

LESSON
3-1

Representing Proportional Relationships

Reteach

A **proportional relationship** is a relationship between two sets of quantities in which the ratio of one quantity to the other quantity is constant. If you divide any number in one group by the corresponding number in the other group, you will always get the same quotient.

Example: Martin mixes a cleaning spray that is 1 part vinegar to 5 parts water.

Proportional relationships can be shown in tables, graphs, or equations.

Table

The table below shows the number of cups of vinegar Martin needs to add to certain amounts of water to mix his cleaning spray.

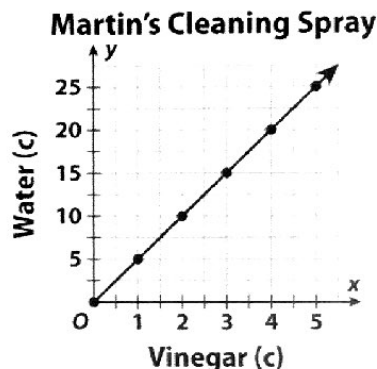
Martin's Cleaning Spray

Water (c)	5	10	15	20	25
Vinegar (c)	1	2	3	4	5

Notice that if you divide the amount of water by the amount of vinegar, the quotient is always 5.

Graph

On the graph, you can see that for every 1 unit you move to the right on the x-axis, you move up 5 units on the y-axis.



Equation

Let y represent the number of cups of water.
Let x represent the cups of vinegar.

$$y = 5x$$

Use the table below for Exercises 1–3.

Distance Driven (mi)	100	200		400		600
Gas Used (gal)	5		15			30

1. There is a proportional relationship between the distance a car drives and the amount of gas used. Complete the table.

2. Find each ratio. $\frac{\text{miles}}{\text{gallons}} \rightarrow \frac{100}{5} = \frac{200}{15} = \frac{400}{30} = \frac{600}{30}$

Each ratio is equal to _____.

3. a. Let x represent gallons of gas used. Let y represent _____.

b. The equation that describes the relationship is _____.

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Practice and Problem Solving: D

Use the table to answer Exercises 1–3.

Yards	1	2		4		6
Feet	3		9		15	

1. The table shows the relationship between lengths in feet and lengths in yards. Complete the table. The first column has been done for you.

2. Write each pair as a ratio. $\frac{\text{feet}}{\text{yards}} \rightarrow \frac{3}{1} = \frac{6}{\quad} = \frac{\quad}{3} = \frac{12}{\quad} = \frac{\quad}{\quad} = \frac{18}{6}$

Each ratio is equal to _____.

3. Let x represent the number of yards. Let y represent the number of feet. The equation that describes the relationship is _____.

Write the equation that describes the relationship.

4. There are 50 stars on each United States flag. Two flags have 100 stars. Three flags have 150 stars.

Let x be the number of flags. Let y be the number of stars.

The equation that describes the relationship is _____.

Use the table to answer problems 5–7. Tell whether each relationship is proportional. The first one is done for you.

Lemonade Recipe

Lemons	1	2	3	4	5	6
Sugar (cups)	1.5	3	4.5	6	7.5	9
Water (cups)	7	14	21	28	35	42

5. the ratio of lemons to cups of sugar yes

6. the ratio of cups of sugar to cups of water _____

7. the ratio of lemons to cups of water _____