

Slope-Point Form

Slope-point form of a linear function contains the **slope** and the **coordinates of a point**

The equation of a line that passes through $P(x_1, y_1)$ and has slope m is:
$$y - y_1 = m(x - x_1)$$

Can be used with
slope and any point.

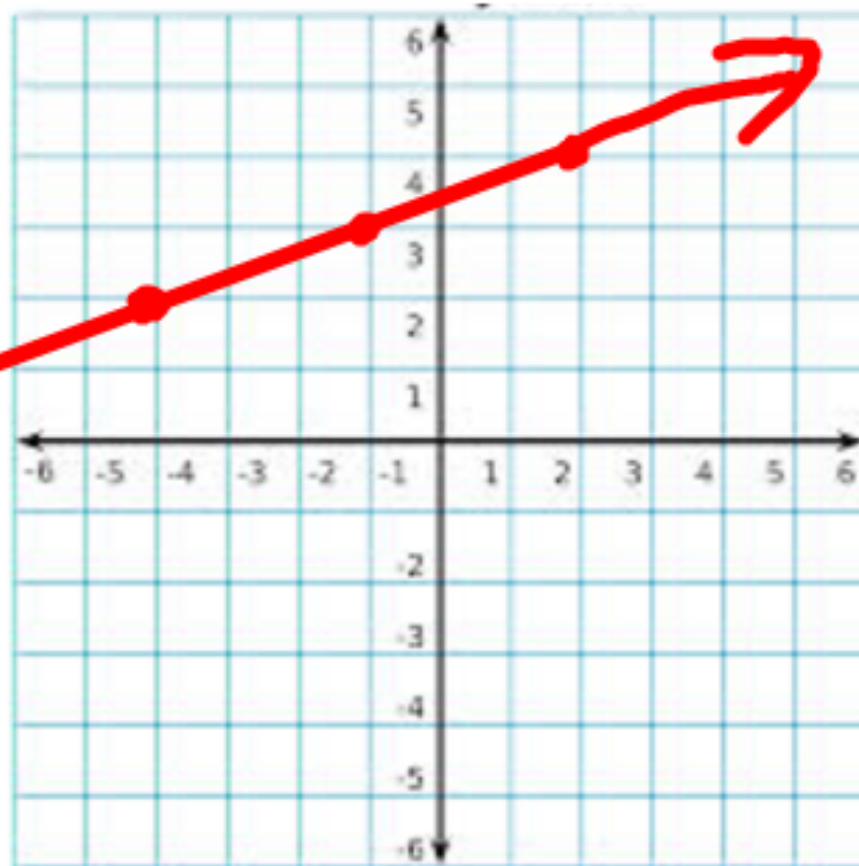
Example

a) Describe the graph of the linear function with this equation:

$$y - 2 = \frac{1}{3}(x + 4)$$

b) Graph the equation.

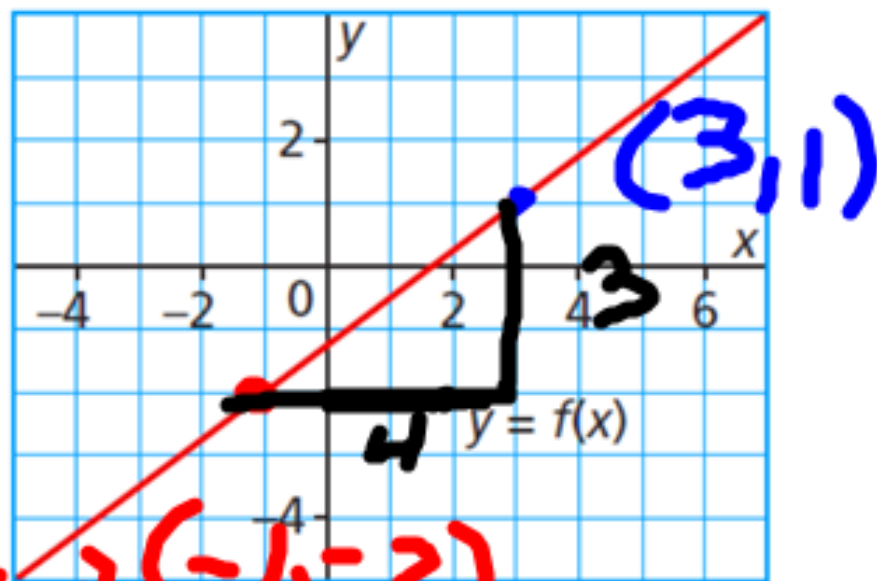
a)
 $m = \frac{1}{3}$ $(-4, 2)$



Example

$$y - 1 = \frac{3}{4}(x - 3)$$

- a) Write an equation in slope-point form for this line.
- b) Write the equation in part a in slope-intercept form. What is the y -intercept of this line?



$$y - (-2) = \frac{3}{4}(x - (-1)) \quad (-1, -2)$$

$$y + 2 = \frac{3}{4}(x + 1)$$

$$y - 1 = \frac{3}{4}(x - 3)$$

$$y - 1 = \frac{3}{4}x - \frac{9}{4}$$

$$y = \frac{3}{4}x - \frac{9}{4} + 1$$

$$y = \frac{3}{4}x - \frac{9}{4} + \frac{4}{4}$$

$$y = \frac{3}{4}x - \frac{5}{4}$$

$$y + 2 = \frac{3}{4}(x + 1)$$

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

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

$$y = \frac{3}{4}x + \frac{3}{4} - \frac{8}{4}$$

$$y = \frac{3}{4}x - \frac{5}{4}$$

Same line

Example

Find the equation of the line passing through the points $(-3, 9)$ and a slope of $\frac{3}{4}$. Write your answer in the form $y=mx+b$.

$$y - y_1 = m(x - x_1)$$

$$y - 9 = \frac{3}{4}(x - (-3))$$

$$y - 9 = \frac{3}{4}(x + 3)$$

$$y = \frac{3}{4}x + \frac{9}{4} + 9$$

$$y = \frac{3}{4}x + \frac{9}{4} + 9 \cdot \frac{4}{4}$$

$$y = \frac{3}{4}x + \frac{9}{4} + \frac{36}{4}$$

$$y = \frac{3}{4}x + \frac{45}{4}$$

Example

Find the equation of the line passing through the points $(-2,5)$ and $(4,7)$. Write your answer in the form $y=mx+b$.

$$y - y_1 = m(x - x_1)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{7 - 5}{4 - (-2)} = \frac{2}{6} = \frac{1}{3}$$

$$y - 7 = \frac{1}{3}(x - 4)$$

$$y - 7 = \frac{1}{3}x - \frac{4}{3} + 7 \cdot \frac{3}{3}$$

$$y = \frac{1}{3}x - \frac{4}{3} + \frac{21}{3}$$

$$y = \frac{1}{3}x + \frac{17}{3}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} \cdot \frac{(x_2 - x_1)}{(x_2 - x_1)}$$

$$m(x_2 - x_1) = y_2 - y_1$$

$$y - y_1 = m(x - x_1)$$

Example

$$y = mx + b$$

Write an equation for the line that passes through $R(1, -1)$ and is:

a) parallel to the line $y = \frac{2}{3}x - 5$

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

$$y - y_1 = m(x - x_1)$$

$$y + 1 = \frac{2}{3}(x - 1)$$

b) perpendicular to the line $y = \frac{2}{3}x - 5$

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

$$b) \quad R(1, -1)$$

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

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

$$y - y_1 = m(x - x_1)$$

$$y + 1 = -\frac{3}{2}(x - 1)$$

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

$$y = -\frac{3}{2}x + \frac{1}{2}$$

Homework

~~Section 6.4 (slope-intercept form)~~

• P. 362-364

~~# 4, 5, 6, 8, 11, 12, 19, 21, 22~~

~~for 4, 5, and 6 only do every second letter~~

Section 6.5 (slope-point form)

• P. 371-374

4, 5, 6, 8, 9, 12, 22

for 4, 5, and 6 only do every second letter