English Spanish

3.2 Slope

Essential Question How can you compare two rates graphically?

1 ACTIVITY: Comparing Unit Rates

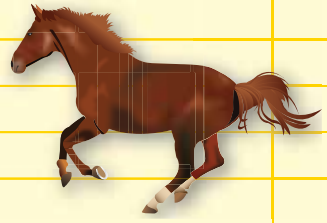
Work with a partner. The table shows the maximum speeds of several animals.

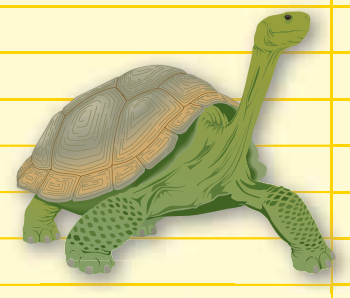
a. Find the missing speeds. Round your answers to the nearest tenth.

b. Which animal is fastest? Which animal is slowest?

c. Explain how you convert between the two units of speed.

Animal	Speed (miles per hour)	Speed (feet per second)
Antelope	61.0	
Black Mamba Snake		29.3
Cheetah		102.6
Chicken		13.2
Coyote	43.0	
Domestic Pig		16.0
Elephant		36.6
Elk		66.0
Giant Tortoise	0.2	
Giraffe	32.0	
Gray Fox		61.6
Greyhound	39.4	
Grizzly Bear		44.0
Human		41.0
Hyena	40.0	
Jackal	35.0	
Lion		73.3
Peregrine Falcon	200.0	
Quarter Horse	47.5	
Spider		1.76
Squirrel	12.0	
Thomson's Gazelle	50.0	
Three-Toed Sloth		0.2
Tuna	47.0	





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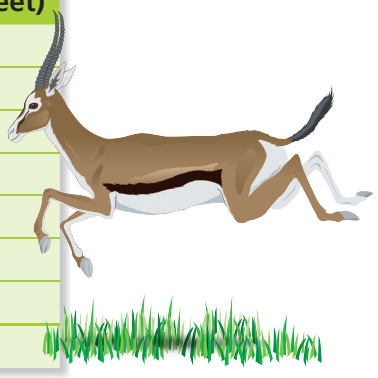
2 ACTIVITY: Comparing Two Rates Graphically

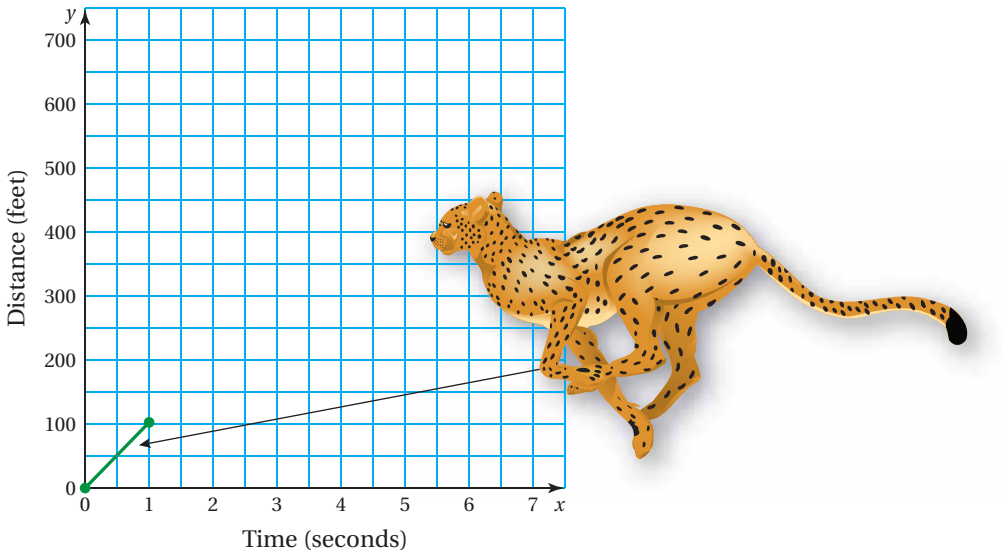
Work with a partner. A cheetah and a Thomson's gazelle are running at constant speeds.

a. Find the missing distances.

	Cheetah	Gazelle
Time (seconds)	Distance (feet)	Distance (feet)
0	0	0
1	102.6	
2		
3		
4		
5		
6		
7		



b. Use the table to complete the line graph for each animal.



c. Which graph is steeper? The speed of which animal is greater?

What Is Your Answer?

3. IN YOUR OWN WORDS How can you compare two rates graphically? Explain your reasoning. Give some examples with your answer.

4. Choose 10 animals from Activity 1.

a. Make a table for each animal similar to the table in Activity 2.

b. Sketch a graph of the distances for each animal.

c. Compare the steepness of the 10 graphs. What can you conclude?

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3.2 Lesson

Check It Out
Lesson Tutorials
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Key Vocabulary
slope, *p. 106*

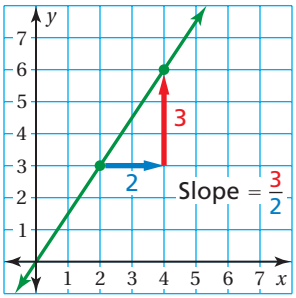
Key Idea

Slope

Slope is the rate of change between any two points on a line. It is a measure of the *steepness* of a line.

To find the slope of a line, find the ratio of the change in y (vertical change) to the change in x (horizontal change).

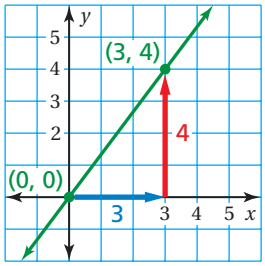
$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$



EXAMPLE 1 Finding Slopes

Find the slope of each line.

a.

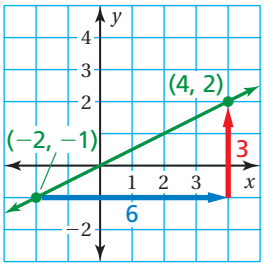


$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

$$= \frac{4}{3}$$

∴ The slope of the line is $\frac{4}{3}$.

b.



$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

$$= \frac{3}{6} = \frac{1}{2}$$

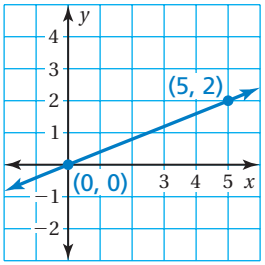
∴ The slope of the line is $\frac{1}{2}$.

On Your Own

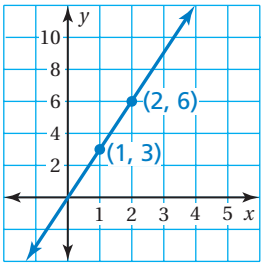
Now You're Ready
Exercises 4–9

Find the slope of the line.

1.



2.



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English Spanish

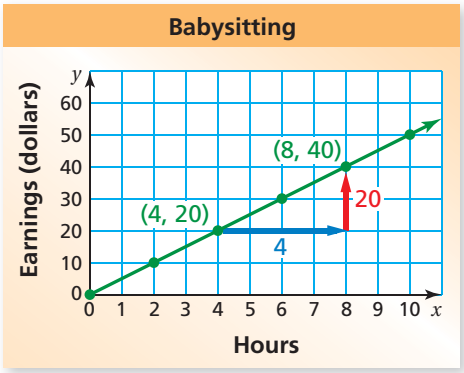
EXAMPLE 2 Finding a Slope

The table shows your earnings for babysitting.

a. Graph the data.

b. Find and interpret the slope of the line through the points.

Hours, x	0	2	4	6	8	10
Earnings, y (dollars)	0	10	20	30	40	50



a. Graph the data. Draw a line through the points.

b. Choose any two points to find the slope of the line.

$$\text{slope} = \frac{\text{change in } y}{\text{change in } x}$$

$$= \frac{20}{4} \quad \leftarrow \text{dollars}, \leftarrow \text{hours}$$

$$= 5$$

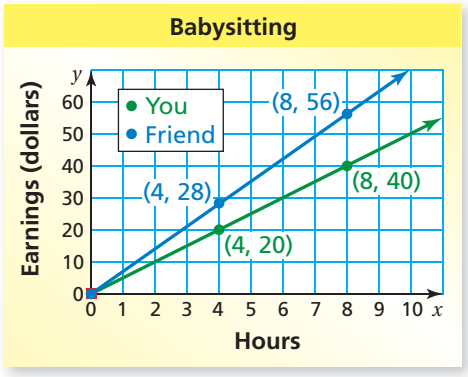
∴ The slope of the line is 5. So, you earn \$5 per hour babysitting.

On Your Own

Now You're Ready
Exercises 10 and 11

3. In Example 2, use two other points to find the slope. Does the slope change?

4. The graph shows the earnings of you and your friend for babysitting.



a. Compare the steepness of the lines. What does this mean in the context of the problem?

b. Find and interpret the slope of the blue line.

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3.2 Exercises

Check It Out
Help with Homework
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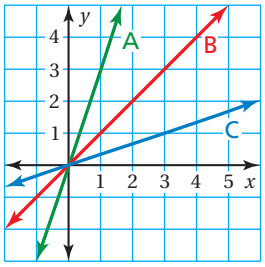
Vocabulary and Concept Check

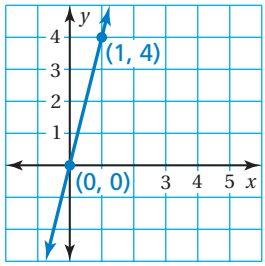
1. **VOCABULARY** Is there a connection between rate and slope? Explain.
2. **REASONING** Which line has the greatest slope?
3. **REASONING** Is it more difficult to run up a ramp with a slope of $\frac{1}{5}$ or a ramp with a slope of 5? Explain.



Practice and Problem Solving

Find the slope of the line.

1

4.


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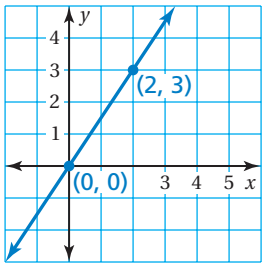

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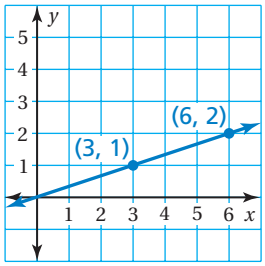

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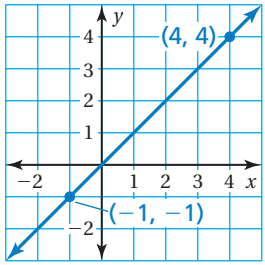

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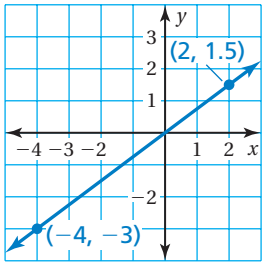

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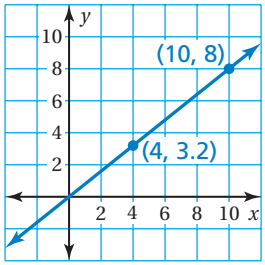


Graph the data. Then find the slope of the line through the points.

2

10.

Minutes, x	3	5	7	9
Words, y	135	225	315	405

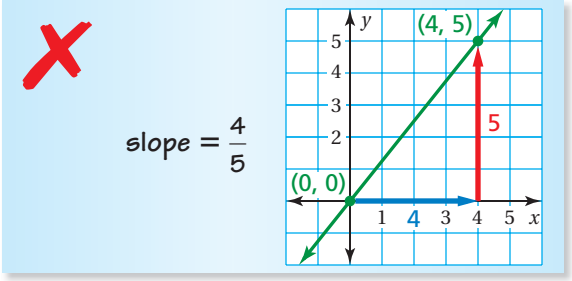
11.

Gallons, x	5	10	15	20
Miles, y	162.5	325	487.5	650

Graph the line that passes through the two points. Then find the slope of the line.

12. (0, 0), (5, 8)
13. (−2, −2), (2, 2)
14. (10, 4), (−5, −2)

15. **ERROR ANALYSIS** Describe and correct the error in finding the slope of the line passing through (0, 0) and (4, 5).



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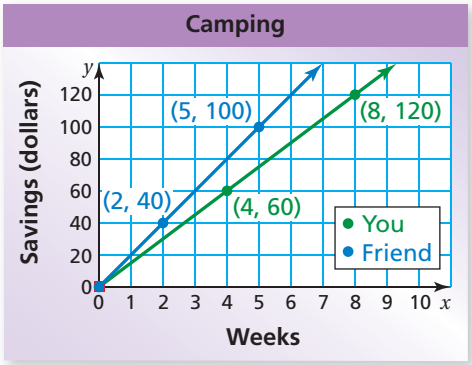
16. CAMPING The graph shows the amount of money you and a friend are saving for a camping trip.



a. Compare the steepness of the lines. What does this mean in the context of the problem?

b. Find the slope of each line.

c. How much more money does your friend save each week than you?

d. The camping trip costs $165. How long will it take you to save enough money?

17. MAPS The table shows data from a key to a map of Ohio.

Distance on Map (mm), x	10	20	30	40
Actual Distance (mi), y	25	50	75	100

a. Graph the data.

b. Find the slope of the line. What does this mean in the context of the problem?

c. The map distance between Toledo and Columbus is 48 millimeters. What is the actual distance?

d. Cincinnati is about 225 miles from Cleveland. What is the distance between these cities on the map?

18. CRITICAL THINKING What is the slope of a line that passes through the points (2, 0) and (5, 0)? Explain.

19. Number Sense A line has a slope of 2. It passes through the points (1, 2) and (3, y). What is the value of y?

Fair Game Review What you learned in previous grades & lessons

Copy and complete the statement using <, >, or =. SECTION 2.1

20. $\frac{9}{2} \square \frac{8}{3}$ **21.** $-\frac{8}{15} \square \frac{10}{18}$ **22.** $\frac{-6}{24} \square \frac{-2}{8}$

Multiply. SECTION 2.3

23. $-\frac{3}{5} \times \frac{8}{6}$ **24.** $1\frac{1}{2} \times \left(-\frac{6}{15}\right)$ **25.** $-2\frac{1}{4} \times -1\frac{1}{3}$

26. MULTIPLE CHOICE You have 18 stamps from Mexico in your stamp collection. These stamps are $\frac{3}{8}$ of your collection. The rest of the stamps are from the United States. How many stamps are from the United States? SECTION 2.5

(A) 12 (B) 24 (C) 30 (D) 48