KEY

Determine whether the lines are parallel, perpendicular, or neither.

Line 1: (-9, 3) and (-5,7)
Line 2: (-11, 6) and (-7,2)

Line 1: $m = \frac{7-3}{-5+9} = \frac{4}{4} = 1$

Line 2: $m = \frac{2-6}{-7+11} = \frac{-4}{4} = -1$

Perpendicular

1

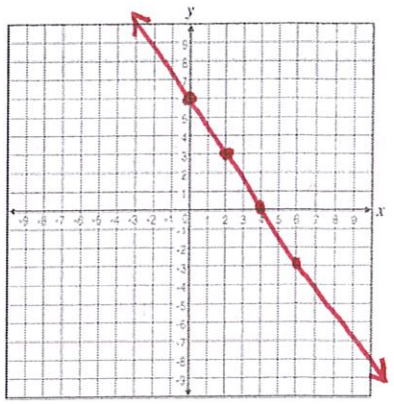
Graph the line and identify the slope.

$3x + 2y = 12$

$\frac{2y}{2} = \frac{-3x}{2} + \frac{12}{2}$

$y = -\frac{3}{2}x + 6$

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

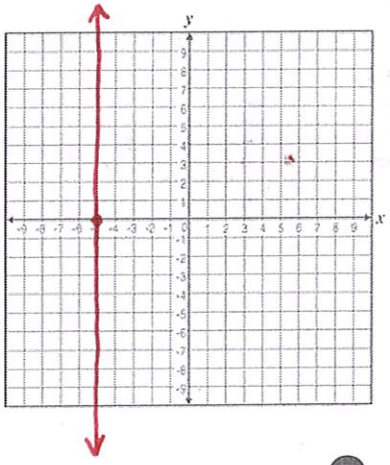


2

Graph the line and identify the slope.

$x = -5$

m = undefined



3

Given the line that contains the points (-8, 12) and (-15, 3), find the slope of the line that is...

a. parallel to the given line.

$m = \frac{3-12}{-15+8} = \frac{-9}{-7} = \frac{9}{7}$ $\quad m_{\parallel} = \frac{9}{7}$

b. perpendicular to the given line.

opposite reciprocal

$m_{\perp} = -\frac{7}{9}$

4

Find the equation of the line in *standard form* that goes the point (-3, 2) and has $m = 5/8$.

$y - 2 = \frac{5}{8}(x+3)$

$8 \cdot (y-2) = \left(\frac{5}{8}x + \frac{15}{8}\right) \cdot 8$

$8y - 16 = 5x + 15$

$+16 \qquad +16$

$8y = 5x + 31$

$-5x \qquad -5x$

$-5x + 8y = 31$

5

Find the equation of the line in *standard form* that goes through the points (-1, 0) and (-7, 3).

$m = \frac{3-0}{-7+1} = \frac{3}{-6} = -\frac{1}{2}$ $\quad m = -\frac{1}{2}$ $(-1, 0)$

$y - 0 = -\frac{1}{2}(x+1)$

$2 \cdot (y) = \left(-\frac{1}{2}x - \frac{1}{2}\right) \cdot 2$

$2y = -1x - 1$

$+1x \qquad +1x$

$x + 2y = -1$

6

A scuba diver is 30 ft below the surface of the water 10 seconds after she entered the water and 100 ft below the surface after 40 seconds. What is her *average rate of change* in feet per second?

$$\frac{\text{feet}}{\text{second}} = \frac{100-30}{40-10} = \frac{70}{30} \overset{\div 30}{\div 30} = \frac{2.\overline{3}\ \text{ft}}{1\ \text{sec}}$$

$\approx$ 2.3 ft per second

7

Find the equation of the line in standard form that goes through the point (-4, 5) and is *parallel* to the line $y = \frac{1}{8}x + 4$.

$m_{\parallel} = \frac{1}{8}$ (-4, 5)

$y - 5 = \frac{1}{8}(x+4)$

$8 \cdot (y-5) = \left(\frac{1}{8}x + \frac{4}{8}\right) \cdot 8$

$8y - 40 = x + 4$

$+40 \quad +40$

$8y = x + 44$

$-x \quad -x$

$-x + 8y = 44$

8

Find the equation of the line in standard form that goes through the coordinate (3, 4) and is *perpendicular* to the line $y = 3x - 7$.

$m_{\perp} = \frac{-1}{3}$ (3, 4)

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

$3 \cdot (y-4) = \left(\frac{-1}{3}x + 1\right) \cdot 3$

$3y - 12 = -1x + 3$

$+12 \quad +12$

$3y = -x + 15$

$+x \quad +x$

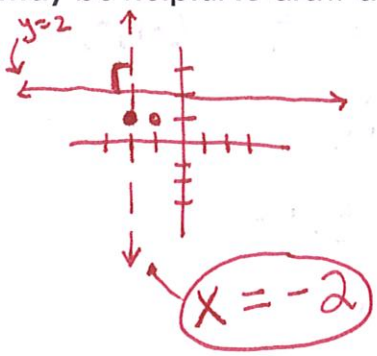
$x + 3y = 15$

9

Find the equation of the line in standard form that goes through the coordinate (-2, 1) and is *parallel* to the line $y = 2$. (Hint: it may be helpful to draw a sketch.)

10

Find the equation of the line in standard form that goes through the coordinate (-2, 1) and is *perpendicular* to the line $y = 2$. (Hint: it may be helpful to draw a sketch.)



11

Find the equation of the line in standard form that goes through the coordinate (3, 4) and is *perpendicular* to the line $3x - 2y = 4$.

$3x - 2y = 4$

$-3x \quad -3x$

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

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

$m_{\perp} = \frac{-2}{3}$ (3, 4)

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

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

$3y - 12 = -2x + 6$

$+12 \quad +12$

$3y = -2x + 18$

$+2x \quad +2x$

$2x + 3y = 18$

12