

Rate Detectives

Use tables, graphs, and stories to uncover constant rates.

GRADE 6 • 6.PFA.2

6.PFA.2 "The student will identify and represent proportional relationships between two quantities, including those in context (unit rates are limited to positive values)..."

NAME _____

DATE _____

SPOT THE CONSTANT RATE

A proportional relationship has a constant unit rate: for every pair with x not equal to 0, y/x is the same. It also includes (0, 0), and its graph is a straight line through the origin. To find a missing value, multiply the known x -value by the unit rate.

WORKED EXAMPLE

A proportional table shows that when $x = 2$, $y = 22$. Find y when $x = 5$.

1. Find the unit rate: $22 / 2 = 11$.
2. Multiply the new x -value by the unit rate: $5 * 11 = 55$.

Answer: $y = 55$

PRACTICE 6 problems

- 1** Find the unit rate, y per x . x : 4, 8, 12 y : 12, 24, 36

ANSWER _____

- 2** Find the missing value in this proportional table. x : 3, 6, 9 y : 18, 36, ____

ANSWER _____

- 3** Does this table show a proportional relationship? Explain using the ratios. x : 4, 8, 12 y : 14, 28, 43

ANSWER _____

- 4** A game store sells 6 card packs for \$48. The packs all cost the same amount. How much do 9 packs cost?

ANSWER _____

- 5** A graph passes through the points (0, 0), (3, 18), and (6, 36). Is the relationship proportional? If so, find the unit rate.

ANSWER _____

- 6** A graph passes through the points (0, 4), (3, 10), and (6, 16). Is the relationship proportional? Explain.

ANSWER _____

APPLY IT Show your work

- 1** A music app uses 9 MB of data for each song you download. Find the unit rate. Then create a table showing the data used for 0, 4, and 7 songs.

WORK SPACE

ANSWER _____

- 2** The environmental club sells reusable water bottles for \$12 each. A table shows 1 bottle costs \$12, 3 bottles cost \$36, and 4 bottles cost \$48. Is the total cost proportional to the number of bottles? Find the cost of 8 bottles.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

The art club pays \$4 per button it orders. Representation A is a table with (0, 0), (3, 12), and (6, 24). Representation B is a graph with points (0, 0), (7, 28), and (9, 36). Representation C says, "The club pays a \$4 starting fee and \$4 per button." Which representations match the situation? Write one sentence explaining your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the unit rate, y per x. x: 4, 8, 12 y: 12, 24, 36	3
2	Find the missing value in this proportional table. x: 3, 6, 9 y: 18, 36, __	54
3	Does this table show a proportional relationship? Explain using the ratios. x: 4, 8, 12 y: 14, 28, 43	No; $14/4 = 28/8 = 3.5$, but $43/12$ is not 3.5.
4	A game store sells 6 card packs for \$48. The packs all cost the same amount. How much do 9 packs cost?	\$72
5	A graph passes through the points (0, 0), (3, 18), and (6, 36). Is the relationship proportional? If so, find the unit rate.	Yes; 6
6	A graph passes through the points (0, 4), (3, 10), and (6, 16). Is the relationship proportional? Explain.	No; the graph does not pass through (0, 0).

PART 2 • APPLY IT

- Unit rate: 9 MB per song. Table: 0 songs, 0 MB; 4 songs, 36 MB; 7 songs, 63 MB.** Multiply each number of songs by 9 MB per song.
- Yes; the unit rate is \$12 per bottle, and 8 bottles cost \$96.** Each cost is 12 times the number of bottles, so the relationship is proportional. Multiply 8 by 12.

CHALLENGE

A and B match because both have a unit rate of \$4 per button and include (0, 0), while C has a starting fee.

Accept equivalent unit-rate language, such as "\$12 for each bottle" or "12 dollars per bottle." For proportionality explanations, accept a correct constant-ratio argument or a correct statement about a graph passing through the origin.