87. Negative slope: line falls to the right.

Zero slope: line is horizontal

Positive slope: line rises to the right

89. In the form $y = mx + b$, m represents the slope and b represents the y-intercept.

91. No, it is not possible for two lines with positive slopes to be perpendicular to each other. Their slopes must be negative reciprocals of each other.

Mid-Chapter Quiz for Chapter 2

1. Quadrants I or II. Since x can be any real number and y is 4, the point $(x, 4)$ can only be located in quadrants in which the y coordinate is positive.

2. $(10, -3)$

3. $4x - 3y = 10$

(a) $(2, 1)$ $\quad 4(2) - 3(1) \stackrel{?}{=} 10$

$8 - 3 \stackrel{?}{=} 10$

$5 \neq 10$ not a solution

(b) $(1, -2)$ $\quad 4(1) - 3(-2) \stackrel{?}{=} 10$

$4 + 6 \stackrel{?}{=} 10$

$10 = 10$ solution

(c) $(2.5, 0)$ $\quad 4(2.5) - 3(0) \stackrel{?}{=} 10$

$10 - 0 \stackrel{?}{=} 10$

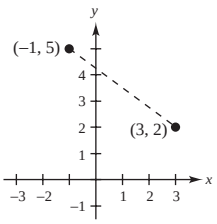
$10 = 10$ solution

(d) $\left(2, -\frac{2}{3}\right)$ $\quad 4(2) - 3\left(-\frac{2}{3}\right) \stackrel{?}{=} 10$

$8 + 2 \stackrel{?}{=} 10$

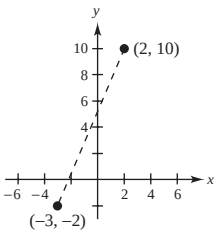
$10 = 10$ solution

4.



$$d = \sqrt{(-1 - 3)^2 + (5 - 2)^2}$$
$$= \sqrt{16 + 9}$$
$$= \sqrt{25}$$
$$= 5$$

5.



$$d = \sqrt{(-3 - 2)^2 + (-2 - 10)^2}$$
$$= \sqrt{25 + 144}$$
$$= \sqrt{169}$$
$$= 13$$

6. $6x - 8y + 48 = 0$

x-intercept: $6x - 8(0) + 48 = 0$

$6x = -48$

$x = -8$ $\quad (-8, 0)$

y-intercept: $6(0) - 8y + 48 = 0$

$-8y = -48$

$y = 6$ $\quad (0, 6)$

7. $y = 2x - 3$

$y = 2(0) - 3$

$= -3$ $\quad (0, -3)$

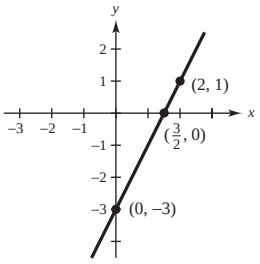
$0 = 2x - 3$

$3 = 2x$

$\frac{3}{2} = x$ $\quad \left(\frac{3}{2}, 0\right)$

$y = 2(2) - 3$

$= 1$ $\quad (2, 1)$



8. $3x + y - 6 = 0$

$3(0) + y - 6 = 0$

$y = 6$ $(0, -6)$

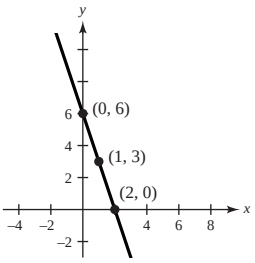
$3x + 0 - 6 = 0$

$3x = 6$

$x = 2$ $(2, 0)$

$3(1) + y - 6 = 0$

$y = 3$ $(1, 3)$



9. $y = 6x - x^2$

$y = 6(0) - 0^2$

$= 0$ $(0, 0)$

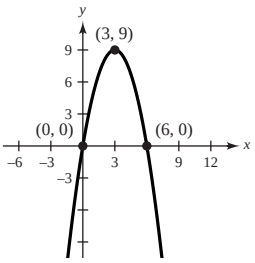
$y = 6(6) - 6^2$

$= 0$ $(6, 0)$

$y = 6(3) - 3^2$

$= 18 - 9$

$= 9$ $(3, 9)$



10. $y = x^2 - 4$

$y = 0^2 - 4$

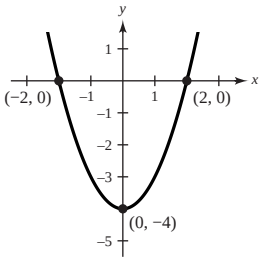
$= -4$ $(0, -4)$

$y = 2^2 - 4$

$= 0$ $(2, 0)$

$y = (-2)^2 - 4$

$= 0$ $(-2, 0)$



11. $y = |x| + 1$

$y = |0| + 1$

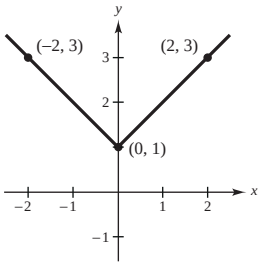
$= 1$ $(0, 1)$

$y = |1| + 1$

$= 2$ $(1, 2)$

$y = |-1| + 1$

$= 2$ $(-1, 2)$



12. $y = |x - 2| - 3$

$y = |0 - 2| - 3$

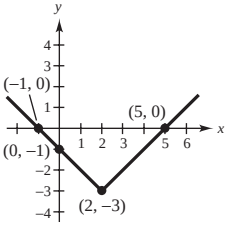
$= -1$ $(0, -1)$

$y = |5 - 2| - 3$

$= 0$ $(5, 0)$

$y = |2 - 2| - 3$

$= -3$ $(2, -3)$



13. $m = \dfrac{-2-3}{5-5} = \dfrac{-5}{0} =$ undefined

Line is vertical.

14. $m = \dfrac{8-8}{7-(-3)} = \dfrac{0}{10} = 0$ Line is horizontal.

15. $m = \dfrac{5-0}{6-3} = \dfrac{5}{3}$ Line rises.

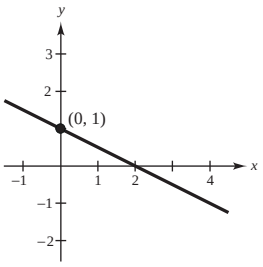
16. $m = \dfrac{-6-4}{5-(-1)} = \dfrac{-10}{6} = \dfrac{-5}{3}$ Line falls.

17. $3x + 6y = 6$

$6y = -3x + 6$

$y = \dfrac{-1}{2}x + 1$

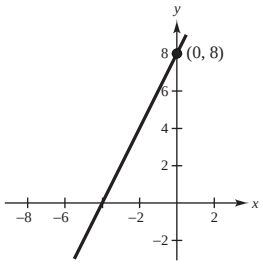
$m = \dfrac{-1}{2}$; (0, 1)



18. $-2x + y = 8$

$y = 2x + 8$

$m = 2$; (0, 8)

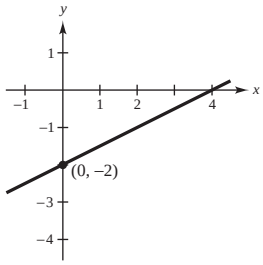


19. $x - 2y = 4$

$-2y = -x + 4$

$y = \dfrac{1}{2}x - 2$

$m = \dfrac{1}{2}$; (0, −2)



20. $y = 3x + 2; y = \dfrac{-1}{3}x - 4$

$m_1 = 3 \quad m_2 = \dfrac{-1}{3}$

$m_1 \cdot m_2 = -1$

Lines are perpendicular.

21. $y = 2x + 3; y = -2x - 3$

$m_1 = 2 \quad m_2 = -2$

$m_1 \neq m_2$

$m_1 \cdot m_2 \neq -1$

Lines are neither.

22. $y = 4x + 3; y = \dfrac{1}{2}(8x + 5)$

$m_1 = 4 \quad m_2 = 4$

$m_1 = m_2$

Lines are parallel.

23. (0, \$85,000), (10, \$4000)

$m = \dfrac{4000 - 85{,}000}{10 - 0} = \dfrac{-81{,}000}{10} = -8100$

$V = -8100t + 85{,}000, 0 \leq t \leq 10$