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

$y = mx + b$

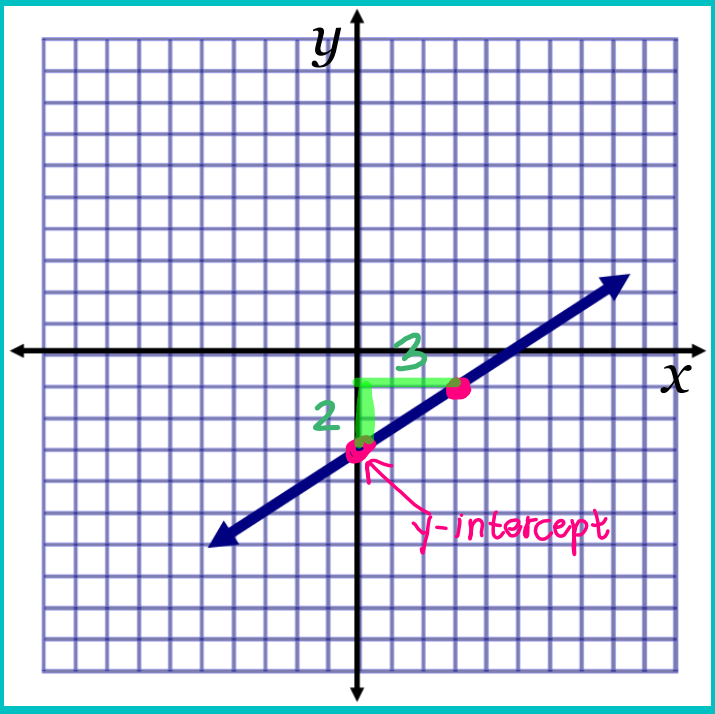
$y = -3x + 7$

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

$y = mx + b$

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

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



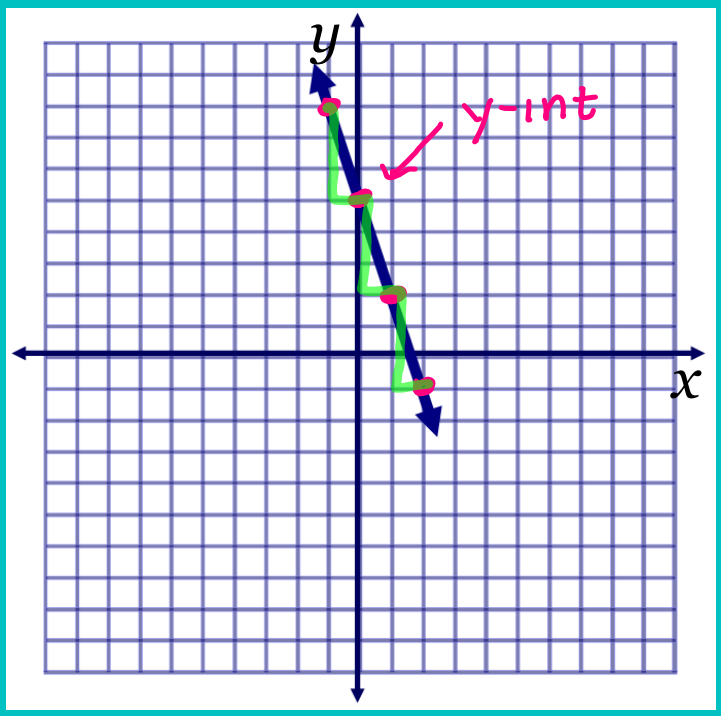
$y = mx + b$

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

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

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

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



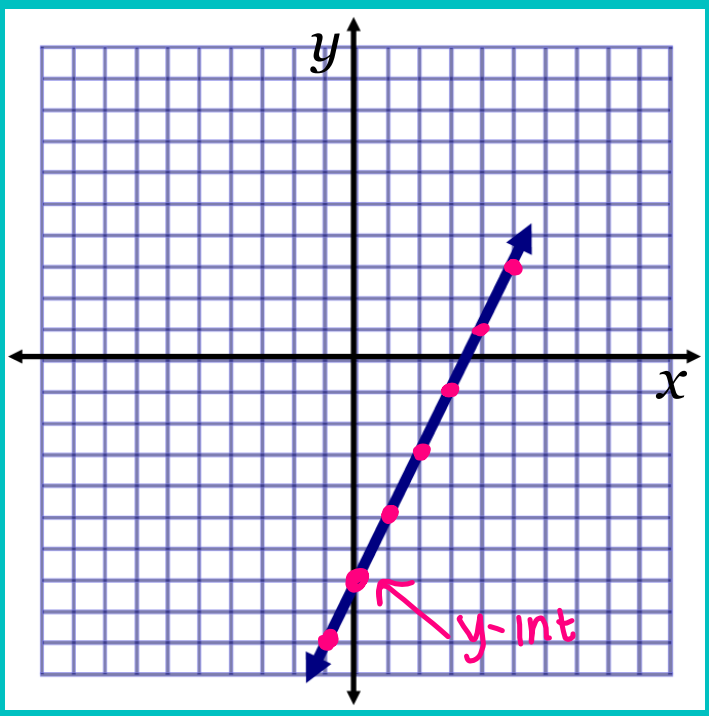
$y = mx + b$

$m = \frac{-3}{1}$ $b = 5$

$m = -3$

$y = -3x + 5$

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

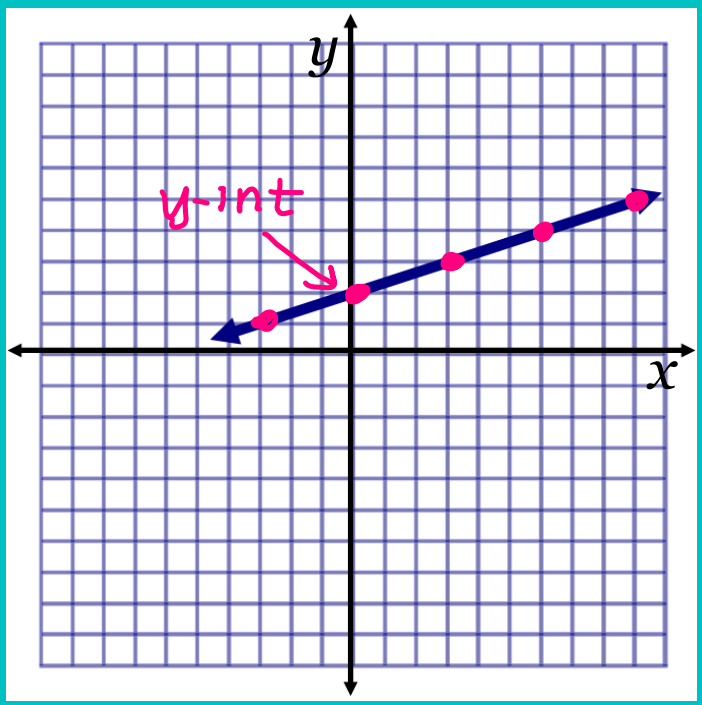


$y = mx + b$

$m = 2$ $b = -7$

$y = 2x - 7$

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



$y = mx + b$

$m = \frac{1}{3}$ $b = 2$

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

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

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 $\frac{2}{3}$. ← m

x_1, y_1

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

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

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

x_1, y_1 m

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

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

$y + 5 = 3x + 6$

$-5 \quad -5$

$y = 3x + 1$

$y = mx + b$

End

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

x_1, y_1 m

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

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

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

$+2 \quad +2$

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

End

$y = mx + b$

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

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

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

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

$m = -1$

$x_1\ y_1 \quad x_2\ y_2$

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

$y - 5 = -1(x - 1)$

$y - 5 = -x + 1$

$+5 \qquad +5$

$y = -x + 6$

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

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

$m = \frac{4 - -10}{-\frac{1}{4} - 6}$

$m = \frac{14}{-\frac{25}{4}}$

$m = -\frac{56}{25}$

$x_1\ y_1 \quad x_2\ y_2$

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

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

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

$-10 \qquad -10$

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

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

x_1, y_1 opposite reciprocal

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

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

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

$y - 1 = 2x - 2$

$+1 \qquad +1$

$y = 2x - 1$

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

x_1, y_1 Same slope $m = \frac{3}{4}$

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

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

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

$+5 \qquad +5$

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