

Slope Showdown

Use graphs, tables, and equations to compare unit rates.

GRADE 7 • 7.PAR.4.8

7.PAR.4.8 "Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways."

NAME _____

DATE _____

RATE BECOMES SLOPE

A proportional relationship has the form $y = kx$, and its graph is a line through $(0,0)$. The unit rate k tells how much y increases when x increases by 1, so k is also the slope. Compare proportional relationships by comparing their unit rates or slopes.

WORKED EXAMPLE

A proportional line passes through $(0,0)$, $(2,14)$, and $(5,35)$. Write its equation and name its slope.

1. Find the unit rate: $14/2 = 7$.
2. Write the equation: $y = 7x$.
3. The line rises 7 for every 1 unit to the right, so its slope is 7.

Answer: $y = 7x$; slope and unit rate = 7

PRACTICE 6 problems

- 1** A proportional graph goes through $(0,0)$ and $(3,12)$. What is the unit rate? Write the equation.

ANSWER _____

- 2** For $y = 8x$, list three points that are on the graph.

ANSWER _____

- 3** A table has x -values 1, 4, and 6 and matching y -values 9, 36, and 54. Write the equation. Then find y when $x = 10$.

ANSWER _____

- 4** Relationship A is $y = 6x$. Relationship B has table values $x = 4$ and 8, with matching y -values 36 and 72. Which relationship has the greater unit rate, and by how much?

ANSWER _____

- 5** A proportional graph includes $(0,0)$ and $(8,48)$. Write the equation and find y when $x = 15$.

ANSWER _____

- 6** A proportional relationship has a slope of 11. Which point is not on its graph? A. $(1,11)$ B. $(3,33)$ C. $(4,45)$

ANSWER _____

APPLY IT Show your work

1

Two school clubs sell snack tickets. Club A uses the equation $y = 4x$, where x is the number of tickets and y is the cost in dollars. Club B has a table showing that 3 tickets cost \$18 and 6 tickets cost \$36. Give one nonzero point to graph for each club. Then decide which club costs more for 9 tickets and find the difference.

WORK SPACE

ANSWER _____

2

A video-editing app offers two export plans. Plan A is shown by a proportional graph that passes through $(0,0)$ and $(8,48)$. Plan B is represented by $y = 3x$, where x is the number of projects exported and y is the cost in dollars. Which plan has the steeper graph? Find each cost for 12 projects and the difference.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Three proportional relationships are shown in different ways. Relationship A is $y = 9x$. Relationship B has x -values 3, 6, and 9 with matching y -values 24, 48, and 72. Relationship C has a graph through $(0,0)$ and $(4,40)$. Rank the relationships from least to greatest unit rate. Then find y for each relationship when $x = 11$ and explain which graph is steepest.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A proportional graph goes through (0,0) and (3,12). What is the unit rate? Write the equation.	Unit rate = 4; $y = 4x$
2	For $y = 8x$, list three points that are on the graph.	Sample answer: (0,0), (1,8), (3,24)
3	A table has x-values 1, 4, and 6 and matching y-values 9, 36, and 54. Write the equation. Then find y when $x = 10$.	$y = 9x$; $y = 90$ when $x = 10$
4	Relationship A is $y = 6x$. Relationship B has table values $x = 4$ and 8, with matching y-values 36 and 72. Which relationship has the greater unit rate, and by how much?	Relationship B has the greater unit rate. Its unit rate is 9, which is 3 greater than 6.
5	A proportional graph includes (0,0) and (8,48). Write the equation and find y when $x = 15$.	$y = 6x$; $y = 90$ when $x = 15$
6	A proportional relationship has a slope of 11. Which point is not on its graph? A. (1,11) B. (3,33) C. (4,45)	C. (4,45)

PART 2 • APPLY IT

- Sample graph points: Club A, (3,12); Club B, (3,18). For 9 tickets, Club A costs \$36 and Club B costs \$54. Club B costs \$18 more.** Club A has a unit rate of 4 dollars per ticket. Club B has a unit rate of $18/3 = 6$ dollars per ticket, so multiply each rate by 9.
- Plan A is steeper. For 12 projects, Plan A costs \$72 and Plan B costs \$36. The difference is \$36.** Plan A has slope $48/8 = 6$, while Plan B has slope 3. Multiply each unit rate by 12 to compare the costs.

CHALLENGE

Least to greatest unit rate: B, A, C. When $x = 11$, Relationship B has $y = 88$, Relationship A has $y = 99$, and Relationship C has $y = 110$. Relationship C is steepest because its unit rate and slope, 10, are greatest.

Accept equivalent equations such as $4x = y$. For items asking for graph points, accept any correct points that satisfy the equation, including different valid nonzero points.