

Algebra 1 - Slope and Rate of Change - Answer Key

Common Core F-IF.B.4, F-IF.B.6, F-LE.A.1b · maths-pdf.fr/en/

This answer key explains every problem on the slope worksheet. Final answers are in bold, and the lines above them show how each result was found. Use it to correct mistakes and to look for patterns in the errors you make most often.

Algebra 1 · Common Core State Standards: **F-IF.B.4, F-IF.B.6, F-LE.A.1b**

Exercise 1 - Positive slope

Rise: $17 - (5) = 12$. Run: $5 - (2) = 3$.

Slope: $\frac{12}{3} = 4$.

$m = 4$

Exercise 2 - Negative slope

Rise: $-5 - (5) = -10$. Run: $3 - (-2) = 5$.

Slope: $\frac{-10}{5} = -2$.

$m = -2$

Exercise 3 - Zero slope

Rise: $4 - (4) = 0$. Run: $7 - (3) = 4$.

Slope: $\frac{0}{4} = 0$.

$m = 0$

Exercise 4 - Vertical line

The run is $2 - 2 = 0$, so the slope cannot be computed.

Undefined (vertical line)

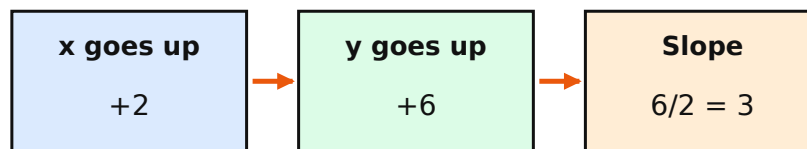
Exercise 5 - Slope from a graph

Read two points: $(-2, -3)$ and $(2, 3)$. Rise: $3 - (-3) = 6$. Run: $2 - (-2) = 4$.

Slope: $\frac{6}{4} = \frac{3}{2}$.

$$m = \frac{3}{2}$$

Exercise 6 - Slope from a table



Rise over run from the table.

Use two rows: $(0, 5)$ and $(2, 11)$. Rise: 6. Run: 2.

Check another pair: $(4, 17)$ to $(6, 23)$ also gives $\frac{6}{2}$.

$$m = 3$$

Exercise 7 - Classify the slope

(a) Same y-value: rise 0, slope 0. (b) Same x-value: run 0, undefined. (c) Rise -3 , run 3, slope -1 . (d) Rise 6, run 6, slope 1.

(a) zero; (b) undefined; (c) negative; (d) positive

Exercise 8 - Ramp

Slope is rise over run: $\frac{2}{24} = \frac{1}{12}$.

$$\frac{1}{12}$$

Exercise 9 - Missing coordinate

Set up $\frac{y-3}{6-2} = 2$, so $\frac{y-3}{4} = 2$.

Multiply by 4: $y-3 = 8$. Add 3.

$$y = 11$$

Exercise 10 - Is it linear?

Rates between consecutive rows: $\frac{7-3}{1} = 4$, $\frac{12-7}{1} = 5$, $\frac{18-12}{1} = 6$.

The rate is not constant.

Not linear

Exercise 11 - Fraction coordinates

Rise: $5 - 1 = 4$. Run: $\frac{3}{2} - \left(-\frac{1}{2}\right) = 2$.

Slope: $\frac{4}{2} = 2$.

$$m = 2$$

Exercise 12 - Savings rate

$$\frac{95-50}{5-2} = \frac{45}{3} = 15.$$

\$15 per week

Exercise 13 - Road trip graph

Use (2,110) and (4,220): $\frac{220-110}{4-2} = \frac{110}{2} = 55$.

For every hour, the car travels 55 more miles.

55 miles per hour

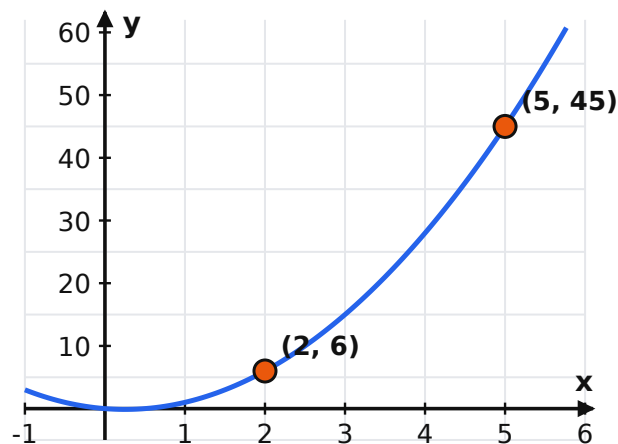
Exercise 14 - Meaning of the intercept

The slope 8 means the cost increases by \$8 for each additional hour.

The y-intercept 15 is the cost when $x = 0$: a \$15 entry fee.

\$8 per hour; \$15 entry fee

Exercise 15 - Average rate of change



The average rate is the slope of the segment between the points.

$$h(2) = 2(4) - 2 = 6 \text{ and } h(5) = 2(25) - 5 = 45.$$

$$\frac{45-6}{5-2} = \frac{39}{3} = 13.$$

13 inches per foot

Exercise 16 - Falling temperature

$$\frac{44-68}{6-2} = \frac{-24}{4} = -6.$$

The temperature fell about 6°F each hour.

-6°F per hour

Exercise 17 - Plant growth

$$\text{From week 1 to week 4: } \frac{9-3}{4-1} = \frac{6}{3} = 2.$$

The plant grows 2 inches each week, and every pair of consecutive rows agrees.

2 inches per week

Exercise 18 - Compare speeds

Car A: $\frac{150}{3} = 50$ mph. Car B: $\frac{220}{5} = 44$ mph.

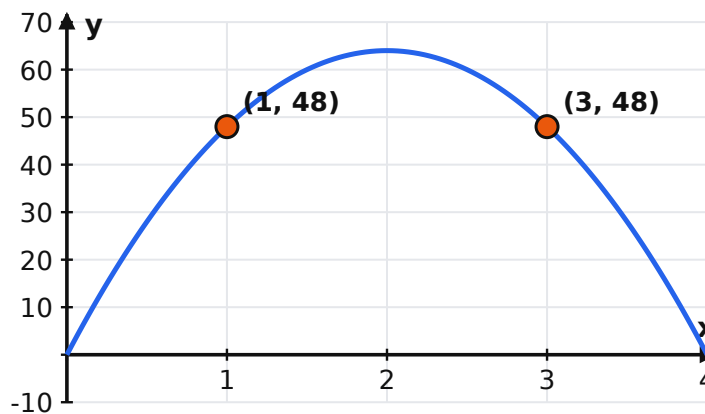
Car A, 50 mph versus 44 mph

Exercise 19 - Hiker's trip

0 to 1: $\frac{3-0}{1-0} = 3$ mi/h (walking away). 1 to 2: $\frac{3-3}{2-1} = 0$ (resting). 2 to 3: $\frac{0-3}{3-2} = -3$ mi/h (walking back).

3, 0, and -3 miles per hour

Exercise 20 - Projectile



The heights at $t = 1$ and $t = 3$ are equal.

$h(0) = 0$, $h(2) = 64$: $\frac{64-0}{2-0} = 32$ ft/s.

$h(1) = 48$, $h(3) = 48$: $\frac{48-48}{3-1} = 0$ ft/s. The ball rises and falls back to the same height, so the average change is 0.

32 ft/s; 0 ft/s

Exercise 21 - Not constant growth

$\frac{4-2}{1} = 2$, $\frac{8-4}{1} = 4$, $\frac{16-8}{1} = 8$.

The rate doubles each step, so it is not constant and the function is not linear.

2, 4, 8; not constant