

Slope Speed Showdown

Use unit rates to compare proportional relationships.

GRADE 8 • 8.EE.B.5

CCSS.Math.Content.8.EE.B.5 "Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example..."

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 , is the slope, so it tells how much y changes for each 1 unit of x .

WORKED EXAMPLE

A relationship is represented by $y = 13/7x$. Find the unit rate and two points on its graph.

1. The coefficient of x is $13/7$, so the unit rate is $13/7$.
2. Use $x = 7$: $y = (13/7)(7) = 13$.
3. Because the graph passes through the origin, use the points $(0,0)$ and $(7,13)$.

Answer: Unit rate: $13/7$. Points: $(0,0)$ and $(7,13)$.

PRACTICE 6 problems

- 1** The equation $y = 6x$ shows the number of pages, y , read in x minutes. What is the unit rate? List two points you could plot on the graph.

ANSWER _____

- 2** This table represents a proportional relationship. x : 0, 2, 6 y : 0, 5, 15 Write the unit rate and an equation for the relationship.

ANSWER _____

- 3** A graph is a line through $(0,0)$ and $(8,20)$. Find its slope and write its equation.

ANSWER _____

- 4** Relationship A is $y = 2x$. Relationship B is a line through $(0,0)$ and $(4,10)$. Which relationship has the greater unit rate?

ANSWER _____

- 5** Which relationship is proportional? Relationship C: x values 0, 2, 4 and y values 0, 8, 17 Relationship D: $y = 4x$ Explain your choice using unit rate.

ANSWER _____

- 6** A proportional graph passes through $(0,0)$ and $(5,15)$. Write an equation for the graph. Then find y when $x = 10$.

ANSWER _____

APPLY IT Show your work

- 1** Priya's photo backup uploads according to $y = \frac{3}{4}x$, where x is minutes and y is gigabytes. Theo's backup graph passes through $(0,0)$ and $(8,10)$. Whose backup uploads faster? By how many gigabytes per minute?

WORK SPACE

ANSWER _____

- 2** At robotics club, Rover A travels 10 meters in 4 minutes and 20 meters in 8 minutes. Rover B travels according to $y = 3x$, where x is minutes and y is meters. Which rover travels farther in 12 minutes, and how much farther does it travel?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A graph for Service A passes through $(0,0)$ and $(12,18)$. Service B is represented by $y = \frac{11}{8}x$. Which service has the greater unit rate? Explain how you know and state the difference between the rates.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	The equation $y = 6x$ shows the number of pages, y , read in x minutes. What is the unit rate? List two points you could plot on the graph.	Unit rate: 6 pages per minute. Sample points: (0,0) and (2,12).
2	This table represents a proportional relationship. x : 0, 2, 6 y : 0, 5, 15 Write the unit rate and an equation for the relationship.	Unit rate: $5/2$. Equation: $y = 5/2x$.
3	A graph is a line through (0,0) and (8,20). Find its slope and write its equation.	Slope: $5/2$. Equation: $y = 5/2x$.
4	Relationship A is $y = 2x$. Relationship B is a line through (0,0) and (4,10). Which relationship has the greater unit rate?	Relationship B. Its unit rate is $5/2$, which is greater than 2.
5	Which relationship is proportional? Relationship C: x values 0, 2, 4 and y values 0, 8, 17 Relationship D: $y = 4x$ Explain your choice using unit rate.	Relationship D is proportional because its unit rate is always 4. Relationship C does not have a constant unit rate.
6	A proportional graph passes through (0,0) and (5,15). Write an equation for the graph. Then find y when $x = 10$.	Equation: $y = 3x$. When $x = 10$, $y = 30$.

PART 2 • APPLY IT

- Theo's backup uploads faster by $1/2$ gigabyte per minute.** Priya's unit rate is $3/4$ gigabyte per minute. Theo's unit rate is $10/8 = 5/4$ gigabytes per minute, and $5/4 - 3/4 = 1/2$.
- Rover B travels farther, by 6 meters.** Rover A's unit rate is $10/4 = 5/2$ meters per minute, so it travels 30 meters in 12 minutes. Rover B travels $3(12) = 36$ meters, so it goes 6 meters farther.

CHALLENGE

Service A has the greater unit rate. Its slope is $18/12 = 3/2 = 12/8$, while Service B's slope is $11/8$. The difference is $1/8$ unit of y per unit of x .

Accept any correct points on the requested proportional graph, including the origin. Accept equivalent fractions and equivalent equation forms, such as $y = (5/2)x$.