

Solutions

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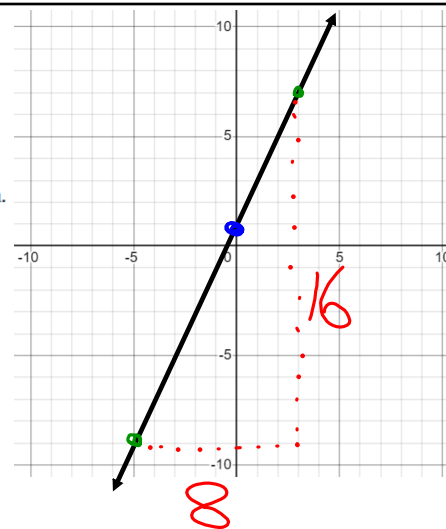
1. A line passes through the points $(-5, -9)$ and $(3, 7)$.

- Plot the two given points and draw the line that passes through them.
- Determine the slope of the line.
- Use your graph from part (a) to determine the line's y-intercept.
- Use the slope and y-intercept to write the equation of the line in $y = mx + b$ form.

$$\begin{aligned} \text{b) Slope} &= \frac{\text{rise}}{\text{run}} \\ &= \frac{16}{8} = 2 \end{aligned}$$

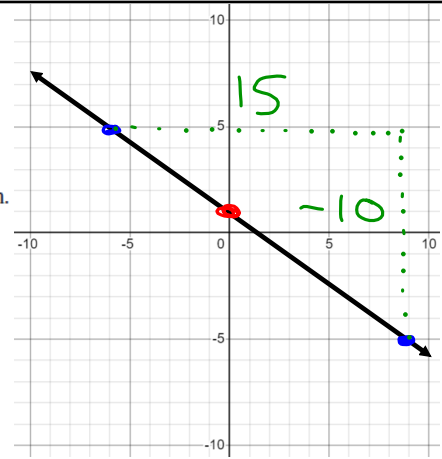
c) y-intercept is $(0, 1)$

d) Equation $y = mx + b$
is $y = 2x + 1$



2. A line passes through the points $(9, -5)$ and $(-6, 5)$.

- Plot the two given points and draw the line that passes through them.
- Determine the slope of the line.
- Use your graph from part (a) to determine the line's y-intercept.
- Use the slope and y-intercept to write the equation of the line in $y = mx + b$ form.



$$\begin{aligned} \text{b) slope} &= \frac{\text{rise}}{\text{run}} \\ &= \frac{-10}{15} = -\frac{2}{3} \end{aligned}$$

c) y-intercept is $(0, 1)$

d) Equation $y = mx + b$
is $y = -\frac{2}{3}x + 1$

3. A line passes through the points $(10, 45)$ and $(12, 57)$.

- Determine the slope of the line.
- Write the equation $y = mx + b$ with the line's slope substituted for m .
- Rewrite your equation from part (b) with the coordinates of a given point substituted for x and y .
- Solve your equation from part (c) to determine the line's y-intercept, b .
- Write the equation of the line.

$$\begin{aligned} \text{a) slope} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{57 - 45}{12 - 10} \\ &= \frac{12}{2} = 6 \end{aligned}$$

$$\begin{aligned} \text{d) } 45 &= 6(10) + b \\ 45 &= 60 + b \\ 45 - 60 &= 60 + b - 60 \\ -15 &= b \end{aligned}$$

$$\text{b) } y = 6x + b$$

$$\begin{aligned} \text{c) use } (10, 45) &\text{ as } (x, y) \\ 45 &= 6(10) + b \end{aligned}$$

$$\text{e) } y = 6x - 15$$

4. A line passes through the points $(-16, -43)$ and $(20, -25)$.

- Determine the slope of the line.
- Write the equation $y = mx + b$ with the line's slope substituted for m .
- Rewrite your equation from part (b) with the coordinates of a given point substituted for x and y .
- Solve your equation from part (c) to determine the line's y -intercept, b .
- Write the equation of the line.

$$\begin{aligned} \text{a) Slope} &= \frac{y_2 - y_1}{x_2 - x_1} \\ &= \frac{-25 - (-43)}{20 - (-16)} \\ &= \frac{18}{36} = \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{d) } -25 &= \frac{1}{2}(20) + b \\ -25 &= 10 + b \\ -25 - 10 &= 10 + b - 10 \\ -35 &= b \end{aligned}$$

$$\text{e) } y = \frac{1}{2}x - 35$$

$$\text{b) } y = \frac{1}{2}x + b$$

c) use $(20, -25)$ as (x, y)

$$-25 = \frac{1}{2}(20) + b$$

6. A line passes through the points $(6, 7)$ and $(6, 10)$.

- Explain how we can quickly tell that the line is vertical.
- What is the slope of the line?
- Write the equation of the line.

a) x -values are the same, with different y -values.

b) Vertical lines have an undefined slope.

c) Equation is $x = 6$

every point is $(6, a)$
where a is a number

7. Determine the equation of the line that has an x -intercept of 24 and passes through $(-16, 40)$.

x -intercept when $y = 0$

\Rightarrow point₂ is $(24, 0)$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{0 - 40}{24 - (-16)}$$

$$= \frac{-40}{40}$$

$$= -1$$

$$y = -1x + b$$

use $(24, 0)$ as (x, y)

$$\Rightarrow 0 = -1(24) + b$$

$$0 = -24 + b$$

$$0 + 24 = -24 + b + 24$$

$$24 = b$$

$$\Rightarrow y = -x + 24$$

8. Determine the equation of the line that has a y -intercept of -10 and passes through $(18, -2)$.

y -intercept when $x = 0$

\Rightarrow point₂ is $(0, -10)$

$$\text{slope} = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{-10 - (-2)}{0 - 18}$$

$$= \frac{-8}{-18} = \frac{4}{9}$$

we are told the y -intercept so no need to calculate it!

$$\text{Equation is } y = \frac{4}{9}x - 10$$

9. To host a children's party at an indoor playground, a family pays a non-refundable deposit plus an additional amount for each child attending. If 10 children attend, the total cost is \$380. If 15 children attend, the total cost is \$440.

- Determine the additional cost per child.
- Determine the initial fee.
- Write an equation to relate the total cost (C) to the number of children attending (n).
- What values can be used for n in your equation?

$$\begin{array}{l} a) \\ 5 < \begin{array}{l} 10 \longrightarrow \$380 \\ 15 \longrightarrow \$440 \end{array} > \$60 \end{array}$$

$$\text{Cost per child} = \frac{60}{5} = \$12$$

b) use $(10, 380)$ as (x, y)

$$\Rightarrow 380 = 12(10) + b$$

$$380 = 120 + b$$

$$380 - 120 = 120 + b - 120$$

$$260 = b$$

\Rightarrow Initial fee is \$260

c) Equation is

$$C = 12n + 260$$

d) n can be any
WHOLE NUMBER
(up to the maximum
capacity allowed)