

Assignment

Write

Define *constant of proportionality* in your own words. Provide a specific example with your definition.

Remember

If y is directly proportional to x , the relationship can be represented by the equation $y = kx$, where k is the constant of proportionality.

Practice

1. Analyze each table or problem situation to determine if the relationship is proportional. State a constant of proportionality if possible. Show your work.

a.

Girls	Boys
7	14
9	21
11	22

b. A baby blue whale weighed 5520 pounds at birth. After two days, the baby weighed 5710. After 14 days, the baby weighed 8180 pounds.

2. Maya's construction company builds brick houses. The number of bricks her crew installs varies directly with the number of hours they work.

Hours Worked	Bricks Installed
8	1680
7	1470
6	1260

- Define variables for the quantities that are changing in this problem situation.
 - Analyze the table to determine the constant of proportionality.
 - What does the constant of proportionality mean in this situation?
 - Write an equation to show the relationship between the number of hours worked, the number of bricks installed, and the constant of proportionality.
 - Use your equation to determine how many bricks Maya's crew can install in 5.5 hours.
 - Use your equation to determine how many hours it will take Maya's crew to install 840 bricks.
3. Given a value for the input variable, x , and the output variable, y , calculate the constant of proportionality.

a. $x = 21$ and $y = 6$

c. $x = 2\frac{2}{5}$ and $y = 7\frac{1}{2}$

b. $x = 60$ and $y = 18$

d. $x = 4\frac{8}{11}$ and $y = 3\frac{6}{11}$

4. The following is the recipe to make 6 cups of Perfect Lemonade:

- 1 cup sugar
- 1 cup water (for the simple syrup)
- 1 cup lemon juice
- 4 cups cold water (to dilute)

You want to analyze the relationship between the number of cups of sugar and the number of cups of lemonade.

- Define variables for the quantities that are changing in this problem situation.
 - Set up a proportion using the ratio of cups of sugar to cups of lemonade.
 - Use your proportion to write an equation for the number of cups of sugar based on the number of cups of lemonade.
 - What is the constant of proportionality in this equation? What does it mean in this context?
 - Use your equation in (c) to write an equation for the number of cups of lemonade based on the number of cups of sugar.
 - What is the constant of proportionality in this equation? What does it mean in this context?
5. Dudley and Bob monitored the distance their pet turtle could walk in a certain amount of time. Their results are shown in the table. The table of values represents a proportional relationship.

Time (minutes)	Distance (inches)
5	14.5
14	40.6
19	55.1
25	72.5

- Define variables for the quantities that are changing in this problem situation.
- Write an equation for the distance traveled by the turtle based on the number of minutes.
- What is the constant of proportionality in this equation? What does it mean in this context?
- Use your equation in (b) to write an equation for the time it would take for the turtle to travel a given distance.
- What is the constant of proportionality in this equation? What does it mean in this context?

Stretch

If a varies inversely as b , then the product of a and b is constant. Use direct and inverse variation to solve this problem.

If x varies inversely as y and varies directly with z , and if y and z are both 3 when $x = 5$, what is the value of $z - y$ when $x = 8$?

Review

1. Sketch a graph that represents a linear, non-proportional relationship. Label your quantities.
2. Sketch a graph that represents a direct variation relationship. Label your quantities.
3. Jonah will be staying a month in one of the cities listed in the table. He wants to determine the average cost of public transportation for each city. He finds the following information.

City	Cost for Unlimited Public Transportation
New York City	\$51.50 for 14 days
Miami	\$100 for 1 month
Los Angeles	\$17 for 1 week
Chicago	\$14 for 3 days

- a. Calculate the unit rate, or per day cost, for unlimited transportation in each city.
(Let 1 week = 7 days and 1 month = 30 days.)
 - b. If Jonah stays in the city for a month, how much would he spend on transportation in each city?
4. Plot each ordered pair on a coordinate plane.
 - a. $A(1, 4.75)$
 - b. $B\left(\frac{7}{2}, 1\right)$
 - c. $C(-2, 8)$
 - d. $D\left(-4, -\frac{1}{2}\right)$
 - e. $E(0, 0)$
 - f. $F\left(5, -\frac{5}{2}\right)$