
 = 34 ÷ 60  $\cong$  0.567 = 56.7%.

About 56.7% of the girls preferred skiing to sledding.

- In the example, were more girls or boys surveyed? How many more?
- Which activity did a greater percent of the girls choose? Which activity did a greater percent of the boys choose?

8	Does the data in the example support the idea that both
	the girls and the boys prefer skiing to sledding? Explain.




## Vocabulary

categorical data data sets that are described by categories, such as favorite sport or eye color, rather than by numbers, such as test scores or temperatures.

#### Use the information and the table below for problems 4-6.

The two-way table shows the results of a survey that asked students whether they watch animated movies.

The first test was open to the second second to the second		A	ge (year	s)	
	11-12	13-14	15–16	17-18	Total
Watch Animated Movies	44	32	39	15	130
Do Not Watch Animated Movies	16	20	36	45	117
Total	60	52	75	60	247

Complete the relative frequency table to show the percent, to the nearest tenth, of each age group that do and do not watch animated movies.

		Age (	years)	
	11-12	[E=14	15-16	17-18
Watch Animated Movies	$\frac{44}{60} \approx 73.3\%$			
Do Not Watch Animated Movies	$\frac{16}{60} \approx 26.7\%$			
Total	100%			

Use the relative frequency table in problem 4 to determine if there is an association between age and watching animated movies. Explain.

Instead of finding the relative frequencies based on age group, Ahanti found the relative frequencies based on whether they watch animated movies or not. Complete Ahanti's table. Can you draw the same conclusions using Ahanti's table that you drew in problem 5? Explain.

			Age (years)		
	11-12	1EE17	15-16	17-18	Total
Watch Animated Movies	$\frac{44}{130}$ $\approx$ 33.8%				
Do Not Watch Animated Movies					

## Categorical Data in Frequency Tables

#### Solve the problems.

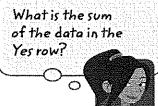
#### Use the information below and the table for problems 1-3.

The two-way table shows the results of a survey that asked students whether or not they were going to the school play.

	Sixth Graders	Seventh Graders	Fighth Graders	Total
Yes	82	70	64	216
No	76	85	96	257
Total	158	155	160	473

- How many students said they were planning to go to the play? Circle the letter of the correct answer.
  - A 158 students
- C 257 students
- **B** 216 students
- D 473 students

Robin chose **C** as the correct answer. How did she get that answer?



Complete the relative frequency table to show the percent of Yes and No responses for each grade level.

	Sixth Graders	Seventh Graders	Eighth Graders
Yes	51.9%		
No		54.8%	
Total			

Should you compute the percents for each column or for each row?



Do you think that there is an association between grade level and going to the play? Explain.

What are the differences in the percent for each grade level?



The two-way table shows the results of a survey that asked students about their favorite fruit.

			avorite Frui	į.	
	Apples	Bananas	Oranges	Grapes	Total
Girls	18	12	15	5	50
Boys	15	15	16	10	56
Total	33	27	31	15	10 <del>6</del>

In each statement, it is important to figure out what is the total and what is the part.



Tell whether each statement is True or False.

- **a.** Of the girls surveyed, 36% prefer apples.
- True False
- **b.** Of those surveyed who prefer bananas, about 44% were boys.
- True False
- **c.** The total number of girls surveyed is 50.
- True False
- **d.** Of all students surveyed, about 25% prefer bananas.
- True False
- Ahmid used the total number of people who bought a hot dog and the total number of people who did not buy a hot dog to make the relative frequency table below. Does it provide evidence that there is an association between buying a hot dog and buying a drink at a baseball game? Explain why or why not.

1.71				1			
	atp						
	ple						
	lad						
per	cent	bu	y a	ho	†	lo	)
but	not	ad	rinl	3			

