

Rate Race Graphs

Use slope 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 _____

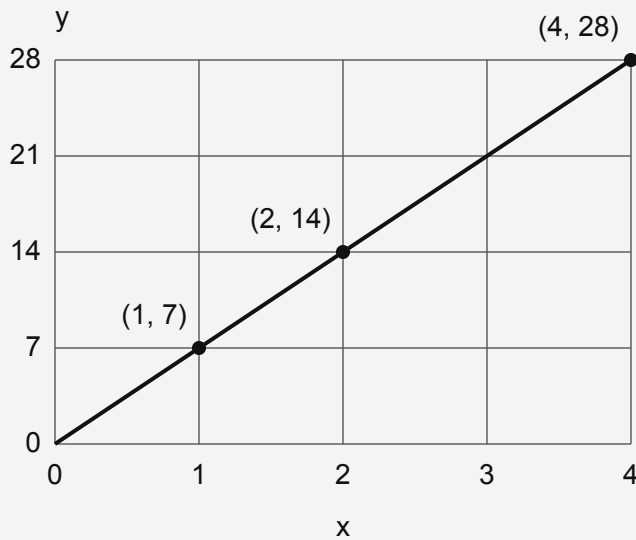
DATE _____

SLOPE IS THE UNIT RATE

A proportional relationship graphs as a straight line through (0,0). In $y = kx$, k is the unit rate and slope, found by rise/run.

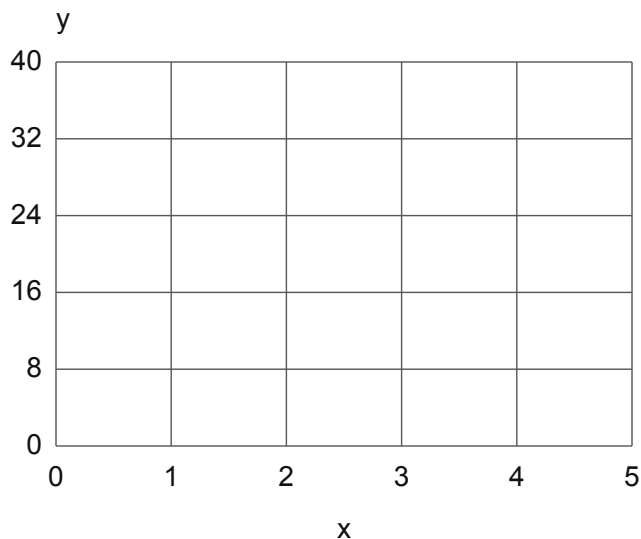
WORKED EXAMPLE

The labeled points show a proportional relationship. Find the unit rate and write an equation.



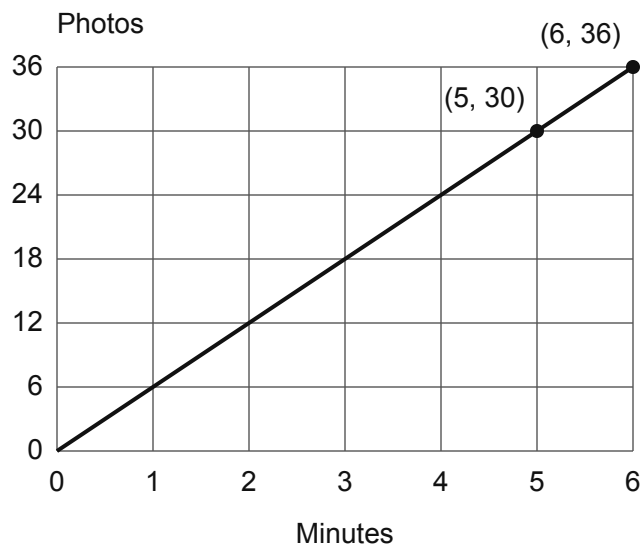
1. Use point (1, 7).
2. Find y/x : $7/1 = 7$.
3. The unit rate is 7.
4. Write $y = 7x$.

Answer: Unit rate: 7. Equation: $y = 7x$.

PRACTICE 4 problems**1** For $y = 6x$, what is the unit rate?**ANSWER** _____**2** A proportional relationship passes through $(0, 0)$ and $(5, 40)$. Write its equation. Plot the two points on the grid and draw the proportional relationship.**ANSWER** _____**3** For $y = 9x$, find y when $x = 6$.**ANSWER** _____**4** Relationship A is $y = 5x$. Relationship B passes through $(0, 0)$ and $(6, 36)$. Which has the greater unit rate? Give both unit rates.**ANSWER** _____

APPLY IT Show your work

- 1** The graph shows Kai's proportional photo-upload relationship. Jules uploads photos according to $p = 5m$, where p is photos and m is minutes. Who uploads faster? Give both unit rates.



ANSWER _____

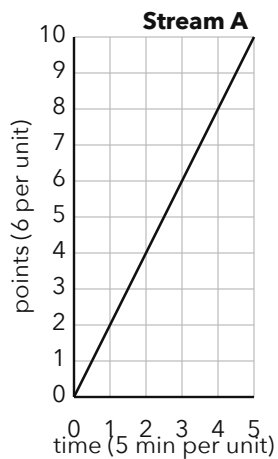
- 2** Lena earns money making bracelets for a school market: $e = 8h$. Omar earns \$54 in 9 hours at a constant rate. Who earns more per hour? How much does each earn in 6 hours?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The grid shows Stream A's proportional relationship. One horizontal grid unit is 5 minutes. One vertical grid unit is 6 points. Stream B follows $p = 5/2t$, where p is points and t is minutes. Which stream gains points faster? Explain using unit rates.



PRACTICE 1

For $y = 6x$, what is the unit rate?

6

PRACTICE 3

For $y = 9x$, find y when $x = 6$.

54

PRACTICE 4

Relationship A is $y = 5x$. Relationship B passes through $(0, 0)$ and $(6, 36)$. Which has the greater unit rate? Give both unit rates.

Relationship B. A has unit rate 5, and B has unit rate 6.

APPLY IT 1

Kai uploads faster. Kai: 6 photos per minute. Jules: 5 photos per minute. Use Kai's labeled point: $30/5 = 6$ photos per minute. Jules's equation has unit rate 5.

APPLY IT 2

Lena earns more per hour. Lena earns \$48 in 6 hours, and Omar earns \$36 in 6 hours. Lena's unit rate is \$8 per hour. Omar's unit rate is $54/9 = \$6$ per hour, then multiply each rate by 6.

CHALLENGE

Stream B gains points faster. Stream A gains $12/5$ points per minute because its slope is 2 grid units, or 12 points, for 5 minutes. Stream B gains $5/2$ points per minute. Since $5/2 = 25/10$ and $12/5 = 24/10$, Stream B is faster.

Accept equivalent unit-rate forms, including 2.4 for $12/5$ and 2.5 for $5/2$ in the challenge. Equations equivalent to $y = 8x$ are acceptable. For Practice 2, require both points and a straight line through the origin. Read actual labeled axis values: the sample slope is $40/5 = 8$, not a count of grid squares.

PRACTICE 2

A proportional relationship passes through $(0, 0)$ and $(5, 40)$. Write its equation. Plot the two points on the grid and draw the proportional relationship.

$y = 8x$

