

## 2.4 WRITING EQUATIONS OF LINES

slope-intercept form:  $y = mx + b$

slope      y-intercept

### Examples

1. Write an equation in slope-intercept form of the line with the given information:

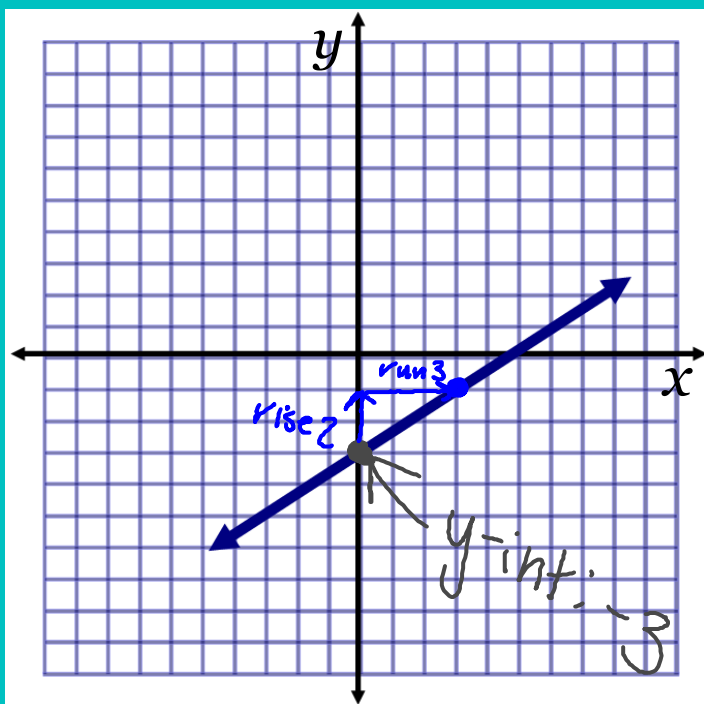
a)  $m = -3, b = 7$

$$y = -3x + 7$$

b)  $m = \frac{6}{7}, b = -9$

$$y = \frac{6}{7}x - 9$$

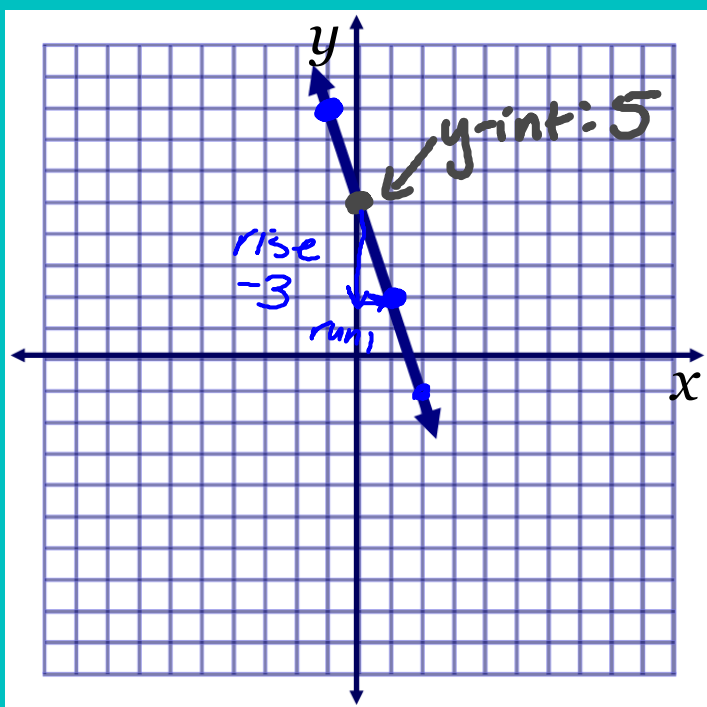
2. Write the equation of the line shown in the graph using *slope-intercept form*.



$$m = \frac{\text{rise}}{\text{run}} = \frac{2}{3}$$

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

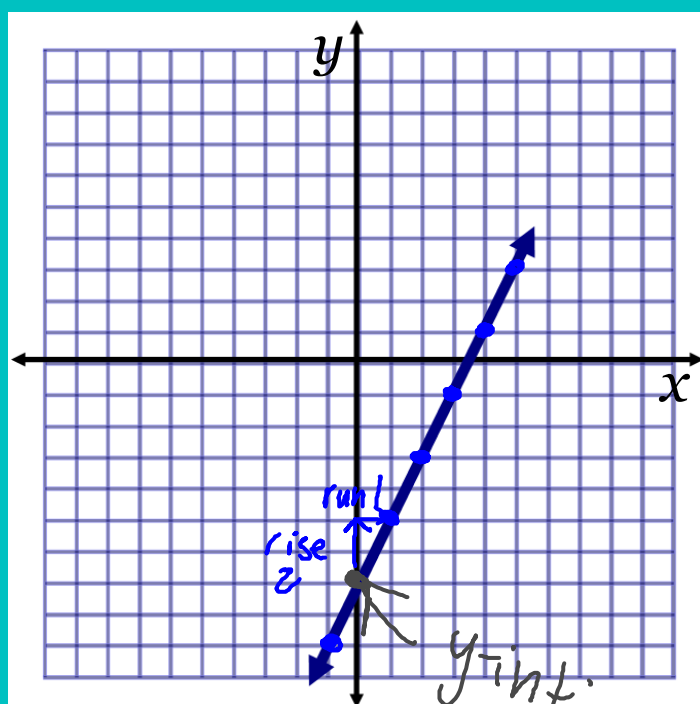
3. Write the equation of the line shown in the graph using *slope-intercept form*.



$$m = \frac{\text{rise}}{\text{run}} = \frac{-3}{1} = -3$$

$$y = -3x + 5$$

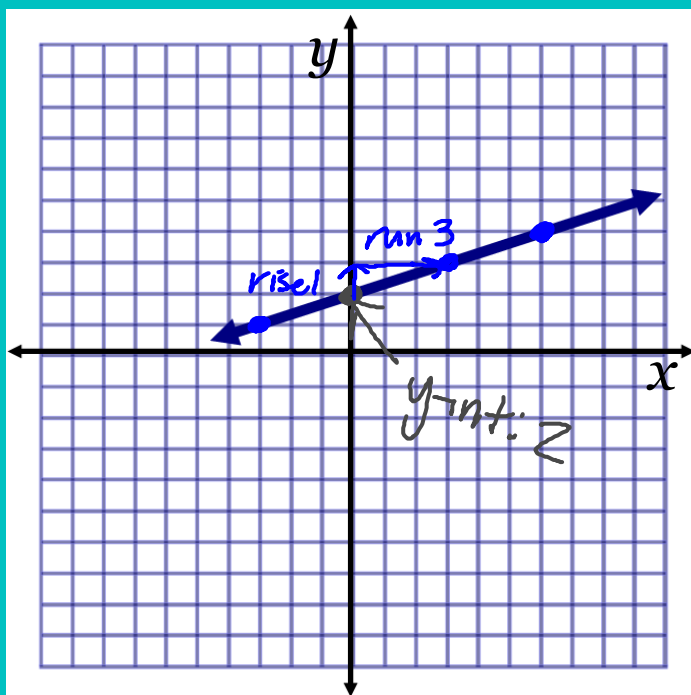
4. Write the equation of the line shown in the graph using *slope-intercept form*.



$$m = \frac{\text{rise}}{\text{run}} = \frac{2}{1} = 2$$

$$y = 2x - 7$$

5. Write the equation of the line shown in the graph using *slope-intercept form*.



$$m = \frac{\text{rise}}{\text{run}} = \frac{1}{3}$$

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

point-slope form:  $y - y_1 = m(x - x_1)$

*Use this form if you know the slope and a point.*

6. Write an equation in *point-slope form* of the line that passes through  $(-3, 4)$  and has a slope of  $\frac{2}{3}$ .

$x_1$   $y_1$

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

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

7. Write an equation in *slope-intercept form* of the line that passes through  $(-2, -5)$  and has a slope of 3.

$$y + 5 = 3(x + 2)$$

$x_1$   $y_1$   $m=3$

$$y + 5 = 3x + 6$$

$-5$   $-5$

$$y = 3x + 1$$

8. Write an equation in *slope-intercept form* of the line that passes through  $(9, 2)$  and has a slope of  $-\frac{1}{3}$ .

$$y - 2 = -\frac{1}{3}(x - 9)$$

$x_1$   $y_1$   $m = -\frac{1}{3}$

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

$+2$   $+2$

$$y = -\frac{1}{3}x + 5$$

9. Write an equation in *slope-intercept form* of the line that passes through  $(1, 5)$  and  $(4, 2)$ .

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

$$y - 5 = -1(x - 1) \quad \text{OR} \quad y - 2 = -1(x - 4)$$

$$y - 5 = -x + 1$$

$$\begin{array}{r} +5 \\ +5 \end{array}$$

$$y = -x + 6$$

$$y - 2 = -x + 4$$

$$\begin{array}{r} +2 \\ +2 \end{array}$$

$$y = -x + 6$$

10. Write an equation in *slope-intercept form* of the line that passes through  $(6, -10)$  and  $(-\frac{1}{4}, 4)$ .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - (-10)}{-\frac{1}{4} - \frac{6}{1}} = \frac{14}{-\frac{1}{4} - \frac{24}{4}} = \frac{14}{-\frac{25}{4}} = \frac{14}{1} \cdot \frac{4}{-25} = \frac{56}{-25}$$

$$y + 10 = \frac{56}{-25}(x - 6)$$

$$y + 10 = \frac{56}{-25}x + \frac{336}{25}$$

$$-10 \cdot \frac{25}{1} = \frac{-250}{25}$$

$$y = \frac{56}{-25}x + \frac{86}{25}$$

11. Write an equation in *slope-intercept form* of the line that passes through  $(1, 1)$  and is perpendicular to  $y = -\frac{1}{2}x + 6$ .

$m = -\frac{1}{2}$

$m_{\perp} = 2$

opposite reciprocal slopes

$$y - 1 = 2(x - 1)$$

$$y - 1 = 2x - 2$$

$$y = 2x - 1$$

12. Write an equation in *slope-intercept form* of the line that passes through  $(-4, 5)$  and is parallel to  $y = \frac{3}{4}x - 9$ .

$m = \frac{3}{4}$

same slope

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

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

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