

Rate Rule Detectives

Use constants of proportionality to connect tables, equations, and situations.

GRADE 7 • TEKS 7.1.F

7.1.F "analyze mathematical relationships to connect and communicate mathematical ideas; and"

NAME _____

DATE _____

FIND THE CONSTANT

A proportional relationship has one constant multiplier, k , that connects x and y : $y = kx$. Find k by dividing y by x , then check that the quotient stays the same for every pair.

WORKED EXAMPLE

A proportional table pairs $x = 8$ with $y = 56$. Find k and write the equation.

1. Divide y by x : $56 / 8 = 7$.
2. The constant of proportionality is $k = 7$.
3. Use $y = kx$: $y = 7x$.

Answer: $k = 7$; $y = 7x$

PRACTICE 6 problems

- 1 For the pair $(2, 6)$ in a proportional relationship, find $k = y/x$.

ANSWER _____

- 2 In $y = 9x$, find y when $x = 4$.

ANSWER _____

- 3 A proportional relationship has $k = 5/2$. Write its equation.

ANSWER _____

- 4 The pairs $(12, 18)$ and $(20, 30)$ are in a table. Is the relationship proportional? Give k .

ANSWER _____

- 5 In a proportional relationship, $y = 30$ when $x = 15$. Find y when $x = 23$.

ANSWER _____

- 6 Which pair lies on $y = 6x$: $(3, 18)$ or $(4, 20)$?

ANSWER _____

APPLY IT Show your work

- 1** Nine arcade game tokens cost \$45. If the token price stays the same, what is the cost of 13 tokens? Write an equation and solve.

WORK SPACE

ANSWER _____

- 2** A club posts short videos online. Five videos receive 30 likes when each video gets the same number of likes. At this rate, how many likes would 9 videos receive?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A proportional table has x-values 6, 14, and 22. Its y-values are 9, 21, and _____. Find the missing value. Then explain how you know one equation fits all three rows.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	For the pair (2, 6) in a proportional relationship, find $k = y/x$.	3
2	In $y = 9x$, find y when $x = 4$.	36
3	A proportional relationship has $k = 5/2$. Write its equation.	$y = (5/2)x$
4	The pairs (12, 18) and (20, 30) are in a table. Is the relationship proportional? Give k .	Yes; $k = 3/2$.
5	In a proportional relationship, $y = 30$ when $x = 15$. Find y when $x = 23$.	46
6	Which pair lies on $y = 6x$: (3, 18) or (4, 20)?	(3, 18)

PART 2 • APPLY IT

1. **\$65** Find the unit price: $45 / 9 = 5$ dollars per token. Use $y = 5x$, then substitute $x = 13$ to get $y = 65$.
2. **54 likes** The rate is $30 / 5 = 6$ likes per video. Multiply 6 by 9 to get 54 likes.

CHALLENGE

33; $y = (3/2)x$, because $9/6 = 21/14 = 33/22 = 3/2$.

Accept equivalent equation forms, such as $y = 2.5x$ for $y = (5/2)x$. For the challenge, accept any clear explanation that the ratio y/x is $3/2$ in every row.