

Name: _____

Date: _____



SOLVING PROPORTIONS N-GEN MATH[®] 7



We learned in the previous lesson that two variables that are **proportional** will have ratios that are **constant** in a given problem (or real world situation). These constants are known as the **proportionality constants**. In this problem we will work with solving proportions. Use your calculator to help solve these equations.

Exercise #1: The **distance** a bicycle moves is **proportional to how many rotations** its wheels make. A certain bike travels 135 feet in 20 rotations of its wheels.

- (a) How far will the bike travel in 45 rotations? Let d be equal to that distance. Set up and solve a proportion for the value of d .
- (b) If the bike travels a total of 459 feet, how many rotations did it make? Let r be equal to the number of rotations. Set up and solve a proportion to find the value of r .

When two variables are **proportional to one another** we need to know only a single pair of values of the two variables to be able to solve a variety of problems.

Exercise #2: Erin is building a model tower using plastic bricks. The height of the tower is proportional to how many layers of bricks he uses. He knows after 15 layers of bricks that his tower is 24 centimeters tall. Erin wants the model to be 120 centimeters tall.

Let n be equal to the number of layers of bricks Erin needs to use to reach 120 centimeters tall. Set up a proportion and use it to solve for n . Show your work.



A situation that arises naturally is when an object moves at a constant **speed**. In these cases, **the distance the object moves is proportional to the time** it has been moving.

Exercise #3: A car is moving at a steady speed on a highway such that the distance it travels is proportional to the time it has traveled. The car travels a distance of 170 miles in 2.5 hours.

(a) What is the ratio of the distance to time traveled expressed as a fraction and then as a unit rate? What does this value represent?

(b) If the car travels at this rate for a total of 4 hours, what distance, d , has it traveled? Set up a proportion to find d .

(c) If the car traveled 425 miles, set up and solve a proportion that could be used to find the time, t , it had been driving.

The variables of **volume** and **weight** are often related proportionally in real-life situations.

Exercise #4: The weight of water in a tank is proportional to the volume of water in the tank. The weight of 20 gallons of water is 166 pounds.

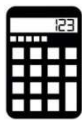
(a) Let w be the weight of water. If a tank holds 55 gallons of water, how much would the water weigh? Set up and solve a proportion.

(b) Let g be the number of gallons of water in a tank. If a tank holds 1,028 pounds of water, how many gallons would there be? Set up and solve a proportion. Round to the nearest gallon.



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SOLVING PROPORTIONS

N-GEN MATH[®] 7 HOMEWORK

FLUENCY

1. Solve each of the following proportions for the variables given without the use of a calculator.

(a) $\frac{c}{8} = 6$

(b) $\frac{x}{14} = \frac{3}{7}$

(c) $\frac{36}{m} = \frac{12}{5}$

2. Solve each of the following proportions using a calculator to aid in calculations.

(a) $\frac{a}{39} = \frac{14}{6}$

(b) $\frac{377}{x} = \frac{13}{5}$

(c) $\frac{10}{3} = \frac{115}{c}$

USING YOUR MATH (USE A CALCULATOR TO HELP)

3. Rachel is getting a sundae where the cost is proportional to the weight of the sundae she makes. Last time Rachel went she bought a 12-ounce sundae for \$4.20. This time she buys a 17-ounce sundae. Let c be the cost of the sundae. Set up and solve a proportion for c .



4. The number of tiles needed for a bathroom floor is proportional to the area of the bathroom floor. Five tiles cover an area of 90 square inches. The bathroom floor has a total area of 3,024 square inches. Let n be equal to the total number of tiles needed for the floor. Set up and solve a proportion to find the value of n .
5. Colton is taking a long bike ride where he rides at a constant speed. The distance he bikes is proportional to the amount of time he has been biking. After 3.5 hours, he has traveled a distance of 49 miles.
- (a) Find the ratio of the distance Colton has traveled to the amount of time he has been traveling. Express this as a unit rate and use appropriate units. What does this rate represent?
- (b) Colton travels at the same rate as in (a) for 6 hours. Let d be the distance he biked. Set up and solve a proportion for d .
- (c) Colton would like to bike 200 miles. Let h be the number of hours it will take Colton to bike this distance. Solve a proportion for h . Round to the nearest tenth of an hour.

