

Slope and Graphing Linear Functions: math practice, Grade 9 – download the PDF

22 problems graded by difficulty (★ easy, ★★ medium, ★★★ hard). Try first, without looking at the solutions!

1 Shrinking candle

★★★

A candle is 18 cm tall after burning for 1 hour and 9 cm tall after burning for 4 hours.

- Find the rate of change of its height.
- What does the sign of the rate tell you?
- At this rate, how tall is the candle after 6 hours?

2 Four slopes

★★★

Find the slope of the line through each pair of points, or write “undefined”.

- $(2, 3)$ and $(6, 11)$
- $(-3, 4)$ and $(5, -12)$
- $(7, -1)$ and $(7, 9)$
- $(-5, 0)$ and $(0, 0)$

3 Read the slope and intercept



Give the slope and the y -intercept of each line.

a. $y = 5x - 7$

b. $y = -\frac{3}{4}x + 2$

c. $y = 6 - x$

d. $y = \frac{x}{2}$

4 Write the equation



Write the equation in slope-intercept form of the line with:

a. slope -2 and y -intercept 9 ;

b. slope $\frac{1}{3}$ and y -intercept -4 ;

c. slope 0 and y -intercept 5 .

5 Find the intercepts



Find the x -intercept and the y -intercept of each line.

a. $2x + y = 8$

b. $x - 3y = 9$

6 Direct variation or not?



Which equations show direct variation? When they do, give the constant of variation.

a. $y = 7x$

b. $y = 7x + 1$

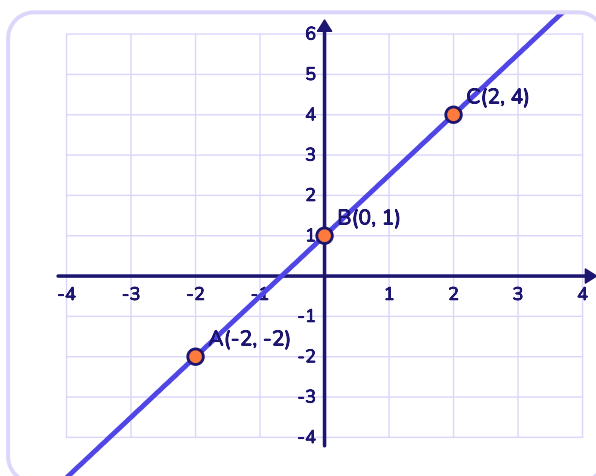
c. $y = -\frac{x}{3}$

d. $y = \frac{4}{x}$

7 Read a graph



The line below passes through A , B and C .



a. Find the slope using A and B , then check it with B and C .

b. Give the y -intercept and write the equation of the line.

8 Into standard form



Write each equation in standard form $Ax + By = C$ with integer coefficients, then use $-\frac{A}{B}$ to confirm the slope.

a. $y = \frac{2}{5}x - 3$

b. $y = -\frac{3}{4}x + 6$

9 Slope and a point



Use point-slope form to write the equation, in slope-intercept form, of the line with slope 5 through $(3, -2)$.

10 Through two points



Find the equation of the line through $(-1, 6)$ and $(3, -2)$.

11 Parallel, perpendicular, or neither?



Classify each pair of lines.

- a. $y = 3x + 2$ and $y = 3x - 5$
- b. $y = 3x + 2$ and $y = -\frac{1}{3}x + 4$
- c. $2x + 3y = 6$ and $3x - 2y = 8$
- d. $y = 2x$ and $y = -2x$

12 Gym membership



A gym charges a 25-dollar sign-up fee plus 18 dollars per month. Let C be the total cost in dollars after m months.

- a. Write an equation for C .
- b. What do the slope and the y -intercept mean here?
- c. Find the cost after 8 months.
- d. After how many months has Dana paid exactly 277 dollars?

13 Fuel economy



The distance d a car travels varies directly with the fuel g it uses. The car goes 128 miles on 4 gallons.

- Find the constant of variation and write the equation.
- How far does the car go on 9 gallons?
- How many gallons are needed for a 400-mile trip?

14 Graph with intercepts



Consider the line $4x + 3y = 12$.

- Find both intercepts and describe how to graph the line.
- Find its slope.
- Does the point $(6, -4)$ lie on the line?

15 Find the missing coordinate



- The line through $(k, 3)$ and $(5, 9)$ has slope 2. Find k .
- The line through $(4, k)$ and $(-2, 6)$ has slope $-\frac{3}{2}$. Find k .

16 A perpendicular line



Find an equation, in standard form, of the line perpendicular to $3x + 4y = 8$ that passes through $(6, 1)$.

17 A parallel line

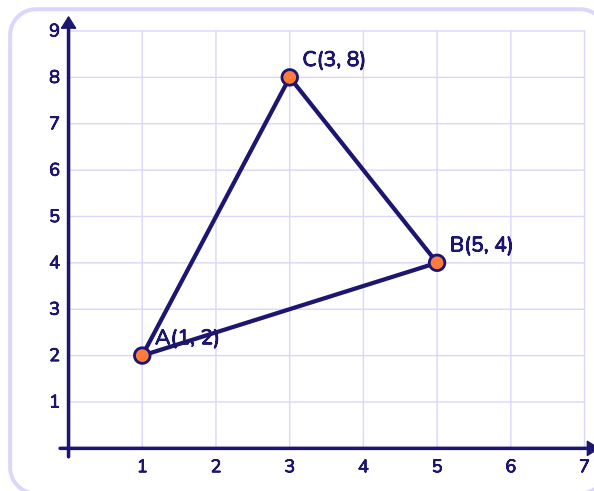
★★★

Write the equation, in slope-intercept form and in standard form, of the line parallel to $y = -\frac{2}{5}x + 1$ that passes through $(5, 2)$.

18 A right triangle?

★★★

The vertices of a triangle are $A(1, 2)$, $B(5, 4)$ and $C(3, 8)$.



Use slopes to decide whether the triangle has a right angle, and if so, at which vertex.

19 Taxi fare

★★★

A taxi ride of 4 miles costs 12.50 dollars and a ride of 10 miles costs 26 dollars. The fare is linear in the distance.

- Find the rate per mile and the starting fee.
- Write the cost C in terms of the distance m in miles.
- What is the longest whole-number ride you can take with 40 dollars?

20 Fahrenheit and Celsius



Water freezes at 0°C (32°F) and boils at 100°C (212°F). The relation between the two scales is linear.

- Find the slope and the equation $F = mC + b$.
- Convert 35°C to Fahrenheit and 68°F to Celsius.
- At what temperature do both scales show the same number?
- Write the equation in standard form.

21 Where two lines meet



Line ℓ_1 has equation $y = 2x - 1$. Line ℓ_2 is perpendicular to ℓ_1 and has y -intercept 9 . Find the equation of ℓ_2 and the coordinates of the point where the two lines cross.

22 True or false?



Decide whether each statement is true or false and justify your answer.

- The line $y = 2x + 3$ shows direct variation.
- If y varies directly with x , doubling x doubles y .
- The line through $(2, 6)$ and $(5, 15)$ shows direct variation.
- A vertical line has slope 0 .



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