

Slope and Proportional Relationships on Graphs

Grade 8 math · Test Answer Key · Standards: 8.EE.B.5, 8.EE.B.6

Use the scoring lines to award points. For graph questions, accept any correct pair of points for the slope triangle. Reward the reasoning about similar triangles even if the wording differs.

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

Question 1 Proportional table (3 points)

- a. $10.5 \div 3 = 3.5$, $17.5 \div 5 = 3.5$ and $31.5 \div 9 = 3.5$. The ratio is constant, so yes.
- b. $k = 3.5$.
- c. $y = 3.5x$.

(a) Yes (b) 3.5 (c) $y = 3.5x$

Scoring: 1 point per part.

Question 2 Slope of a line (3 points)

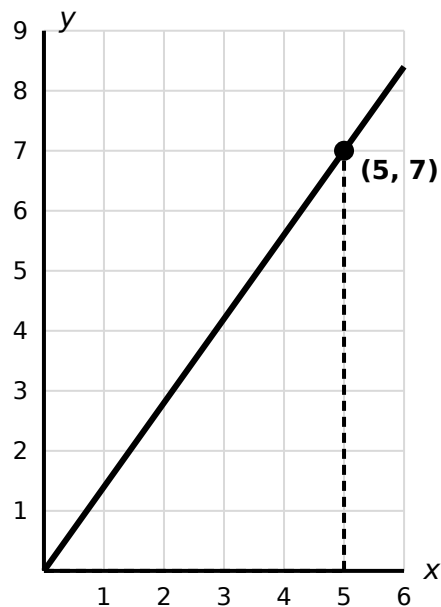
- (a) Rise = $-12 - 4 = -16$ and run = $5 - (-3) = 8$, so the slope is $-16 \div 8 = -2$.
- (b) The slope is negative, so the line falls.

(a) -2 (b) falls

Scoring: (a) 1 point for the rise and run, 1 point for -2 . (b) 1 point.

Question 3 Grapes at two stands (3 points)

- a. Slope = $7 \div 5 = 1.4$ dollars per pound.
- b. 1.55 dollars per pound.
- c. $1.40 < 1.55$, so Stand A is cheaper by \$0.15 per pound.



Slope triangle for Stand A.

(a) \$1.40 (b) \$1.55 (c) Stand A

Scoring: 1 point per part.

Question 4 Two slope triangles (3 points)

- $4 \div 6 = \frac{2}{3}$.
- $10 \div 15 = \frac{2}{3}$.
- The triangles share an angle at the origin and each has a right angle, so they are similar. Matching sides are in equal ratios, so rise $\div$ run is the same.

Both slopes are $\frac{2}{3}$.

Scoring: 1 point per part.

Question 5 Slope and intercept (2 points)

Compare with $y = mx + b$: $m = -\frac{5}{8}$ and $b = 9$.

Slope $-\frac{5}{8}$; y-intercept 9

Scoring: 1 point each.

Question 6 Proportional equation (2 points)

$k = 9 \div 12 = \frac{3}{4}$, so $y = \frac{3}{4}x$. When $x = 20$: $\frac{3}{4} \cdot 20 = 15$.

$$y = \frac{3}{4}x; y = 15$$

Scoring: 1 point for the equation, 1 point for 15.

Question 7 Plumber's fee (3 points)

- a. $y = 38x + 45$.
- b. $38 \cdot 3.5 = 133$, and $133 + 45 = 178$.
- c. No. At 0 hours the cost is \$45, so the graph does not pass through the origin.

(a) $y = 38x + 45$ (b) \$178 (c) Not proportional

Scoring: 1 point per part.

Question 8 Flat line (1 point)

It is a horizontal line through (0, 4). The rise is always 0, so the slope is 0.

Horizontal line; slope 0

Scoring: 1 point for slope 0 with a description.