

Equation Connection

Turn constant rates into proportional equations.

GRADE 7 • 7.RP.A.2c

CCSS.Math.Content.7.RP.A.2c "Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p ..."

NAME _____

DATE _____

WRITE THE RULE

When two quantities are proportional, one quantity equals a constant rate times the other quantity. Write the relationship as $y = kx$, where k is the amount for one unit of x . Check that y/x stays the same for every pair of values.

WORKED EXAMPLE

A game club charges \$4 for each ticket. Let x be the number of tickets and y be the total cost. Write an equation, then find the cost of 3 tickets.

1. The constant rate is 4 dollars per ticket, so $k = 4$.
2. Write the equation: $y = 4x$.
3. Substitute $x = 3$: $y = 4(3) = 12$.

Answer: $y = 4x$; 3 tickets cost \$12.

PRACTICE 6 problems

- 1** The table shows a proportional relationship. Write an equation for y in terms of x . x : 2, 5; y : 14, 35.

ANSWER _____

- 2** A movie rental service charges \$6 per movie. Let m be the number of movies and c be the total cost. Write an equation.

ANSWER _____

- 3** In a proportional relationship, $y = 45$ when $x = 9$. Write an equation for y in terms of x .

ANSWER _____

- 4** A plant grows 2 centimeters each day. Let d be the number of days and h be the growth in centimeters. Write an equation.

ANSWER _____

- 5** A proportional relationship has $x = 7$ and $y = 77$. Write an equation for y in terms of x .

ANSWER _____

- 6** The table shows a proportional relationship. Write an equation, then find y when $x = 15$. x : 6, 10; y : 48, 80.

ANSWER _____

APPLY IT Show your work

- 1** At an esports tournament, a team earns 18 points for each match it wins. Let p be the total points and w be the number of wins. Write an equation, then find the points for 7 wins.

WORK SPACE

ANSWER _____

- 2** A video creator donates \$25 to an animal shelter for each hoodie sold. Let d be the total donation and h be the number of hoodies sold. Write an equation, then find the donation for 9 hoodies.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two tables are shown below. Which relationship is proportional? Write its equation and explain how you know. Relationship A: x : 2, 5, 8; y : 14, 35, 56 Relationship B: x : 2, 5, 8; y : 16, 31, 46

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	The table shows a proportional relationship. Write an equation for y in terms of x. x: 2, 5; y: 14, 35.	$y = 7x$
2	A movie rental service charges \$6 per movie. Let m be the number of movies and c be the total cost. Write an equation.	$c = 6m$
3	In a proportional relationship, $y = 45$ when $x = 9$. Write an equation for y in terms of x.	$y = 5x$
4	A plant grows 2 centimeters each day. Let d be the number of days and h be the growth in centimeters. Write an equation.	$h = 2d$
5	A proportional relationship has $x = 7$ and $y = 77$. Write an equation for y in terms of x.	$y = 11x$
6	The table shows a proportional relationship. Write an equation, then find y when $x = 15$. x: 6, 10; y: 48, 80.	$y = 8x$; when $x = 15$, $y = 120$

PART 2 • APPLY IT

- $p = 18w$; 7 wins earns 126 points.** The team earns a constant 18 points per win, so $p = 18w$. Substitute $w = 7$ to get $p = 18(7) = 126$.
- $d = 25h$; 9 hoodies earns a \$225 donation.** The donation rate is \$25 per hoodie, so $d = 25h$. Substitute $h = 9$ to get $d = 25(9) = 225$.

CHALLENGE

Relationship A is proportional. Its equation is $y = 7x$ because y/x is 7 for every pair. Relationship B is not proportional because y/x is not constant.

Accept equivalent equation forms, such as $7x = y$, when the variables are correctly defined. For the word problems, accept the equation and requested total in either order.