

ec 6-2: Slope-Intercept Form for the equation of a line.

$$y = mx + b$$

slope $\rightarrow m$ Y-intercept $\rightarrow b$

Given a line

- a) How many Point-Slope equations are there for the line. **Infinitely Many**
- b) How many Slope-Intercept equations are there for the line. **Only ONE**

Writing the equation of a line in Slope-Intercept Form:

Write the equation of the line that passes through these two points in Slope-Intercept Form

(2, 1) and (-3, 21)

Method 1:

First: Find the slope.

$$m = \frac{21 - 1}{-3 - 2} = \frac{20}{-5} = -4$$

Second: Write the equation in Point-Slope Form

use (-3, 21) $y - 21 = -4(x + 3)$

Third: Change Point-Slope into Slope-Intercept

$$y - 21 = -4x - 12$$

$$+21 \quad +21$$

$$y = -4x + 9$$

Method 2:

(2, 1) and (-3, 21)

First: Find the slope. The same as previous page

$$m = -4$$

Second: Replace m in $y = mx + b$ with the slope

$$y = -4x + b$$

Third: Replace y and x with the coordinates of one of the points

use (2, 1) $\rightarrow 1 = -4(2) + b$

Fourth: Solve for b .

$$1 = -8 + b$$

$$+8 \quad +8$$

$$b = 9$$

Fifth: Rewrite $y = mx + b$ with the values of m and b you've found.

$$y = -4x + 9$$

Write the equation of the line that passes through the given pair of points. Give your answer in Slope-Intercept Form.

$(-4, 7)$ & $(-1, 13)$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 7 &= 2(x - (-4)) \\ y - 7 &= 2x + 8 \\ +7 & \quad +7 \\ \boxed{y} &= \boxed{2x + 15} \end{aligned}$$

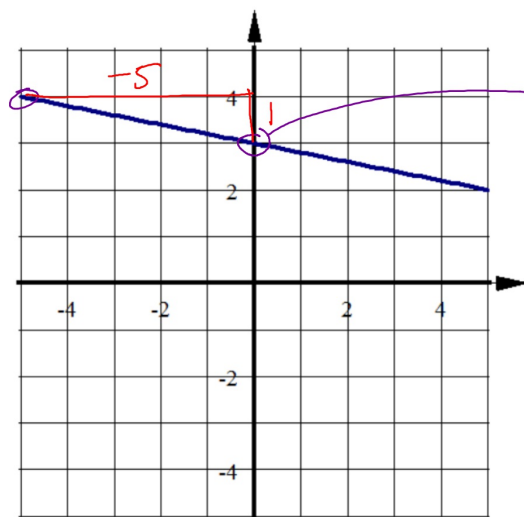
$$\begin{aligned} m &= \frac{13 - 7}{-1 - (-4)} = \frac{6}{3} = 2 \\ y &= 2x + b \\ 7 &= 2(-4) + b \\ 7 &= -8 + b \\ +8 & \quad +8 \\ 15 &= b \\ \boxed{y} &= \boxed{2x + 15} \end{aligned}$$

Write the equation of the line that passes through the given pair of points. Give your answer in Slope-Intercept Form.

$(2, 5)$ & $(10, -7)$

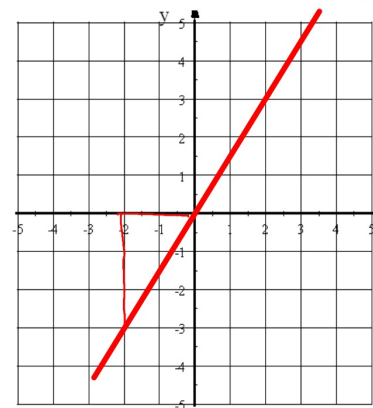
$$\begin{aligned} m &= \frac{5 - (-7)}{2 - 10} = \frac{12}{-8} = -\frac{3}{2} \\ y - 5 &= -\frac{3}{2}(x - 2) \\ y - 5 &= -\frac{3}{2}x + 3 \\ +5 & \quad +5 \\ \boxed{y} &= \boxed{-\frac{3}{2}x + 8} \end{aligned}$$

Write the equation of the line in the graph. Give your answer in Slope-Intercept Form.



$$\begin{aligned} y &= mx + b \\ y &= -\frac{1}{5}x + 3 \end{aligned}$$

Write the equation of this line in Slope-Intercept Form:



$$\begin{aligned} y &= \frac{3}{2}x + 0 \\ \text{or} \\ y &= \frac{3}{2}x \end{aligned}$$

The data in the table can be modeled using a linear function.

x	y
4	14
8	15.5
12	17
16	18.5

1. Write this linear function.

$$m = \frac{3}{8}$$

$$y - 18.5 = \frac{3}{8}(x - 16)$$

2. Find the value of y when x=6

$$\frac{3}{8}(6) + 12.5 = 14.75$$

3. Find the value of x when y=11

$$\begin{aligned} 11 &= \frac{3}{8}x + 12.5 \\ -12.5 &= \frac{3}{8}x - 12.5 \\ \frac{8}{3} \cdot -1.5 &= \frac{3}{8}x \cdot \frac{8}{3} \\ -4 &= x \end{aligned}$$

Science At the surface of the ocean, pressure is 1 atmosphere. At 66 ft below sea level, the pressure is 3 atmospheres. The relationship of pressure and depth is linear.

a. Write an equation for the data.

b. Predict the pressure at 100 ft below sea level.

write equation in Point Slope Form then convert to Slope-Intercept Form.

$$y - 1 = \frac{1}{33}(x - 0)$$

a. $y = \frac{1}{33}x + 1$

b. $y = \frac{1}{33}(100) + 1$

$$y = 4.33 \text{ atmospheres}$$

depth pressure
(66, 3)

(0, 1)

$$m = \frac{3-1}{66-0} = \frac{2}{66} = \frac{1}{33}$$