

Rate Rule Rally

Use unit rates to spot, write, and solve proportional relationships.

GRADE 7 • 7.PAR.4.4

7.PAR.4.4 "Identify, represent, and use proportional relationships."

NAME _____

DATE _____

THE BIG IDEA

A relationship is proportional when every pair with x not equal to 0 has the same ratio y/x , and the graph includes $(0, 0)$. You can represent a proportional relationship with $y = kx$, where k is the constant of proportionality. Find k by dividing y by x for any pair with x not equal to 0.

WORKED EXAMPLE

A band earns \$5 for each song it plays. Let x be the number of songs and y be the dollars earned. Write an equation and find y when $x = 8$.

1. The unit rate is \$5 per song, so $y = 5x$.
2. Substitute $x = 8$: $y = 5(8)$.
3. Multiply: $y = 40$.

Answer: $y = 5x$; \$40

PRACTICE 6 problems

- 1** Does this table show a proportional relationship? If it does, write an equation. x : 1, 2, 6 y : 7, 14, 42

ANSWER _____

- 2** A proportional relationship has $x = 9$ and $y = 54$. Find k and write the equation.

ANSWER _____

- 3** For the proportional relationship $y = 2x$, find y when $x = 11$.

ANSWER _____

- 4** A proportional relationship passes through $(7, 63)$. Write its equation.

ANSWER _____

- 5** Does this table show a proportional relationship? If it does, write an equation. x : 0, 6, 10 y : 0, 18, 30

ANSWER _____

- 6** Which equation represents a proportional relationship? A. $y = 4x + 1$ B. $y = 11x$ C. $y = x + 9$

ANSWER _____

APPLY IT Show your work

- 1** The school esports club buys 7 matching controller grips for \$42. Each grip costs the same amount. What is the cost of 11 grips? Write an equation using x for grips and y for cost.

WORK SPACE

ANSWER _____

- 2** A student earns \$9 for each hour spent walking dogs. How much will the student earn for 14 hours? Write an equation using x for hours and y for earnings.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A bike rental costs \$14 for 7 hours. The cost is proportional to the number of hours. Write an equation using x for hours and y for cost. Then find how many hours cost \$38.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Does this table show a proportional relationship? If it does, write an equation. x: 1, 2, 6 y: 7, 14, 42	Yes; $y = 7x$
2	A proportional relationship has $x = 9$ and $y = 54$. Find k and write the equation.	$k = 6$; $y = 6x$
3	For the proportional relationship $y = 2x$, find y when $x = 11$.	$y = 22$
4	A proportional relationship passes through (7, 63). Write its equation.	$y = 9x$
5	Does this table show a proportional relationship? If it does, write an equation. x: 0, 6, 10 y: 0, 18, 30	Yes; $y = 3x$
6	Which equation represents a proportional relationship? A. $y = 4x + 1$ B. $y = 11x$ C. $y = x + 9$	B. $y = 11x$

PART 2 • APPLY IT

- $y = 6x$; \$66** Divide \$42 by 7 to find a unit rate of \$6 per grip. Multiply 11 by \$6.
- $y = 9x$; \$126** The constant of proportionality is 9 dollars per hour. Substitute $x = 14$ into $y = 9x$.

CHALLENGE

 $y = 2x$; 19 hours

Accept equivalent equation forms that clearly show the same constant of proportionality, such as $6x = y$. For proportional-relationship questions, students should identify both a constant rate and an origin value of (0, 0).