



Objective

Proportional Relationships

Warm-Up



1. A bus travels 25 miles in 18 minutes. At the same rate, what distance will the bus travel in 63 minutes?

2. A copy machine averages 250 copies in 5.3 minutes. At the same rate, how many copies can the machine make in 13 minutes?



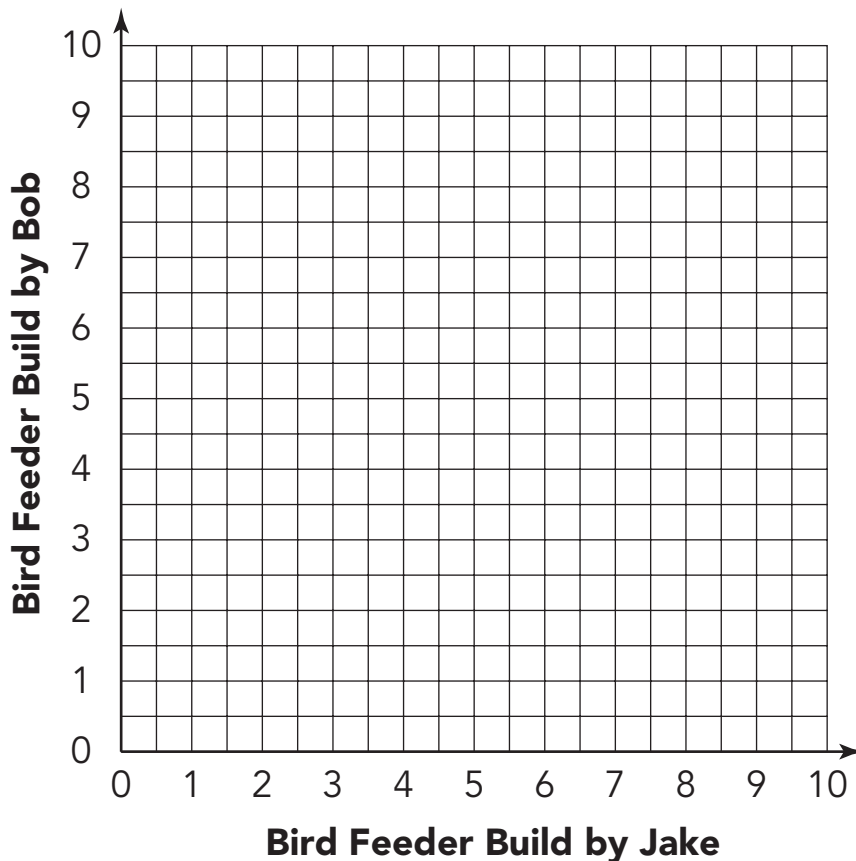
In this activity you will analyze three different problem situations and then determine which represents a proportional relationship.

Bob and his little brother Jake want to build bird feeders to sell at a local farmers market. They have enough money to buy materials to build 10 bird feeders.

1. Complete a table of values by listing possible ways in which they can divide up the work. Assume that each brother only makes whole bird feeders. Then complete the graph.

Bird Feeders Built by Bob	Bird Feeders Built by Jake

Duplicate the graph on your notebook



2. Describe how the number of bird feeders built by Bob affects the number Jake builds.

3. What is the ratio of bird feeders that Bob builds to the number that Jake builds? Explain your reasoning.

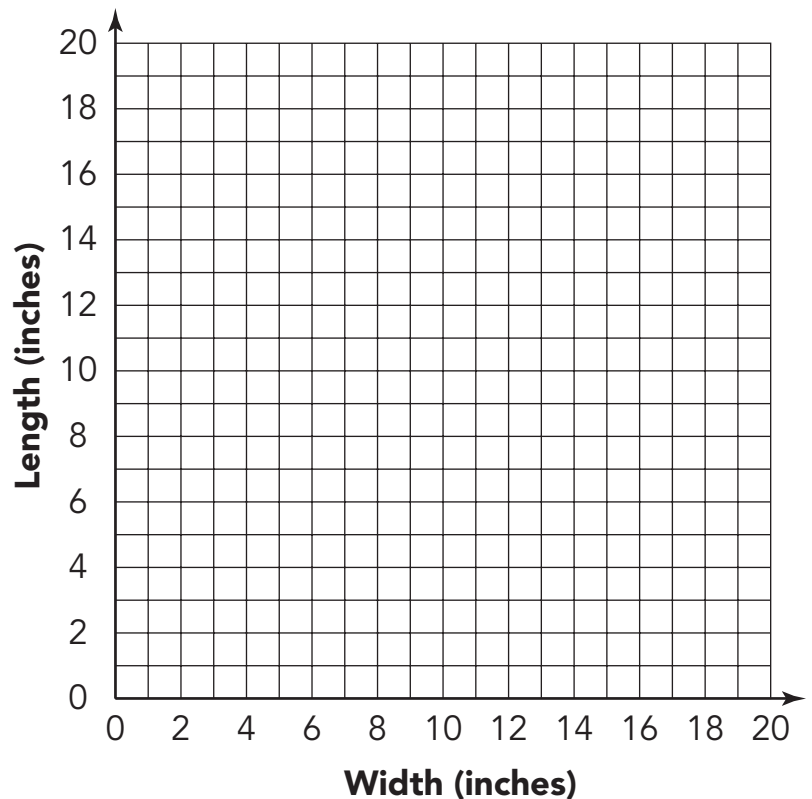
4. Dontrell claims that the number of bird feeders Bob builds is proportional to the number of bird feeders Jake builds. Do you agree with Dontrell's claim? Explain your reasoning.

Vanessa was given a math problem to determine how many different rectangles can be constructed with an area of 12 square inches.

5. Vanessa thinks that there are only two: one with a width of 2 inches and a length of 6 inches, and another with a width of 3 inches and a length of 4 inches. Is she correct? Explain your reasoning.

6. Complete a table of values for the width and length of a rectangle with an area of 12 square inches. Then complete the graph.

Width of rectangle (in.)	Length of Rectangle (in.)



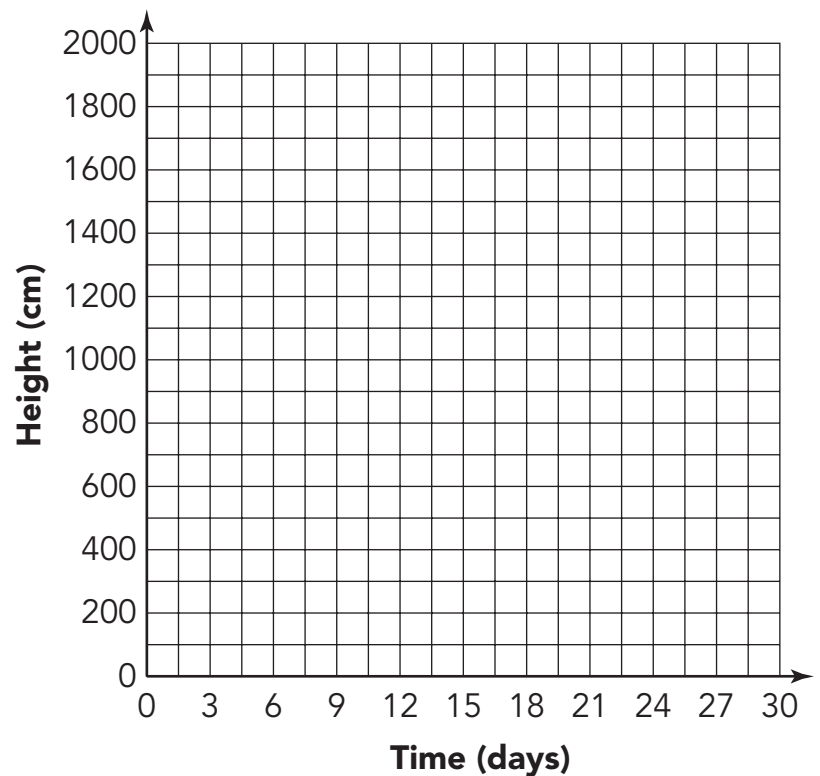
7. Describe how the width of the rectangle affects the length of the rectangle.

8. Do the width and length of a rectangle with an area of 12 square inches form a proportional relationship? Explain your reasoning.

One species of bamboo can grow at an average rate of 60 centimeters per da

9. Complete a table of values using the given growth rate of the bamboo plant. Then complete the graph.

Time (days)	Height of Bamboo (cm)



10. Describe how the time affects the height of the bamboo plant.

11. Is the number of days of growth proportional to the height of the bamboo plant? Explain your reasoning.



You saw that the height of a bamboo plant varies based on the number of days the bamboo grows. For example, for each increase in one day, the bamboo grows 60 centimeters.

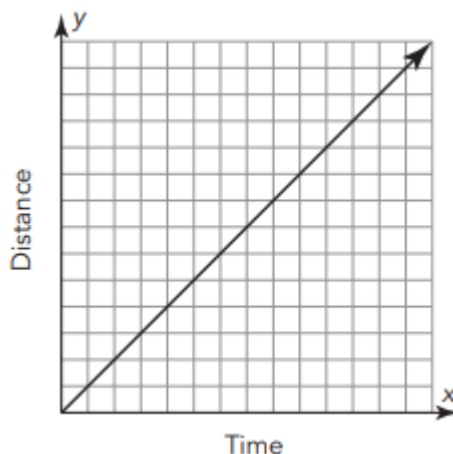
A situation represents a direct variation if the ratio between the y -value and its corresponding x -value is constant for every point. If two quantities vary directly, the points on a graph form a straight line, and the line passes through the origin.

Examine the worked example.

WORKED EXAMPLE

A car driving at a constant rate of 60 miles per hour is an example of direct variation. The distance varies directly as time.

A sketch of a graph that could represent this situation is shown.



When you sketch a graph, be sure to include the labels for each axis. However, you don't always have to show values.

1. Explain how the situation in the worked example is an example of a direct variation.

2. Explain how you can use each graph in the previous activity, Proportional or Not?, to determine which scenarios represent direct variations.

3. List another example of quantities that vary directly. Then, sketch a graph that could represent the relationship between the quantities.



**Show You
KNOW**

Determining Proportionality from Tables and Graphs

Go back and examine the graphs in this lesson. Do you see a pattern?

1. How are all the graphs that display proportional relationships the same?

2. Sketch a graph that displays a proportional relationship.



LESSON 3.1b How Does Your Garden Grow?



Objective **Proportional Relationships**

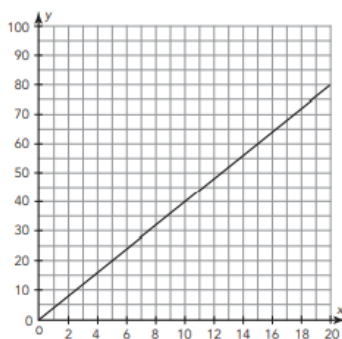
Practice

- Analyze each table shown. Determine if the relationship is proportional. If the relationship is proportional, state the constant ratio for the relationship.
 - Of the 75 boys in the 7th grade class, 25 participate in at least one sport. Of the 120 girls in the 7th grade class, 30 participate in at least one sport.
 - Of the 210 boys in the 8th grade, 190 have a cell phone. Of the 168 girls in the 8th grade, 152 have a cell phone.
- Match each graph with its scenario. Then state if the scenario represents a linear relationship. If it represents a linear relationship, state if it represents a proportional relationship.
 - Vanessa and Michelle must decide how to divide 16 marbles among themselves.
 - The perimeter of a square is 4 times the length of one side of the square.
 - The area of a square is calculated by squaring the length of one side of the square.
 - When Tara, a nurse, works on Saturdays, she is paid a \$30 bonus plus \$40 per hour worked.

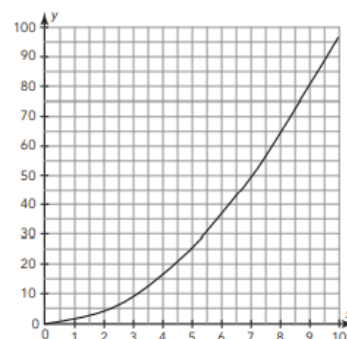
7th Grade Class	Plays Sports	Total
Boys	25	75
Girls	30	120

8th Grade Class	Cell Phones	Total
Boys	190	210
Girls	152	168

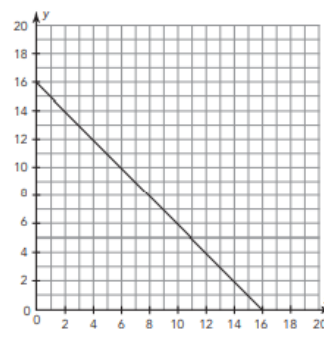
Graph A



Graph B



Graph C



Graph D

