

Slope and Proportional Relationships on Graphs

Grade 8 math · Worksheet · Standards: 8.EE.B.5, 8.EE.B.6

Name: _____ Date: _____ Class: _____

These 20 problems follow Standards 8.EE.B.5 and 8.EE.B.6. They cover unit rates and slope, graphs of proportional relationships, similar slope triangles and the equations $y = mx$ and $y = mx + b$.

Start with tables and unit rates, then read slopes from graphs and finish with word problems that compare two rates or build a line from two points.

Standards: 8.EE.B.5, 8.EE.B.6 · **Level:** Grade 8

Problem 1 Is the table proportional? (easy)

Decide whether each table is proportional. If it is, give the constant of proportionality.

Table 1

x	2	4	6
y	7	14	21

Table 2

x	1	2	3
y	5	9	13

Problem 2 Hiking rate (easy)

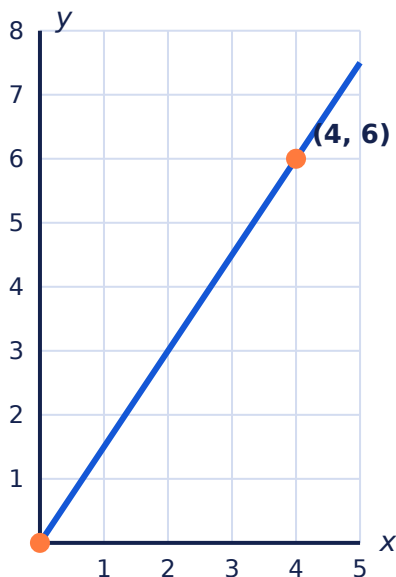
A hiker walks 7.5 miles in 3 hours at a steady pace. Find the unit rate and write an equation for the distance y after x hours.

Problem 3 Slope from two points (easy)

Find the slope of the line through: (a) (1, 3) and (4, 12) (b) (2, -1) and (6, 7)

Problem 4 Equation from a graph (easy)

The graph shows a proportional relationship. Write its equation.



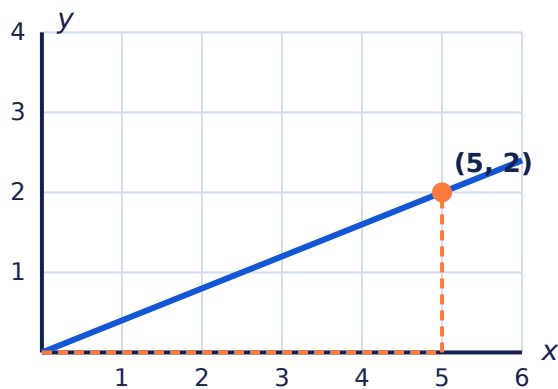
Line through $(0, 0)$ and $(4, 6)$.

Problem 5 Printer speed (easy)

A printer prints 24 pages in 4 minutes. Write an equation relating pages y to minutes x .

Problem 6 Read the slope (easy)

Use the labeled slope triangle to find the slope of the line.



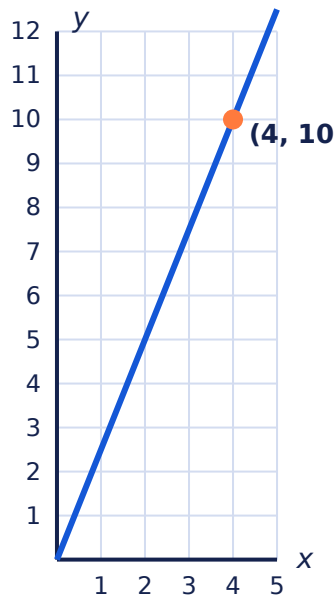
The slope triangle has run 5 and rise 2.

Problem 7 Which machine is faster? (medium)

Machine A fills $y = 4.5x$ gallons in x minutes. Machine B fills 10 gallons in 2 minutes, 20 in 4 minutes and 30 in 6 minutes. Which machine fills faster, and by how much per minute?

Problem 8 Graph versus equation (medium)

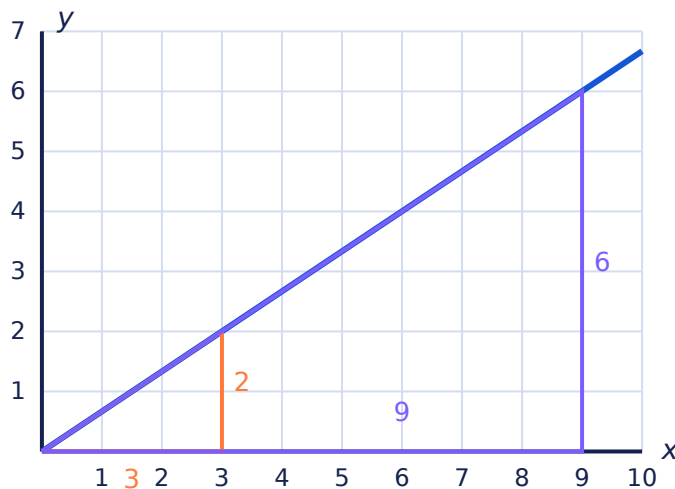
Graph: a line through the origin and (4, 10). Equation: $y = 2.8x$. Which relationship has the greater unit rate?



Graph of the first relationship.

Problem 9 Similar slope triangles (medium)

Two slope triangles are drawn on a line. The small one has run 3 and rise 2. The large one has run 9 and rise 6. Show that they give the same slope and explain why using similar triangles.



Two slope triangles.

Problem 10 Finding missing coordinates (medium)

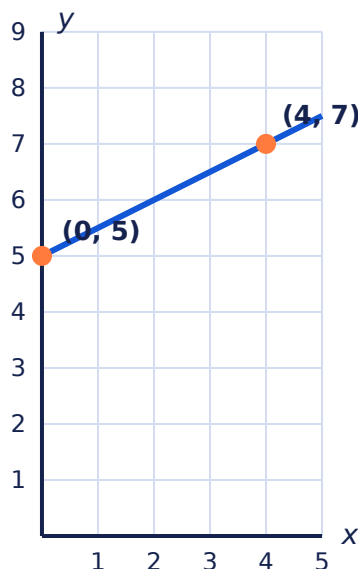
A line through the origin has slope $\frac{3}{4}$. Find y when $x = 8$, and find x when $y = 15$.

Problem 11 Slope and intercept (medium)

Name the slope and the y-intercept: (a) $y = -6x + 5$ (b) $y = \frac{2}{5}x - 8$ (c) $y = 9x$

Problem 12 Write the equation from a graph (medium)

Find the slope and y-intercept of the line, then write its equation in the form $y = mx + b$.



Line through $(0, 5)$ and $(4, 7)$.

Problem 13 Negative slopes (medium)

Find the slope of the line through: (a) $(-2, 5)$ and $(4, -1)$ (b) $(3, 8)$ and $(7, 2)$

Problem 14 Zero and undefined slope (medium)

Find the slope of the horizontal line $y = 4$ and of the vertical line $x = 3$. Explain each answer.

Problem 15 Smoothie mango (hard)

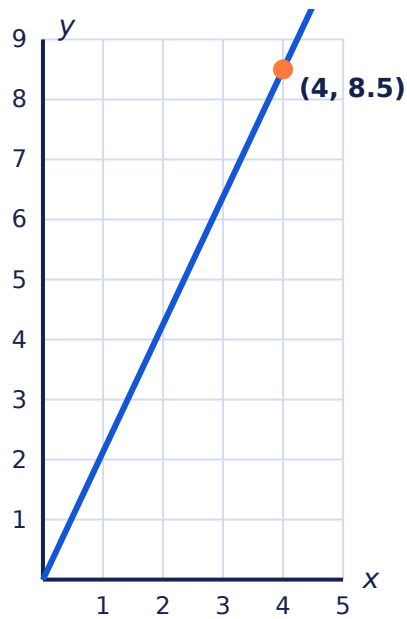
A smoothie shop uses 1.5 cups of mango for every 4 smoothies. Write an equation for the cups y needed for x smoothies. Then find the cups for 30 smoothies.

Problem 16 Dog walkers (hard)

Dana earns $y = 13.5x$ dollars for x hours. Eli earns \$42 for 3 hours and \$70 for 5 hours at a steady rate. Who earns more per hour? How much more would that person earn in an 8-hour day?

Problem 17 Charity walk (hard)

Leo's walk is shown by the graph through the origin and $(4, 8.5)$, with hours on the x-axis and miles on the y-axis. Zoe walks $y = 2.25x$. Who is faster, and how many more miles does that walker cover in 6 hours?



Leo's distance in miles.

Problem 18 Collinear points (hard)

Points $A(1, 2)$, $B(3, 5)$ and $C(5, 8)$ are plotted. Decide whether they lie on one line by comparing slopes, and explain with similar triangles.

Problem 19 Taxi fare (hard)

A taxi charges \$3.50 plus \$2.25 per mile. Write an equation for the fare y after x miles, find the fare for an 8-mile ride, and say whether the relationship is proportional.

Problem 20 Line through two points (hard)

A line passes through $(2, 5)$ and $(6, 13)$. Find its slope, its equation, and its y value when $x = 10$.