

Review Assignment

Pages 336 - 340

Required: 1-49 odds

Extra Credit: 2-50 evens

$$ax^2 + bx + c = 0$$

$$ax^2 + bx = -c$$

$$x^2 + \frac{b}{a}x = -\frac{c}{a}$$

$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = -\frac{c}{a} + \frac{b^2}{4a^2} \text{ complete the square}$$

$$\left(x + \frac{b}{2a}\right)^2 = -\frac{4ac}{4a^2} + \frac{b^2}{4a^2}$$

$$\left(x + \frac{b}{2a}\right)^2 = \frac{b^2 - 4ac}{4a^2}$$

$$x + \frac{b}{2a} = \pm \sqrt{\frac{b^2 - 4ac}{4a^2}}$$

$$x + \frac{b}{2a} = \frac{\pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

46.)

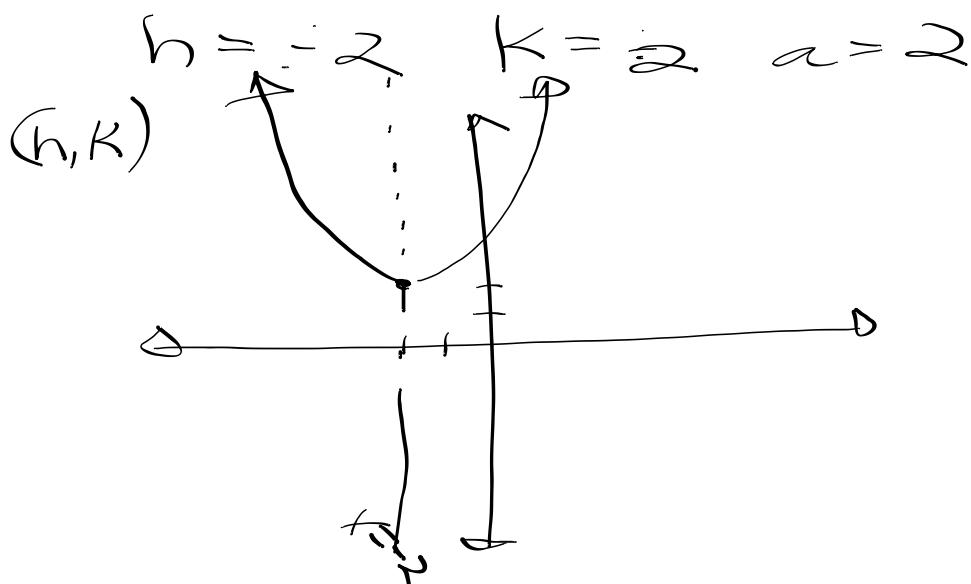
$$y = 2x^2 + 8x + 10$$

Write in vertex form
and graph

$$y = 2(x^2 + 4x) + 10 \quad (\frac{b}{2})^2 = 4$$

$$y = 2(x^2 + 4x + 4) + 10 - 8 \quad y = a(x-h)^2 + k$$

$$2(x+2)^2 + 2$$



Write an equation with
vertex $(-2, 3)$
goes through $(-6, 11)$

$$y = a(x - h)^2 + k$$

vertex (h, k)

$$y = a(x - (-2))^2 + 3$$

$$11 = a(-6 - (-2))^2 + 3$$

$$11 = a(-4)^2 + 3$$

$$11 = a \cdot 16 + 3$$

$$\begin{array}{r} 11 = 16a + 3 \\ -3 \\ \hline \end{array}$$

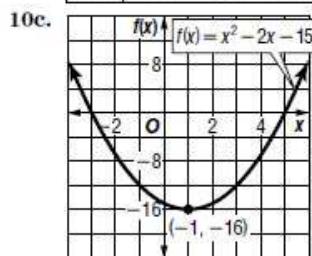
$$8 = 16a$$

$$\frac{1}{2} = a$$

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

10b.

x	$x^2 - 2x - 15$	$f(x)$	$(x, f(x))$
-1	$(-1)^2 - 2(-1) - 15$	-12	(-1, -12)
0	$(0)^2 - 2(0) - 15$	-15	(0, -15)
1	$(1)^2 - 2(1) - 15$	-16	(1, -16)
2	$(2)^2 - 2(2) - 15$	-15	(2, -15)
3	$(3)^2 - 2(3) - 15$	-12	(3, -12)



11a. $f(x) = x^2 - 8x + 7 \rightarrow f(x) = 1x^2 - 8x + 7$

So, $a = 1$, $b = -8$, and $c = 7$.

Since $c = 7$, the y -intercept is 7.

Axis of symmetry:

$$x = -\frac{b}{2a}$$

$$x = -\frac{-8}{2(1)}$$

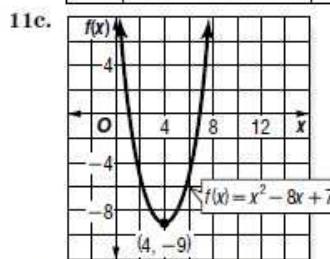
$$x = 4$$

The equation of the axis of symmetry is $x = 4$.

Therefore, the x -coordinate of the vertex is 4.

11b.

x	$x^2 - 8x + 7$	$f(x)$	$(x, f(x))$
2	$(2)^2 - 8(2) + 7$	-5	(2, -5)
3	$(3)^2 - 8(3) + 7$	-8	(3, -8)
4	$(4)^2 - 8(4) + 7$	-9	(4, -9)
5	$(5)^2 - 8(5) + 7$	-8	(5, -8)
6	$(6)^2 - 8(6) + 7$	-5	(6, -5)



12a. $f(x) = -2x^2 + 12x - 9$

So, $a = -2$, $b = 12$, and $c = -9$.

Since $c = -9$, the y -intercept is -9.

Axis of symmetry:

$$x = -\frac{b}{2a}$$

$$x = -\frac{12}{2(-2)}$$

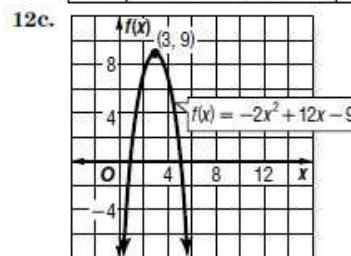
$$x = 3$$

The equation of the axis of symmetry is $x = 3$.

Therefore, the x -coordinate of the vertex is 3.

12b.

x	$-2x^2 + 12x - 9$	$f(x)$	$(x, f(x))$
1	$-2(1)^2 + 12(1) - 9$	1	(1, 1)
2	$-2(2)^2 + 12(2) - 9$	7	(2, 7)
3	$-2(3)^2 + 12(3) - 9$	9	(3, 9)
4	$-2(4)^2 + 12(4) - 9$	7	(4, 7)
5	$-2(5)^2 + 12(5) - 9$	1	(5, 1)



13a. $f(x) = -x^2 - 4x - 3 \rightarrow f(x) = -1x^2 - 4x - 3$

So, $a = -1$, $b = -4$, and $c = -3$.

Since $c = -3$, the y -intercept is -3.

Axis of symmetry:

$$x = -\frac{b}{2a}$$

$$x = -\frac{-4}{2(-1)}$$

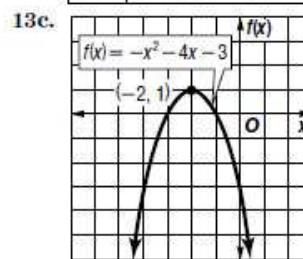
$$x = -2$$

The equation of the axis of symmetry is $x = -2$.

Therefore, the x -coordinate of the vertex is -2.

13b.

x	$-x^2 - 4x - 3$	$f(x)$	$(x, f(x))$
-4	$-(-4)^2 - 4(-4) - 3$	-3	(-4, -3)
-3	$-(-3)^2 - 4(-3) - 3$	0	(-3, 0)
-2	$-(-2)^2 - 4(-2) - 3$	1	(-2, 1)
-1	$-(-1)^2 - 4(-1) - 3$	0	(-1, 0)
0	$-(0)^2 - 4(0) - 3$	-3	(0, -3)



14a. $f(x) = 3x^2 + 9x + 6$

So, $a = 3$, $b = 9$, and $c = 6$.

Since $c = 6$, the y -intercept is 6.

Axis of symmetry:

$$x = -\frac{b}{2a}$$

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

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

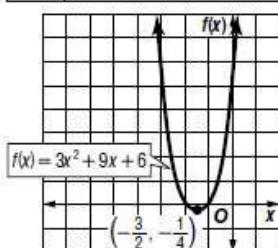
The equation of the axis of symmetry is $x = -\frac{3}{2}$.

Therefore, the x -coordinate of the vertex is $-\frac{3}{2}$.

14b.

x	$3x^2 + 9x + 6$	$f(x)$	$(x, f(x))$
-3	$3(-3)^2 + 9(-3) + 6$	6	(-3, 6)
-2	$3(-2)^2 + 9(-2) + 6$	0	(-2, 0)
$-\frac{3}{2}$	$3\left(-\frac{3}{2}\right)^2 + 9\left(-\frac{3}{2}\right) + 6$	$-\frac{3}{4}$	$\left(-\frac{3}{2}, -\frac{3}{4}\right)$
-1	$3(-1)^2 + 9(-1) + 6$	0	(-1, 0)
0	$3(0)^2 + 9(0) + 6$	6	(0, 6)

14c.

15. For this function, $a = 4$, $b = -3$, and $c = -5$.

Since $a > 0$, the graph opens up and the function has a minimum value. The x -coordinate of the vertex is $-\frac{-3}{2(4)}$ or $\frac{3}{8}$.

$$\begin{aligned}f(x) &= 4x^2 - 3x - 5 \\f\left(\frac{3}{8}\right) &= 4\left(\frac{3}{8}\right)^2 - 3\left(\frac{3}{8}\right) - 5 \\&= -\frac{89}{16}\end{aligned}$$

Therefore, the minimum value of the function is $-\frac{89}{16}$.

16. For this function, $a = -3$, $b = 2$, and $c = -2$. Since $a < 0$, the graph opens down and the function has a maximum value. The x -coordinate of the vertex is $-\frac{2}{2(-3)}$ or $\frac{1}{3}$.

$$\begin{aligned}f(x) &= -3x^2 + 2x - 2 \\f\left(\frac{1}{3}\right) &= -3\left(\frac{1}{3}\right)^2 + 2\left(\frac{1}{3}\right) - 2 \\&= -\frac{5}{3}\end{aligned}$$

Therefore, the maximum value of the function is $-\frac{5}{3}$.

17. For this function, $a = -2$, $b = 0$, and $c = 7$. Since $a < 0$, the graph opens down and the function has a maximum value. The x -coordinate of the vertex is $-\frac{0}{2(-2)}$ or 0.

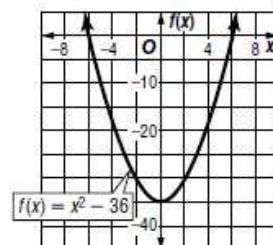
$$\begin{aligned}f(x) &= -2x^2 + 7 \\f(0) &= -2(0)^2 + 7 \\&= 7\end{aligned}$$

Therefore, the maximum value of the function is 7.

18. Graph the related quadratic function

$$f(x) = x^2 - 36.$$

x	-4	-2	0	2	4
$f(x)$	-20	-32	-36	-32	-20

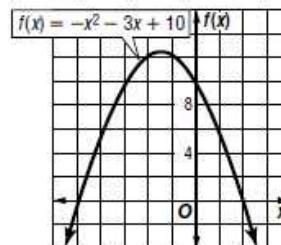


From the graph, we can see that the zeros of the function are -6 and 6. Therefore, the solutions of the equation are -6 and 6.

19. Graph the related quadratic function

$$f(x) = -x^2 - 3x + 10.$$

x	-3	-2	-1.5	-1	0
$f(x)$	10	12	12.25	12	10

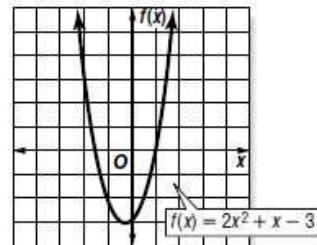


From the graph, we can see that the zeros of the function are -5 and 2. Therefore, the solutions of the equation are -5 and 2.

20. Graph the related quadratic function

$$f(x) = 2x^2 + x - 3.$$

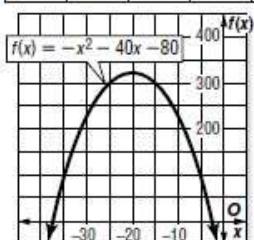
x	-2	-1	0	1	2
$f(x)$	3	-2	-3	0	7



The x -intercepts of the graph are 1 and between -2 and -1. So, one solution is 1, and the other is between -2 and -1.

21. Graph the related quadratic function
 $f(x) = -x^2 - 40x - 80$.

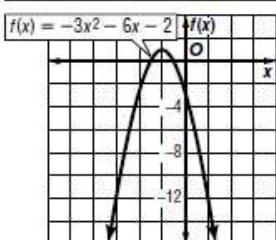
x	-30	-25	-20	-15	-10
$f(x)$	220	295	320	295	220



The x -intercepts of the graph are between -38 and -37 and between -3 and -2 . So, one solution is between -38 and -37 , and the other is between -3 and -2 .

22. Graph the related quadratic function
 $f(x) = -3x^2 - 6x - 2$.

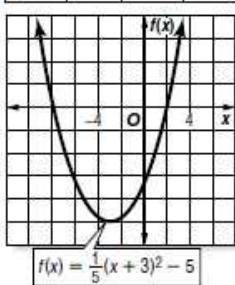
x	-3	-2	-1	0	1
$f(x)$	-11	-2	1	-2	-11



The x -intercepts of the graph are between -2 and -1 and between -1 and 0 . So, one solution is between -2 and -1 , and the other is between -1 and 0 .

23. Graph the related quadratic function
 $f(x) = \frac{1}{5}(x + 3)^2 - 5$.

x	-8	-6	-3	0	2
$f(x)$	0	-3.2	-5	-3.2	0



From the graph, we can see that the zeros of the function are -8 and 2 . Therefore, the solutions of the equations are -8 and 2 .

24. $x^2 - 4x - 32 = 0$
 $(x - 8)(x + 4) = 0$
 $x - 8 = 0$ or $x + 4 = 0$
 $x = 8$ $x = -4$
The solution set is $\{-4, 8\}$.

25. $3x^2 + 6x + 3 = 0$
 $3(x^2 + 2x + 1) = 0$
 $x^2 + 2x + 1 = 0$
 $(x + 1)(x + 1) = 0$
 $x + 1 = 0$ or $x + 1 = 0$
 $x = -1$ $x = -1$
The solution set is $\{-1\}$.

26. $5y^2 = 80$
 $5y^2 - 80 = 0$
 $5(y^2 - 16) = 0$
 $y^2 - 16 = 0$
 $(y - 4)(y + 4) = 0$
 $y - 4 = 0$ or $y + 4 = 0$
 $y = 4$ $y = -4$
The solution set is $\{-4, 4\}$.

27. $2c^2 + 18c - 44 = 0$
 $2(c^2 + 9c - 22) = 0$
 $c^2 + 9c - 22 = 0$
 $(c - 2)(c + 11) = 0$
 $c - 2 = 0$ or $c + 11 = 0$
 $c = 2$ $c = -11$
The solution set is $\{-11, 2\}$.

28. $25x^2 - 30x = -9$
 $25x^2 - 30x + 9 = 0$
 $(5x - 3)(5x - 3) = 0$
 $5x - 3 = 0$ or $5x - 3 = 0$
 $5x = 3$ $5x = 3$
 $x = \frac{3}{5}$ $x = \frac{3}{5}$
The solution set is $\left\{\frac{3}{5}\right\}$.

29. $6x^2 + 7x = 3$
 $6x^2 + 7x - 3 = 0$
 $(3x - 1)(2x + 3) = 0$
 $3x - 1 = 0$ or $2x + 3 = 0$
 $3x = 1$ $2x = -3$
 $x = \frac{1}{3}$ $x = -\frac{3}{2}$
The solution set is $\left\{-\frac{3}{2}, \frac{1}{3}\right\}$.

30. $[x - (-4)][x - (-25)] = 0$
 $(x + 4)(x + 25) = 0$
 $x^2 + 29x + 100 = 0$

31. $(x - 10)[x - (-7)] = 0$
 $(x - 10)(x + 7) = 0$
 $x^2 - 3x - 70 = 0$

32. $\left(x - \frac{1}{3}\right)(x - 2) = 0$
 $x^2 - \frac{7}{3}x + \frac{2}{3} = 0$
 $3x^2 - 7x + 2 = 0$

33. Step 1 Find one half of 34. $\frac{34}{2} = 17$
Step 2 Square the result of Step 1. $17^2 = 289$
Step 3 Add the result of Step 2 to $x^2 + 34x$. $x^2 + 34x + 289$
The trinomial $x^2 + 34x + 289$ can be written as $(x + 17)^2$.

34. Step 1 Find one half of -11 . $\frac{-11}{2} = -\frac{11}{2}$
Step 2 Square the result of Step 1. $\left(-\frac{11}{2}\right)^2 = \frac{121}{4}$
Step 3 Add the result of Step 2 to $x^2 - 11x$. $x^2 - 11x + \frac{121}{4}$
The trinomial $x^2 - 11x + \frac{121}{4}$ can be written as $\left(x - \frac{11}{2}\right)^2$.

35. Step 1 Find one half of $\frac{7}{2}$. $\frac{\frac{7}{2}}{2} = \frac{7}{4}$
Step 2 Square the result of Step 1. $\left(\frac{7}{4}\right)^2 = \frac{49}{16}$
Step 3 Add the result of Step 2 to $x^2 + \frac{7}{2}x$. $x^2 + \frac{7}{2}x + \frac{49}{16}$
The trinomial $x^2 + \frac{7}{2}x + \frac{49}{16}$ can be written as $\left(x + \frac{7}{4}\right)^2$.

36. $2x^2 - 7x - 15 = 0$
 $x^2 - \frac{7}{2}x - \frac{15}{2} = 0$
 $x^2 - \frac{7}{2}x = \frac{15}{2}$
 $x^2 - \frac{7}{2}x + \frac{49}{16} = \frac{15}{2} + \frac{49}{16}$
 $\left(x - \frac{7}{4}\right)^2 = \frac{169}{16}$
 $x - \frac{7}{4} = \pm \frac{13}{4}$
 $x = \frac{7}{4} \pm \frac{13}{4}$
 $x = \frac{7}{4} + \frac{13}{4}$ or $x = \frac{7}{4} - \frac{13}{4}$
 $x = 5$ $x = -\frac{3}{2}$
The solution set is $\left\{-\frac{3}{2}, 5\right\}$.

37. $2n^2 - 12n - 22 = 0$
 $n^2 - 6n - 11 = 0$
 $n^2 - 6n = 11$
 $n^2 - 6n + 9 = 11 + 9$
 $(n - 3)^2 = 20$
 $n - 3 = \pm \sqrt{20}$
 $n - 3 = \pm 2\sqrt{5}$
 $n = 3 \pm 2\sqrt{5}$
The solution set is $\{3 - 2\sqrt{5}, 3 + 2\sqrt{5}\}$.

38. $2x^2 - 5x + 7 = 3$
 $2x^2 - 5x + 4 = 0$
 $x^2 - \frac{5}{2}x + 2 = 0$
 $x^2 - \frac{5}{2}x = -2$
 $x^2 - \frac{5}{2}x + \frac{25}{16} = -2 + \frac{25}{16}$
 $\left(x - \frac{5}{4}\right)^2 = -\frac{7}{16}$
 $x - \frac{5}{4} = \pm \sqrt{-\frac{7}{16}}$
 $x - \frac{5}{4} = \pm i\frac{\sqrt{7}}{4}$
 $x = \frac{5}{4} \pm i\frac{\sqrt{7}}{4}$
 $x = \frac{5 \pm i\sqrt{7}}{4}$
The solution set is $\left\{\frac{5 + i\sqrt{7}}{4}, \frac{5 - i\sqrt{7}}{4}\right\}$.

39a. $a = 1, b = 2, c = 7$
 $b^2 - 4ac = (2)^2 - 4(1)(7)$
 $= 4 - 28$
 $= -24$
39b. The discriminant is negative, so there are two complex roots.
39c. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(7)}}{2(1)}$
 $x = \frac{-2 \pm \sqrt{-24}}{2}$
 $x = \frac{-2 \pm 2i\sqrt{6}}{2}$
 $x = -1 \pm i\sqrt{6}$

40a. $a = -2, b = 12, c = -5$
 $b^2 - 4ac = (12)^2 - 4(-2)(-5)$
 $= 144 - 40$
 $= 104$
40b. The discriminant is 104, which is not a perfect square. Therefore, there are two irrational roots.
40c. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-(12) \pm \sqrt{(12)^2 - 4(-2)(-5)}}{2(-2)}$
 $x = \frac{-12 \pm \sqrt{104}}{-4}$
 $x = \frac{-12 \pm 2\sqrt{26}}{-4}$
 $x = \frac{6 \pm \sqrt{26}}{2}$
 $x = 3 \pm \frac{\sqrt{26}}{2}$
The exact solutions are $\left\{3 + \frac{\sqrt{26}}{2}, 3 - \frac{\sqrt{26}}{2}\right\}$.

41a. $a = 3, b = 7, c = -2$
 $b^2 - 4ac = (7)^2 - 4(3)(-2)$
 $= 49 + 24$
 $= 73$
41b. The discriminant is 73, which is not a perfect square. Therefore, there are two irrational roots.
41c. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x = \frac{-(7) \pm \sqrt{(7)^2 - 4(3)(-2)}}{2(3)}$
 $x = \frac{-7 \pm \sqrt{73}}{6}$

42. $y = -6(x + 2)^2 + 3$
 $y = -6[x - (-2)]^2 + 3$
 $h = -2$ and $k = 3$.
The vertex is at $(-2, 3)$, and the axis of symmetry is $x = -2$. Since $a = -6$, the graph opens down.

43. $y = 5x^2 + 35x + 58$

$$y = 5(x^2 + 7x) + 58$$

$$y = 5\left(x^2 + 7x + \frac{49}{4}\right) + 58 - 5\left(\frac{49}{4}\right)$$

$$y = 5\left(x + \frac{7}{2}\right)^2 - \frac{13}{4}$$

$$y = 5\left[x - \left(-\frac{7}{2}\right)\right]^2 + \left(-\frac{13}{4}\right)$$

$$h = -\frac{7}{2} \text{ and } k = -\frac{13}{4}$$

The vertex is at $\left(-\frac{7}{2}, -\frac{13}{4}\right)$, and the axis of symmetry is $x = -\frac{7}{2}$. Since $a = 5$, the graph opens up.

44. $y = -\frac{1}{3}x^2 + 8x$

$$y = -\frac{1}{3}(x^2 - 24x)$$

$$y = -\frac{1}{3}(x^2 - 24x + 144) - \left(-\frac{1}{3}\right)(144)$$

$$y = -\frac{1}{3}(x - 12)^2 + 48$$

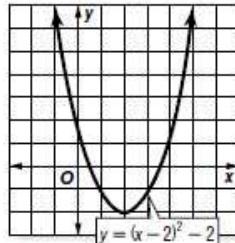
$$h = 12 \text{ and } k = 48$$

The vertex is at $(12, 48)$, and the axis of symmetry is $x = 12$. Since $a = -\frac{1}{3}$, the graph opens down.

45. Plot the vertex, $(2, -2)$.

Find and plot two points on one side of the axis of symmetry, such as $(3, -1)$ and $(4, 2)$.

Use symmetry to complete the graph.



46. Put the equation in vertex form.

$$y = 2x^2 + 8x + 10$$

$$y = 2(x^2 + 4x) + 10$$

$$y = 2(x^2 + 4x + 4) + 10 - 2(4)$$

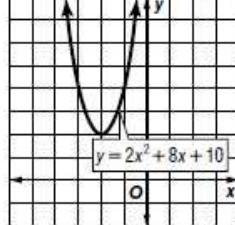
$$y = 2(x + 2)^2 + 2$$

$$y = 2[x - (-2)]^2 + 2$$

Plot the vertex, $(-2, 2)$.

Find and plot two points on one side of the axis of symmetry, such as $(-1.5, 2.5)$ and $(-1, 4)$.

Use symmetry to complete the graph.



47. Put the equation in vertex form.

$$y = -9x^2 - 18x - 6$$

$$y = -9(x^2 + 2x) - 6$$

$$y = -9(x^2 + 2x + 1) - 6 - (-9)(1)$$

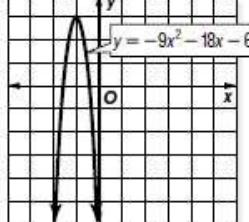
$$y = -9(x + 1)^2 + 3$$

$$y = -9[x - (-1)]^2 + 3$$

Plot the vertex, $(-1, 3)$.

Find and plot two points on one side of the axis of symmetry, such as $(-0.5, 0.75)$ and $(0, -6)$.

Use symmetry to complete the graph.



48. $h = 4$ and $k = 1$. Let $x = 2$ and $y = 13$.

Substitute these values into the vertex form of the equation and solve for a .

$$y = a(x - h)^2 + k$$

$$13 = a(2 - 4)^2 + 1$$

$$13 = a(4) + 1$$

$$12 = 4a$$

$$3 = a$$

The equation is $y = 3(x - 4)^2 + 1$.

49. $h = -2$ and $k = 3$. Let $x = -6$ and $y = 11$.

Substitute these values into the vertex form of the equation and solve for a .

$$y = a(x - h)^2 + k$$

$$11 = a[-6 - (-2)]^2 + 3$$

$$11 = a(16) + 3$$

$$8 = 16a$$

$$\frac{1}{2} = a$$

The equation is $y = \frac{1}{2}(x + 2)^2 + 3$.

50. $h = -3$ and $k = -5$. Let $x = 0$ and $y = -14$.

Substitute these values into the vertex form of the equation and solve for a .

$$y = a(x - h)^2 + k$$

$$-14 = a[0 - (-3)]^2 + (-5)$$

$$-14 = a(9) - 5$$

$$-9 = 9a$$

$$-1 = a$$

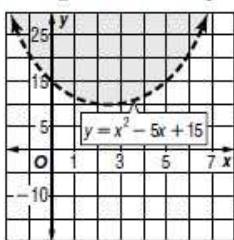
The equation is $y = -(x + 3)^2 - 5$.

51. Graph the related quadratic function $y = x^2 - 5x + 15$. Since the inequality symbol is $>$, the parabola should be dashed.

Test (2, 10).

$$\begin{aligned}y &> x^2 - 5x + 15 \\10 &\geq (2)^2 - 5(2) + 15 \\10 &\geq 4 - 10 + 15 \\10 &\geq 9 \quad \checkmark\end{aligned}$$

So, (2, 10) is a solution of the inequality. Shade the region inside the parabola.



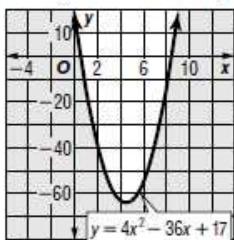
52. Graph the related quadratic function

$y = 4x^2 - 36x + 17$. Since the inequality symbol is \leq , the parabola should be solid.

Test (2, 0).

$$\begin{aligned}y &\leq 4x^2 - 36x + 17 \\0 &\leq 4(2)^2 - 36(2) + 17 \\0 &\leq 16 - 72 + 17 \\0 &\leq -39 \quad \times\end{aligned}$$

So, (2, 0) is not a solution of the inequality. Shade the region outside the parabola.



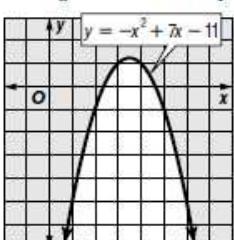
53. Graph the related quadratic function

$y = -x^2 + 7x - 11$. Since the inequality symbol is \geq , the parabola should be solid.

Test (3, 0).

$$\begin{aligned}y &\geq -x^2 + 7x - 11 \\0 &\geq -(3)^2 + 7(3) - 11 \\0 &\geq -9 + 21 - 11 \\0 &\geq 1 \quad \times\end{aligned}$$

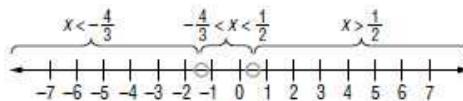
So, (3, 0) is not a solution of the inequality. Shade the region outside the parabola.



54. Solve the related quadratic equation $6x^2 + 5x = 4$.

$$\begin{aligned}6x^2 + 5x - 4 &= 0 \\(2x - 1)(3x + 4) &= 0 \\2x - 1 &= 0 \text{ or } 3x + 4 = 0 \\2x &= 1 \quad 3x = -4 \\x &= \frac{1}{2} \quad x = -\frac{4}{3}\end{aligned}$$

Plot $-\frac{4}{3}$ and $\frac{1}{2}$ on a number line. Use circles.



Test a value in each interval.

$x < -\frac{4}{3}$	$-\frac{4}{3} < x < \frac{1}{2}$	$x > \frac{1}{2}$
Test $x = -2$.	Test $x = 0$.	Test $x = 1$.
$6x^2 + 5x > 4$	$6x^2 + 5x > 4$	$6x^2 + 5x > 4$
$6(-2)^2 + 5(-2) \geq 4$	$6(0)^2 + 5(0) \geq 4$	$6(1)^2 + 5(1) \geq 4$
$14 > 4 \quad \checkmark$	$0 > 4 \quad \times$	$11 > 4 \quad \checkmark$

The solution set is $\{x | x < -\frac{4}{3} \text{ or } x > \frac{1}{2}\}$.

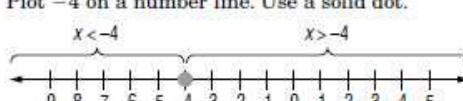
55. Solve the related quadratic equation

$$8x + x^2 = -16$$

$$\begin{aligned}8x + x^2 &= -16 \\x^2 + 8x + 16 &= 0 \\(x + 4)(x + 4) &= 0\end{aligned}$$

$$\begin{aligned}x + 4 &= 0 \quad \text{or } x + 4 = 0 \\x &= -4 \quad x = -4\end{aligned}$$

Plot -4 on a number line. Use a solid dot.



Test a value in each interval.

$x < -4$	$x > -4$
Test $x = -5$.	Test $x = -3$.
$8x + x^2 \geq -16$	$8x + x^2 \geq -16$
$8(-5) + (-5)^2 \geq -16$	$8(-3) + (-3)^2 \geq -16$
$-15 \geq -16 \quad \checkmark$	$-15 \geq -16 \quad \checkmark$

The solution set is $\{x | x \text{ is all real numbers}\}$.