

Ratio Pattern Detectives

Spot constant ratios and write proportional equations.

GRADE 7 • 7.RP.A.2

CCSS.Math.Content.7.RP.A.2 "Recognize and represent proportional relationships between quantities."

NAME _____

DATE _____

THE BIG IDEA

Two quantities are proportional when their ratio stays the same. Find the constant of proportionality, k , by dividing y by x , then write the relationship as $y=kx$. Check more than one pair of values to make sure the ratio is constant.

WORKED EXAMPLE

11 bracelets cost \$44. Write an equation for cost c in terms of bracelets b .

1. Find the unit rate: $44 / 11 = 4$ dollars per bracelet.
2. Multiply the number of bracelets by 4: $c=4b$.
3. Check: when $b=11$, $c=4 \times 11=44$.

Answer: $c=4b$

PRACTICE 6 problems

- 1** Is this table proportional? If it is, write an equation for y in terms of x . x : 2, 5, 8; y : 6, 15, 24.

ANSWER _____

- 2** Is this table proportional? Explain using the ratios. x : 2, 5, 8; y : 10, 25, 41.

ANSWER _____

- 3** For the proportional relationship $y=6x$, find y when $x=13$.

ANSWER _____

- 4** A graphic design club prints 18 posters for \$54 at a constant cost per poster. Write an equation for cost c in terms of the number of posters p .

ANSWER _____

- 5** A runner travels 30 miles in 5 hours at a constant speed. Write an equation for distance d in terms of time h .

ANSWER _____

- 6** Complete the proportion: $9/27=x/42$.

ANSWER _____

APPLY IT Show your work

- 1** A game gives 35 coins for 5 completed quests. If the game gives coins at the same rate, how many coins will you earn for 12 completed quests?

WORK SPACE

ANSWER _____

- 2** A skate park charges \$18 for 3 hours. The hourly rate stays the same. Write an equation for cost c in terms of hours h , then find the cost for 8 hours.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A table shows x : 6, 10, 14 and y : 15, 25, 35. Is the relationship proportional? If it is, write an equation for y in terms of x and explain how the table proves it.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Is this table proportional? If it is, write an equation for y in terms of x. x: 2, 5, 8; y: 6, 15, 24.	Yes; $y=3x$.
2	Is this table proportional? Explain using the ratios. x: 2, 5, 8; y: 10, 25, 41.	No; $10/2=5$, but $41/8$ is not 5.
3	For the proportional relationship $y=6x$, find y when $x=13$.	78
4	A graphic design club prints 18 posters for \$54 at a constant cost per poster. Write an equation for cost c in terms of the number of posters p.	$c=3p$
5	A runner travels 30 miles in 5 hours at a constant speed. Write an equation for distance d in terms of time h.	$d=6h$
6	Complete the proportion: $9/27=x/42$.	$x=14$

PART 2 • APPLY IT

- 84 coins** Find the unit rate: $35/5=7$ coins per quest. Then multiply 7×12 to get 84 coins.
- $c=6h$; \$48** The hourly cost is $18/3=6$, so $c=6h$. Substitute $h=8$ to get $c=48$.

CHALLENGE

Yes. $y=(5/2)x$ because $15/6=25/10=35/14=5/2$.

Accept equivalent equations that use the same variable meanings, such as $3p=c$ for $c=3p$. For the challenge, accept an explanation that identifies the constant ratio as $5/2$.