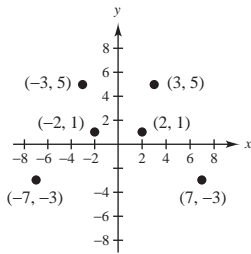


101. No. The scales on the x and y -axes are determined by the magnitudes of the quantities being measured by x and y .

103.



When the sign of the x -coordinate is changed, the point is on the opposite side of the y -axis as the original point.

Section 2.2 Graphs of Equations

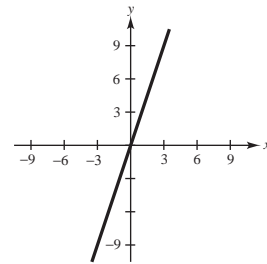
1. $y = 2$ matches graph (e).

3. $y = 2 - x$ matched graph (f)

5. $y = x^2 - 4$ matches graph (d).

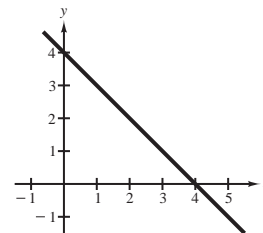
7.

x	-2	-1	0	1	2
$y = 3x$	-6	-3	0	3	6
Solution	$(-2, -6)$	$(-1, -3)$	$(0, 0)$	$(1, 3)$	$(2, 6)$



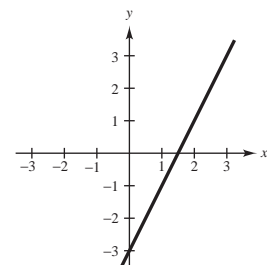
9.

x	-2	-1	0	1	2
$y = 4 - x$	6	5	4	3	2
Solution	$(-2, 6)$	$(-1, 5)$	$(0, 4)$	$(1, 3)$	$(2, 2)$



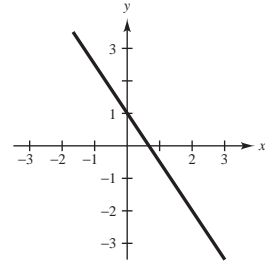
11.

x	-2	-1	0	1	2
$y = 2x - 3$	-7	-5	-3	-1	1
Solution	$(-2, -7)$	$(-1, -5)$	$(0, -3)$	$(1, -1)$	$(2, 1)$



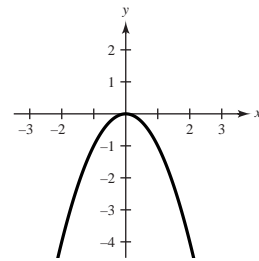
13.

x	-2	-1	0	1	2
$y = -\frac{3}{2}x + 1$	4	$\frac{5}{2}$	1	$-\frac{1}{2}$	-2
Solution	$(-2, 4)$	$(-1, \frac{5}{2})$	$(0, 1)$	$(1, -\frac{1}{2})$	$(2, -2)$



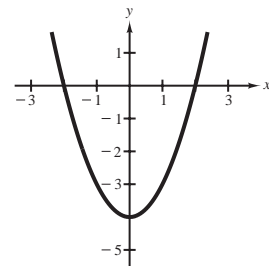
15.

x	-2	-1	0	1	2
$y = -x^2$	-4	-1	0	-1	-4
Solution	$(-2, -4)$	$(-1, -1)$	$(0, 0)$	$(1, -1)$	$(2, -4)$



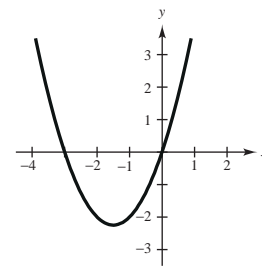
17.

x	-2	-1	0	1	2
$y = x^2 - 4$	0	-3	-4	-3	0
Solution	$(-2, 0)$	$(-1, -3)$	$(0, -4)$	$(1, -3)$	$(2, 0)$



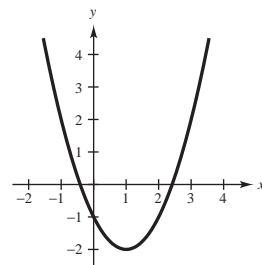
19.

x	-2	-1	0	1	2
$y = x^2 + 3x$	-2	-2	0	4	10
Solution	$(-2, -2)$	$(-1, -2)$	$(0, 0)$	$(1, 4)$	$(2, 10)$



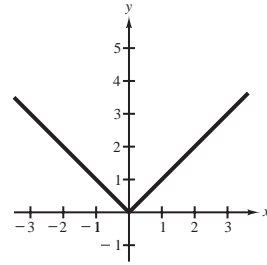
21.

x	-2	-1	0	1	2
$y = x^2 - 2x - 1$	7	2	-1	-2	-1
Solution	$(-2, 7)$	$(-1, 2)$	$(0, -1)$	$(1, -2)$	$(2, -1)$



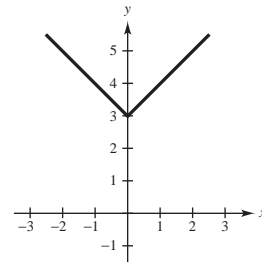
23.

x	-2	-1	0	1	2
$y = x $	2	1	0	1	2
Solution	(-2, 2)	(-1, 1)	(0, 0)	(1, 1)	(2, 2)



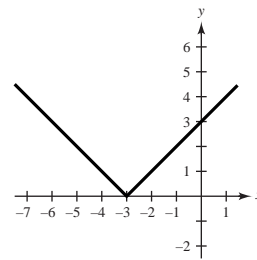
25.

x	-2	-1	0	1	2
$y = x + 3$	5	4	3	4	5
Solution	(-2, 5)	(-1, 4)	(0, 3)	(1, 4)	(2, 5)



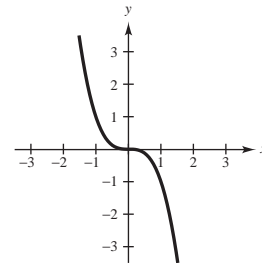
27.

x	-2	-1	0	1	2
$y = x + 3 $	1	2	3	4	5
Solution	(-2, 1)	(-1, 2)	(0, 3)	(1, 4)	(2, 5)



29.

x	-2	-1	0	1	2
$y = -x^3$	8	1	0	-1	-8
Solution	(-2, 8)	(-1, 1)	(0, 0)	(1, -1)	(2, -8)



31. $y = 6x - 3$

y-intercept: $y = 6(0) - 3$

$y = -3$ $(0, -3)$

x-intercept: $0 = 6x - 3$

$3 = 6x$

$\frac{3}{6} = x$

$\frac{1}{2} = x$ $(\frac{1}{2}, 0)$

33. $y = \frac{3}{4}x + 15$

y-intercept: $y = \frac{3}{4}(0) + 15$

$y = 15$ $(0, 15)$

x-intercept: $0 = \frac{3}{4}x + 15$

$-15 = \frac{3}{4}x$

$-20 = x$ $(-20, 0)$

35. $x + 2y = 10$

y-intercept: $0 + 2y = 0$

$y = 5 \quad (0, 5)$

x-intercept: $x + 2(0) = 10$

$x = 10 \quad (10, 0)$

37. $4x - y + 3 = 0$

y-intercept: $4(0) - y + 3 = 0$

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

x-intercept: $4x - 0 + 3 = 0$

$4x = -3$

$x = -\frac{3}{4} \quad \left(-\frac{3}{4}, 0\right)$

39. $y = |x| - 1$

y-intercept: $y = |0| - 1$

$y = -1 \quad (0, -1)$

x-intercept: $0 = |x| - 1$

$1 = |x|$

$\pm 1 = x \quad (1, 0), (-1, 0)$

41. $y = |x + 2|$

y-intercept: $y = |0 + 2|$

$y = 2 \quad (0, 2)$

x-intercept: $0 = |x + 2|$

$0 = x + 2$

$-2 = x \quad (-2, 0)$

43. $y = |x - 1| - 3$

y-intercept: $y = |0 - 1| - 3$

$y = 1 - 3$

$y = -2 \quad (0, -2)$

x-intercept: $0 = |x - 1| - 3$

$3 = |x - 1|$

$3 = x - 1 \text{ or } -3 = x - 1$

$4 = x \quad -2 = x \quad (4, 0), (-2, 0)$

45. $2x + 3y = 6$

Estimate: y-intercept ≈ 2 **Check:** $2(0) + 3y = 6$

x-intercept ≈ 3 $3y = 6$

$y = 2 \quad (0, 2)$

$2x + 3(0) = 6$

$2x = 6$

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

47. $y = x^2 + 3$

Estimate: y-intercept ≈ 3 **Check:** $y = 0^2 + 3 = 3 \quad (0, 3)$

no x-intercepts $0 = x^2 + 3$

$-3 = x^2 \quad \text{no real solution}$

49. $y = 4x - 6$

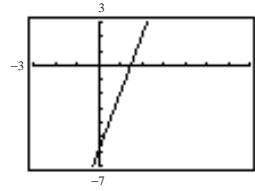
Keystrokes: $\boxed{Y=}$ 4 $\boxed{X,T,\theta}$ $\boxed{-}$ 6 $\boxed{\text{GRAPH}}$

Estimate: y-intercept ≈ -6

x-intercept $\approx \frac{3}{2}$

Check: $y = 4(0) - 6$

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



Check: $0 = 4x - 6$

$6 = 4x$

$\frac{6}{4} = x$

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

51. $y = (x - 1)(x - 6)$

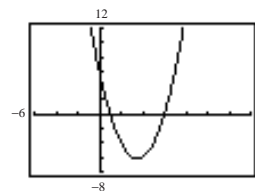
Keystrokes: $\boxed{Y=}$ $\boxed{}$ $\boxed{X,T,\theta}$ $\boxed{-}$ 1 $\boxed{)}$ $\boxed{}$ $\boxed{X,T,\theta}$ $\boxed{-}$ 6 $\boxed{)}$ $\boxed{\text{GRAPH}}$

Estimate: y-intercept ≈ 6

x-intercepts $\approx 1, 6$

Check: $y = (0 - 1)(0 - 6)$

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



Check: $0 = (x - 1)(x - 6)$

$x = 1 \quad x = 6 \quad (1, 0), (6, 0)$

53. $y = |4x + 6| - 2$

Keystrokes: $\boxed{Y=}$ $\boxed{\text{ABS}}$ $\boxed{}$ 4 $\boxed{X,T,\theta}$ $\boxed{+}$ 6 $\boxed{)}$ $\boxed{-}$ 2 $\boxed{\text{GRAPH}}$

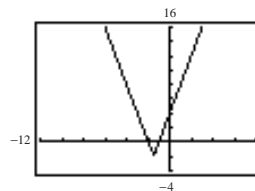
Estimate: y-intercept ≈ 4

x-intercepts $\approx -1, -2$

Check: $y = |4(0) + 6| - 2$

$y = 6 - 2$

$y = 4 \quad (0, 4)$



Check: $0 = |4x + 6| - 2$

$2 = |4x + 6|$

$2 = 4x + 6 \quad \text{or} \quad 4x + 6 = -2$

$-4 = 4x \quad 4x = -8$

$-1 = x \quad x = -2$

$(-1, 0), (-2, 0)$

55. $y = 3 - 0$

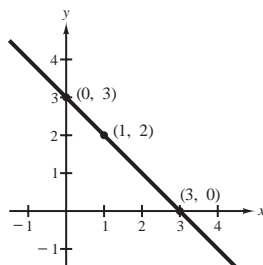
$y = 3 \quad (0, 3)$

$0 = 3 - x$

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

$y = 3 - 1$

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



57. $y = 2(0) - 3$

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

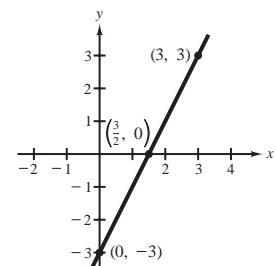
$0 = 2x - 3$

$3 = 2x$

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

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

$y = 3 \quad (3, 3)$



59. $4x + y = 3$

$4(0) + y = 3$

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

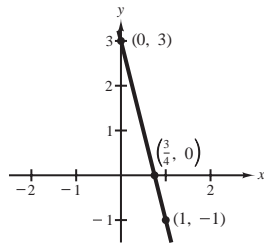
$4x + 0 = 3$

$4x = 3$

$x = \frac{3}{4} \quad (\frac{3}{4}, 0)$

$4(1) + y = 3$

$y = -1 \quad (1, -1)$



61. $2x - 3y = 6$

$2(0) - 3y = 6$

$-3y = 6$

$y = -2 \quad (0, -2)$

$2x - 3(0) = 6$

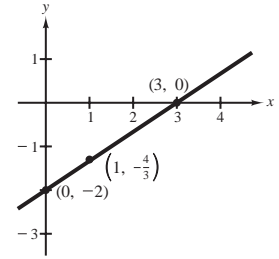
$2x = 6$

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

$2(1) - 3y = 6$

$-3y = 4$

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



63. $x + 5y = 10$

$0 + 5y = 10$

$y = 2 \quad (0, 2)$

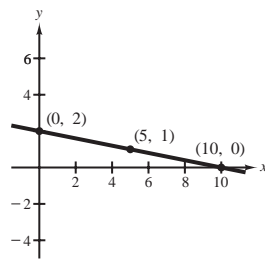
$x + 5(0) = 10$

$x = 10 \quad (10, 0)$

$5 + 5y = 10$

$5y = 5$

$y = 1 \quad (5, 1)$



65. $y = x^2 - 9$

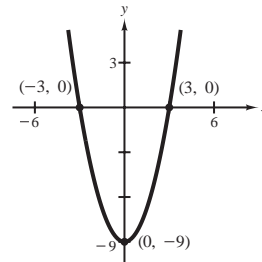
$0 = x^2 - 9$

$0 = (x - 3)(x + 3)$

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

$y = 0^2 - 9$

$y = -9 \quad (0, -9)$



67. $y = 1 - x^2$

$y = 1 - 0$

$y = 1 \quad (0, 1)$

$y = 1 - (1)^2$

$y = 1 - 1$

$y = 0 \quad (1, 0)$

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

$y = 1 - 1$

$y = 0 \quad (-1, 0)$

69. $y = x(x - 2)$

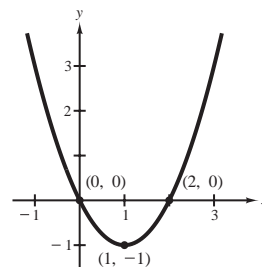
$y = 0^2 - 2(0)$

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

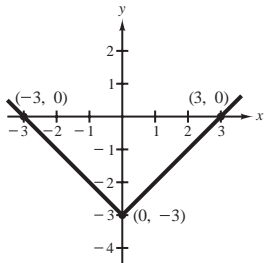
$0 = x^2 - 2x$

$0 = x(x - 2)$

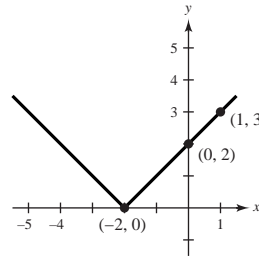
$0 = x \quad x = 2 \quad (0, 0), (2, 0)$



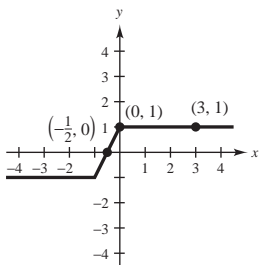
71. $y = |x| - 3$
 $y = -3$ (0, -3)
 $0 = |x| - 3$
 $3 = |x|$
 $3 = x$ $x = -3$ (3, 0), (-3, 0)



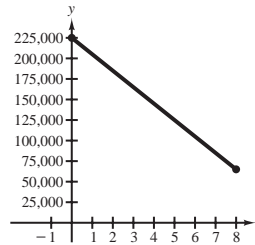
73. $y = |x + 2|$
 $= 2$ (0, 2)
 $y = |-2 + 2|$
 $= 0$ (-2, 0)
 $y = |-4 + 2|$
 $= 2$ (-4, 2)



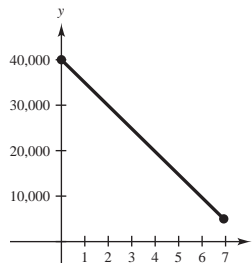
75. $y = -|x| + |x + 1|$ $y = -|3| + |3 + 1|$
 $y = -|0| + |0 + 1|$ $y = -3 + 4$
 $y = 1$ (0, 1) $y = 1$ (3, 1)
 $0 = -|x| + |x + 1|$
 $|x| = |x + 1|$
 $x = x + 1$ or $-x = x + 1$
 $0 \neq 1$ $-2x = 1$
 $x = -\frac{1}{2}$ $(-\frac{1}{2}, 0)$



77. $y = 225,000 - 20,000t$
 $y = 225,000 - 20,000(0)$
 $= 225,000$ (0, 225,000)
 $y = 225,000 - 20,000(8)$
 $= 225,000 - 160,000$
 $= 65,000$ (8, 65,000)

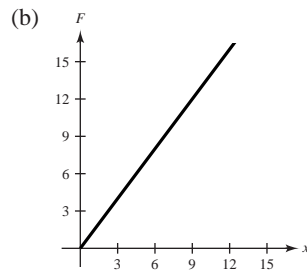


79. $0 \leq x \leq 7$
(0, 40,000), (7, 5000)
 $m = \frac{40,000 - 5,000}{0 - 7} = \frac{35,000}{-7} = -5000$
 $y = -5000x + 40,000$



81. (a)

x	0	3	6	9	12
$\frac{4}{3}x$	0	4	8	12	16



(c) F doubles.

83. The scales on the y-axes are different. From graph (a) it appears that sales have not increased. From graph (b) it appears that sales have increased dramatically.

85. The graph of an equation is the set of all solutions of the equation plotted on a rectangular coordinate system.

87. To find the x -intercepts, let $y = 0$ and solve the equation for x . To find the y -intercepts, let $x = 0$ and solve the equation for y .

Example:

$$2x - y = 4$$

$$2x - 0 = 4 \qquad 2(0) - y = 4$$

$$2x = 4 \qquad -y = 4$$

$$x = 2 \quad (2, 0) \qquad y = -4 \quad (0, -4)$$

x -intercept y -intercept

89. (a) It is 6 miles from the person's home.

(b) For time $4 < t < 6$ the person is stopped since the graph is a constant line.

(c) The person's speed was greatest during $6 \leq t \leq 10$ because the graph is steepest there.

Section 2.3 Slope and Graphs of Linear Equations

1. (0, 2) and (6, 6)

$$m = \frac{6 - 2}{6 - 0} = \frac{4}{6} = \frac{2}{3}$$

3. (0, 8) and (4, 0)

$$m = \frac{0 - 8}{4 - 0} = \frac{-8}{4} = -2$$

5. (3, 0) and (3, 8)

$$m = \frac{8 - 0}{3 - 3} = \frac{8}{0} = \text{undefined}$$

7. (a) $m = \frac{3}{4} \Rightarrow L_3$ (b) $m = 0 \Rightarrow L_2$

(c) $m = -3 \Rightarrow L_1$