Bartlett

NAME DATE PERIOD

Unit 2, Lesson 11: Interpreting Graphs of Proportional Relationships

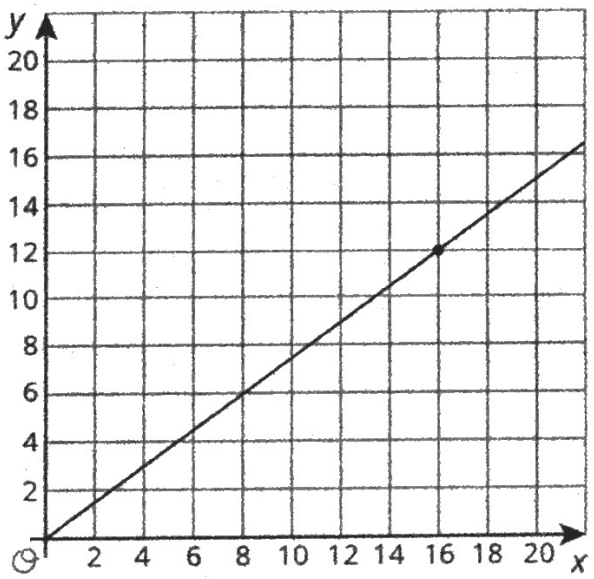
Let's read stories from the graphs of proportional relationships.

1 min quiet think, thumbs up when have situation

Look @ unlabeled graph → Think of a situation it could represent

11.1: What Could the Graph Represent?

Here is a graph that represents a proportional relationship.



Call on some, record

Q: How do you know all of the relationships are proportional?

1. Invent a situation that could be represented by this graph.

2. Label the axes with the quantities in your situation.

3. Give the graph a title.

4. There is a point on the graph. What are its coordinates? What does it represent in your situation?

The coordinates are (16, 12).

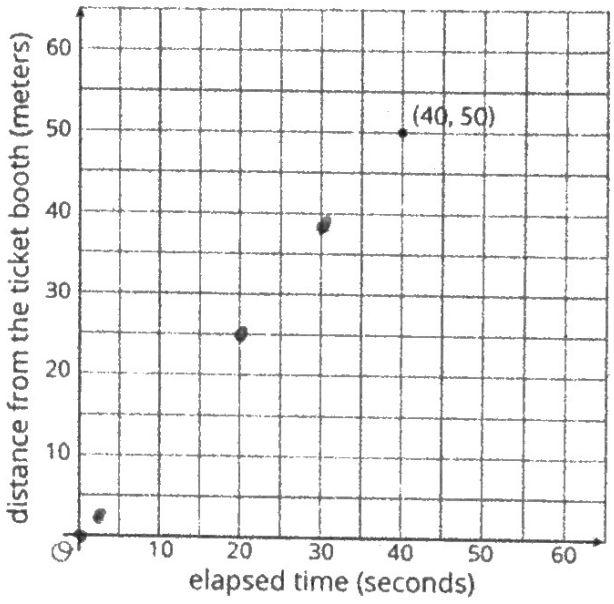
NAME DATE PERIOD

11.2: Tyler's Walk 5 min quiet work, partner share, whole class

Tyler was at the amusement park. He walked at a steady pace from the ticket booth to the bumper cars.

1. The point on the graph shows his arrival at the bumper cars. What do the coordinates of the point tell us about the situation?

40 secs after Tyler started walking he was 50 meters from the ticket booth.



2. The table representing Tyler's walk shows other values of time and distance. Complete the table. Next, plot the pairs of values on the grid.

Q: What quantities are shown in the graph?

time (seconds)	distance (meters)
0	0
20	25
30	37.5
40	50
1	1.25

3. What does the point (0, 0) mean in this situation?

Before any time passed, there was no distance between tyler & ticket booth.

4. How far away from the ticket booth was Tyler after 1 second? Label the point on the graph that shows this information with its coordinates.

Tyler was 1.25 m from the ticket booth after 1 second (1, 1.25)

5. What is the constant of proportionality for the relationship between time and distance? What does it tell you about Tyler's walk? Where do you see it in the graph?

the constant is 1.25. Tyler is walking at a speed of 1.25 m per second.

NAME DATE PERIOD

Are you ready for more?

If Tyler wanted to get to the bumper cars in half the time, how would the graph representing his walk change? How would the table change? What about the constant of proportionality?

11.3: Seagulls Eat What?

m.openup.org/1/7-2-11-3

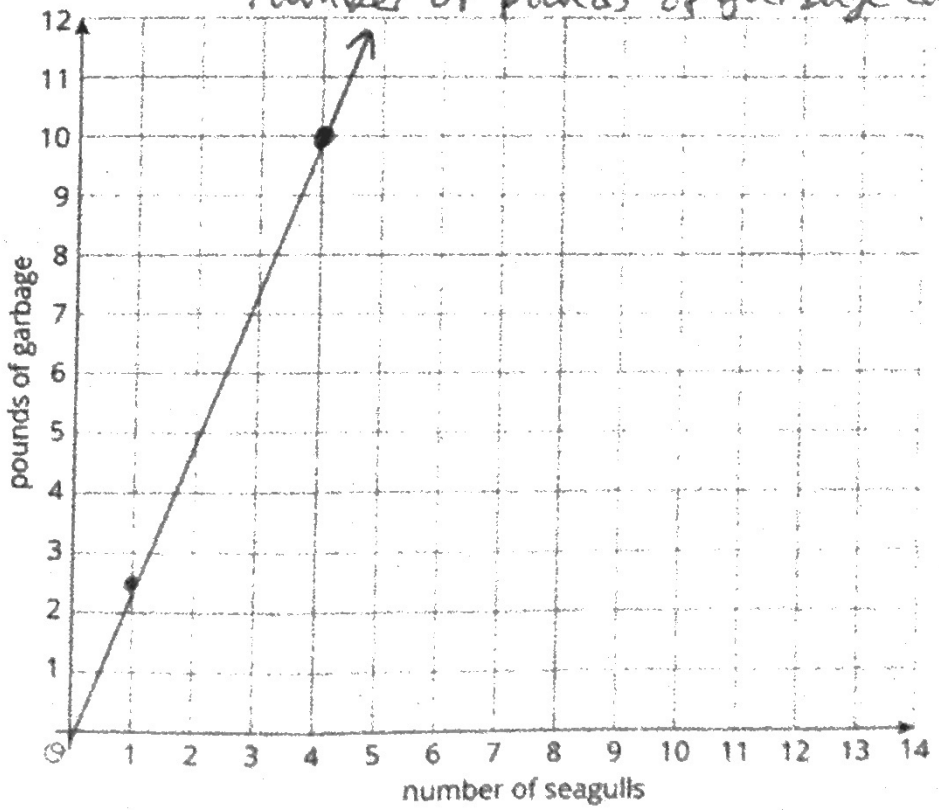
4 seagulls ate 10 pounds of garbage. Assume this information describes a proportional relationship.

1. Plot a point that shows the number of seagulls and the amount of garbage they ate.

2. Use a straight edge to draw a line through this point and $(0, 0)$.

3. Plot the point $(1, k)$ on the line. What is the value of k? What does the value of k tell you about this context?

The value of k is 2.5, which tells you the number of pounds of garbage consumed per seagull.



12.1

One problem @ a time

30s for each, signal + share strategy

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

$\frac{4}{3} \cdot \frac{1}{4} = \frac{4}{12} = \frac{1}{3}$

$\frac{4}{1} \div \frac{1}{5} = 20$

$\frac{9}{6} \div \frac{1}{2} = \frac{18}{6} = 3$

12.2: Race to the Bumper Cars

Diego, Lin, and Mai went from the ticket booth to the bumper cars.

PERIOD

1. Use each description to complete the table representing that person's journey.

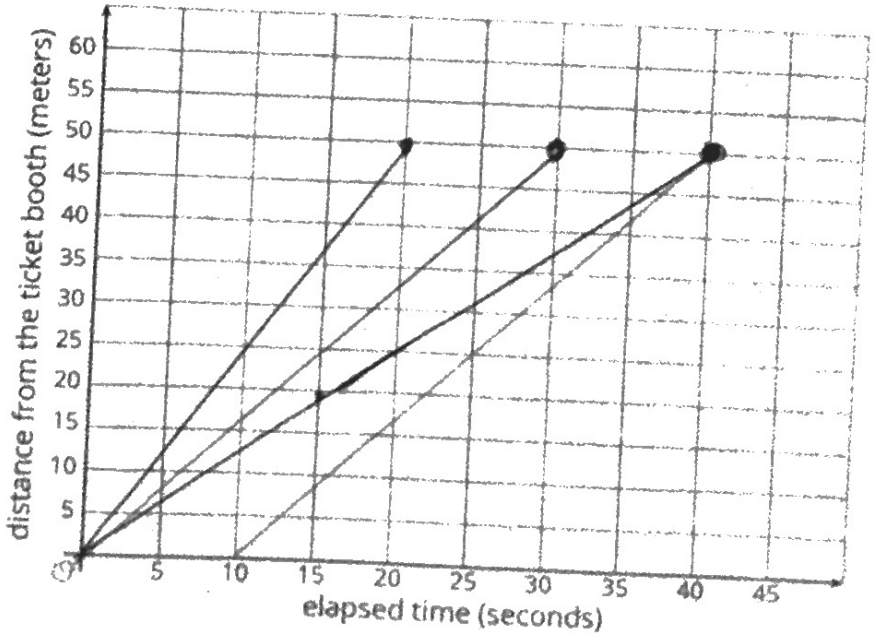
   a. Diego left the ticket booth at the same time as Tyler. Diego jogged ahead at a steady pace and reached the bumper cars in 30 seconds.
   b. Lin left the ticket booth at the same time as Tyler. She ran at a steady pace and arrived at the bumper cars in 20 seconds.
   c. Mai left the booth 10 seconds later than Tyler. Her steady jog enabled her to catch up with Tyler just as he arrived at the bumper cars.

Diego's time (seconds)	Diego's distance (meters)
0	0
15	25
30	50
1	5/3

Lin's time (seconds)	Lin's distance (meters)
0	0
10	25
20	50
1	2.5

Mai's time (seconds)	Mai's distance (meters)
10	0
25	25
40	50
1	0

2. Using a different color for each person, draw a graph of all four people's journeys (including Tyler's from the other day).



3. Which person is moving the most quickly? How is that reflected in the graph?

Lin is moving most quickly.

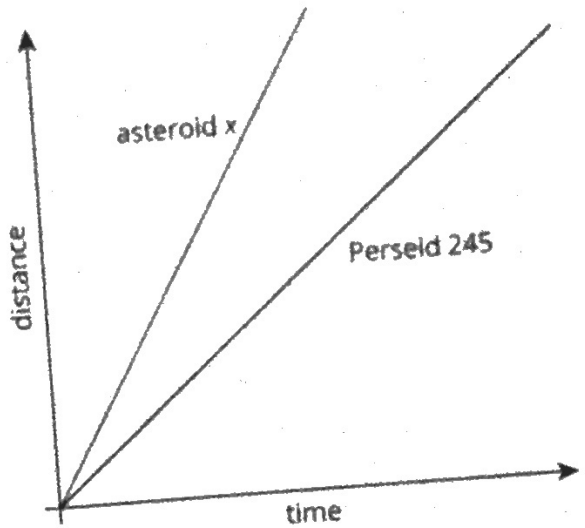
re you ready for more?

Write equations to represent each person's relationship between time and distance.

12.3: Space Rocks and the Price of Rope

• The steeper the graph, the greater the constant.

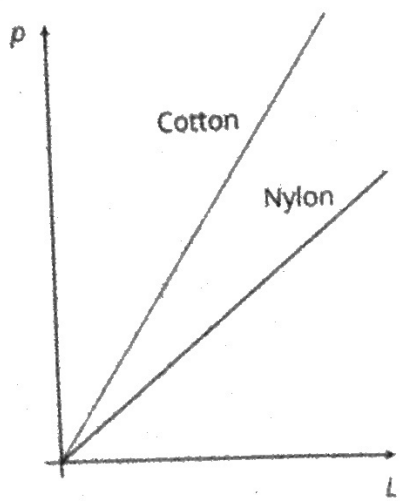
1. Meteoroid Perseid 245 and Asteroid x travel through the solar system. The graph shows the distance each traveled after a given point in time.



Is Asteroid x traveling faster or slower than Perseid 245? Explain how you know.

Asteroid x is traveling faster than Perseid 245.

2. The graph shows the price, p, of different lengths, L, of two types of rope.



If you buy $1.00 of each kind of rope, which one will be longer? Explain how you know.

The nylon rope is longer.

NAME DATE PERIOD

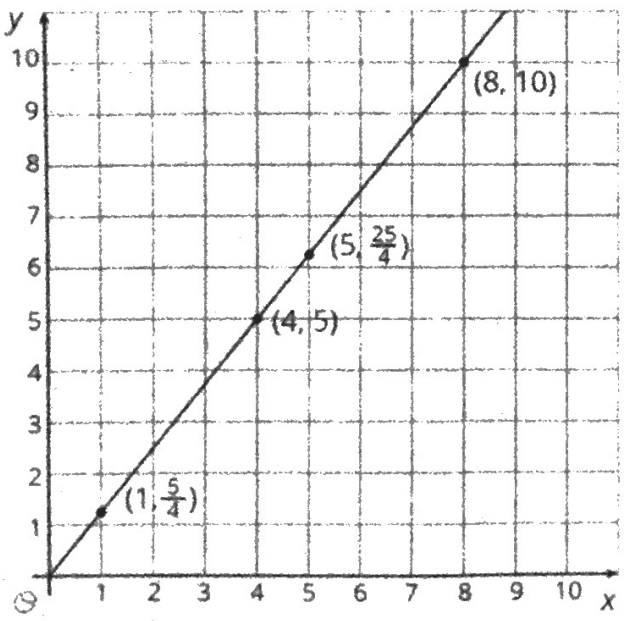
Lesson 11 Summary

For the relationship represented in this table, y is proportional to x. We can see in the table that $\frac{5}{4}$ is the constant of proportionality because it's the y value when x is 1.

x	y
4	5
5	$\frac{25}{4}$
8	10
1	$\frac{5}{4}$

The equation $y = \frac{5}{4}x$ also represents this relationship.

Here is the graph of this relationship.



If y represents the distance in feet that a snail crawls in x minutes, then the point (4, 5) tells us that the snail can crawl 5 feet in 4 minutes.

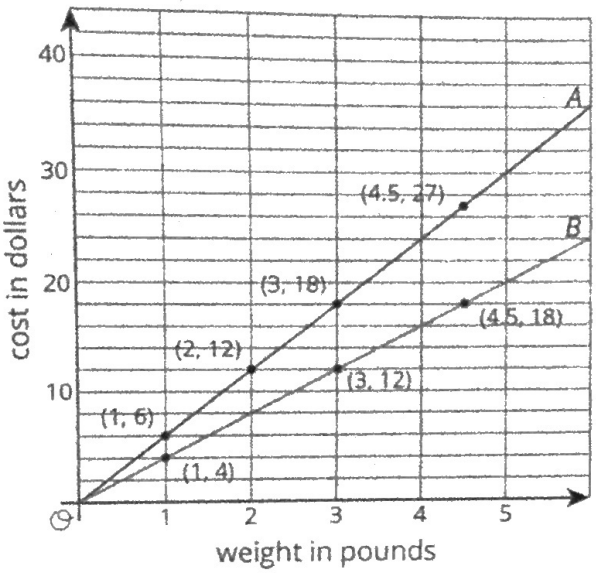
If y represents the cups of yogurt and x represents the teaspoons of cinnamon in a recipe for fruit dip, then the point (4, 5) tells us that you can mix 4 teaspoons of cinnamon with 5 cups of yogurt to make this fruit dip.

We can find the constant of proportionality by looking at the graph, because $\frac{5}{4}$ is the y-coordinate of the point on the graph where the x-coordinate is 1. This could mean the snail is traveling $\frac{5}{4}$ feet per minute or that the recipe calls for $1\frac{1}{4}$ cups of yogurt for every teaspoon of cinnamon.

In general, when y is proportional to x, the corresponding constant of proportionality is the y-value when $x = 1$.

Lesson 12 Summary

Here is a graph that shows the price of blueberries at two different stores. Which store has a better price?



We can compare points that have the same x value or the same y value. For example, the points (2, 12) and (3, 12) tell us that at store B you can get more pounds of blueberries for the same price.

The points (3, 12) and (3, 18) tell us that at store A you have to pay more for the same quantity of blueberries. This means store B has the better price.

We can also use the graphs to compare the constants of proportionality. The line representing store B goes through the point (1, 4), so the constant of proportionality is 4. This tells us that at store B the blueberries cost \$4 per pound. This is cheaper than the \$6 per pound unit price at store A.