Rate Race Graphs

Use slope to compare proportional relationships.

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, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Name _____ Date _____

Slope Is the Unit Rate

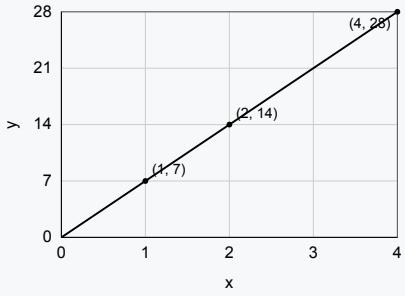
A proportional relationship graphs as a straight line through (0,0). In y = kx, k is the unit rate and slope, found by rise/run.

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.

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

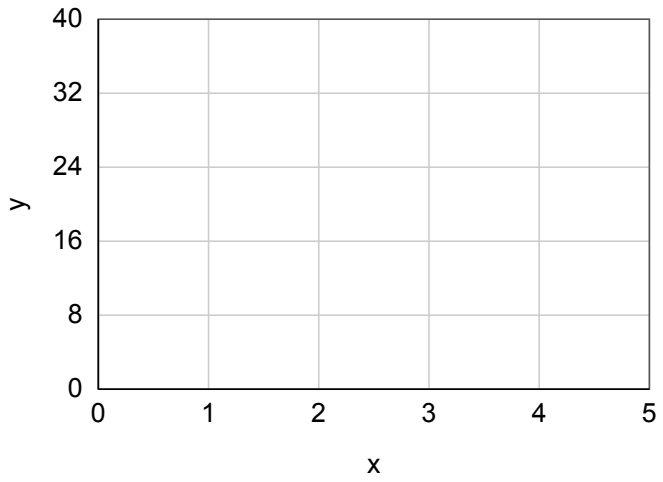


1. Practice

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

2. Practice

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.



3. Practice

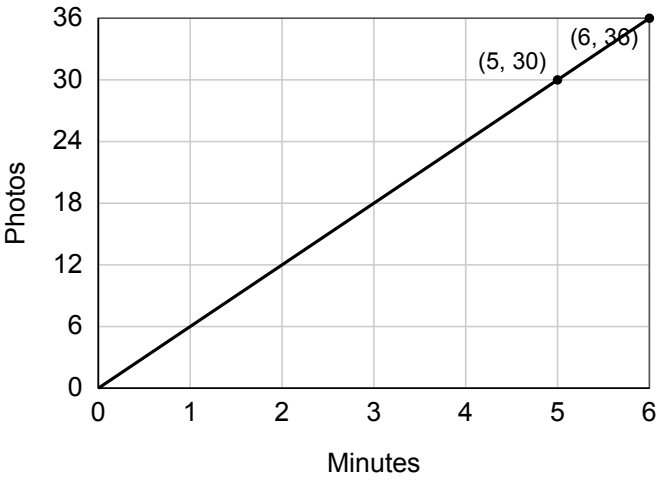
For y = 9x, find y when x = 6.

4. Practice

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

5. Apply

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.

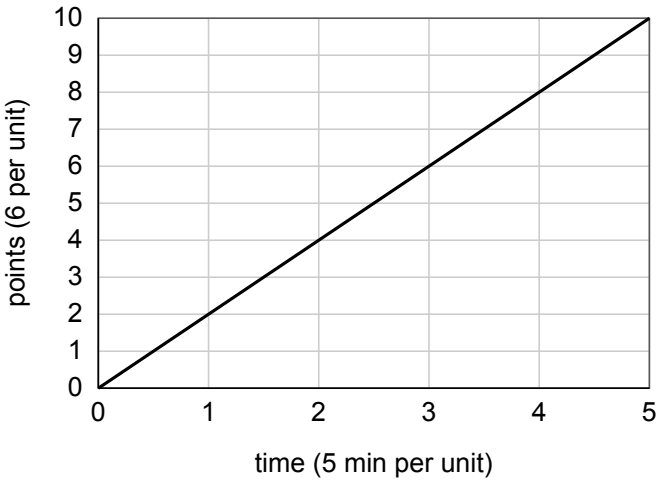


6. Apply

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?

7. Challenge

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.



What to accept

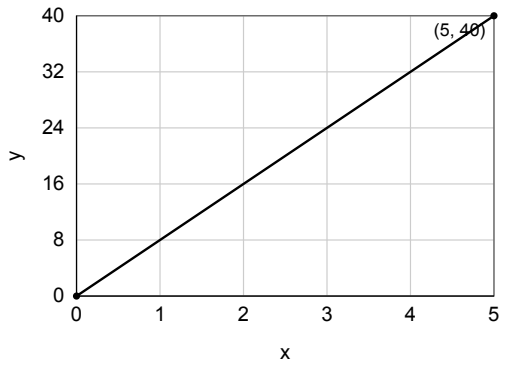
Accept equivalent unit-rate forms, including 2.4 for 12/5 and 2.5 for 5/2 in the challenge. Equations equivalent to y = 8x are acceptable. For Practice 2, require both points and a straight line through the origin. Read actual labeled axis values: the sample slope is 40/5 = 8, not a count of grid squares.

1. Practice

6

2. Practice

y = 8x



3. Practice

54

4. Practice

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

5. Apply

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.

6. Apply

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.

7. 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.