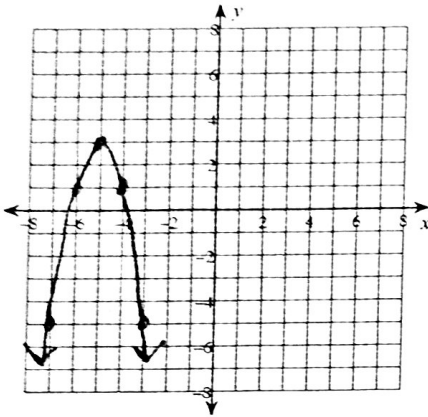


Semester Final Review Part 1

Graph the function and identify the key features. Approximate where necessary. Write intervals in both notations.

5.3 1) $y = -2(x + 5)^2 + 3$



2) a. x-intercept(s): $(-6.5, 0), (-3.5, 0)$

b. y-intercept: $(0, -47)$

c. axis of symmetry: $x = -5$

d. vertex: $(-5, 3)$

e. Max/Min Value: 3

f. x-value that max/min the function: -5

g. Domain:

$(-\infty, \infty)$

h. Range:

$(-\infty, 3]$

j. Increasing:

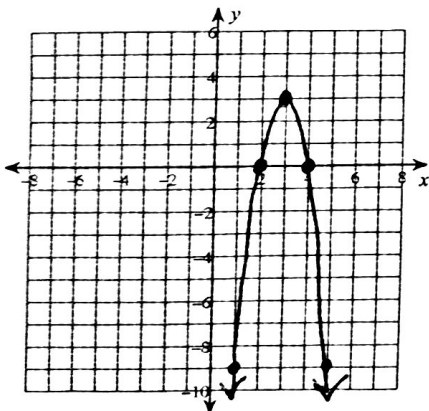
$(-\infty, -5)$

k. Decreasing:

$(-5, \infty)$

l. Direction of Opening: Down

5.5 3) $y = -3(x - 2)(x - 4)$



4) a. x-intercept(s): $(2, 0), (4, 0)$

b. y-intercept: $(0, -24)$

c. axis of symmetry: $x = 3$

d. vertex: $(3, 3)$

e. Max/Min Value: 3

f. x-value that max/min the function: 3

g. Domain:

$(-\infty, \infty)$

h. Range:

$(-\infty, 3]$

j. Increasing:

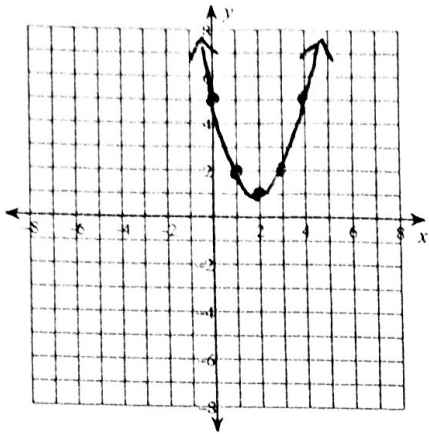
$(-\infty, 3)$

k. Decreasing:

$(3, \infty)$

l. Direction of Opening: Down

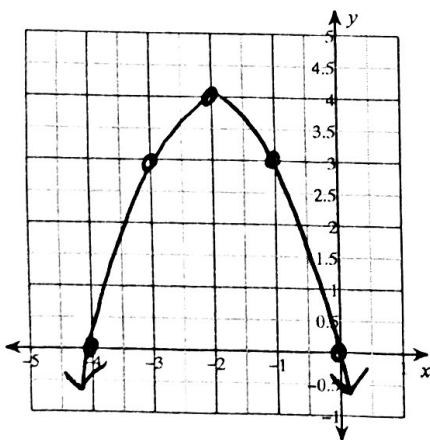
5.4 5) $y = x^2 - 4x + 5$



- 6) a. x-intercept(s): None
- b. y-intercept: (0, 5)
- c. axis of symmetry: $x = 2$
- d. vertex: (2, 1)
- e. Max/Min Value: 1
- f. x-value that max/min the function: 2
- g. Domain: $(-\infty, \infty)$
- h. Range: $[1, \infty)$
- j. Increasing: $(2, \infty)$
- k. Decreasing: $(-\infty, 2)$
- l. Direction of Opening: Up

Sketch the graph. Then write the equation in all three forms.

5.4 7) $y = -x^2 - 4x$



5.6 / 5.7 8) Vertex Form:

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

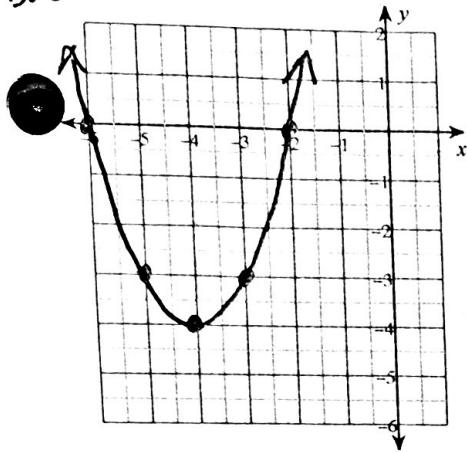
Intercept Form:

$$y = -x(x+4)$$

Standard Form:

$$y = -x^2 - 4x$$

9) $y = (x + 4)^2 - 4$
 5.3



5.6/ 10) Vertex Form:
 5.7

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

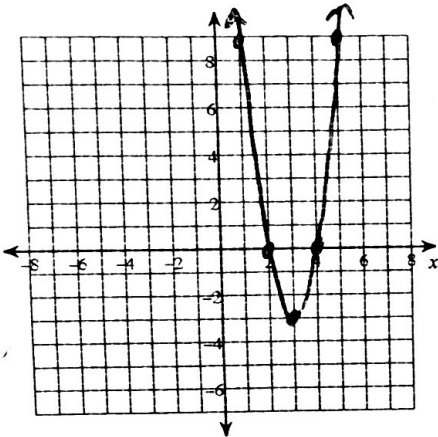
Intercept Form:

$$y = (x + 6)(x + 2)$$

Standard Form:

$$y = x^2 + 8x + 12$$

5.5 11) $y = 3(x - 4)(x - 2)$



5.6/ 12) Vertex Form:
 5.7

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

Intercept Form:

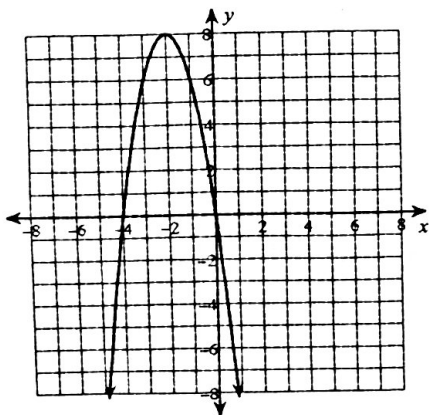
$$y = 3(x - 4)(x - 2)$$

Standard Form:

$$y = 3x^2 - 18x + 24$$

Write the equation from the graph.

13)



5.6 14) Vertex Form:

$$y = -2(x + 2)^2 + 8$$

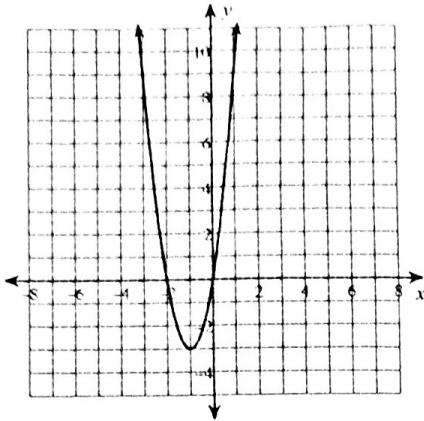
Intercept Form:

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

Standard Form:

$$y = -2x^2 - 8x$$

15)



5.6 16) Vertex Form:

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

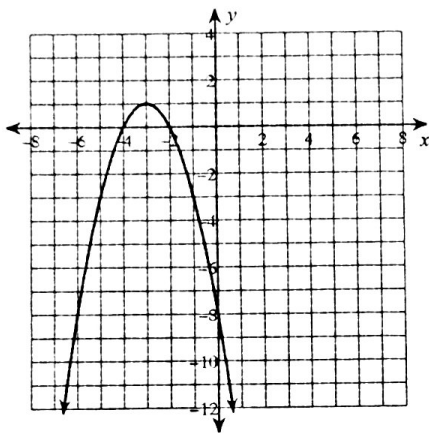
Intercept Form:

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

Standard Form:

$$y = 3x^2 + 6x$$

17)



5.6 18) Vertex Form:

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

Intercept Form:

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

Standard Form:

$$y = -x^2 - 6x - 8$$

Factor each completely.

3.3 19) $4x^2 + 16x + 12$

$$4(x+3)(x+1)$$

3.3 20) $n^2 - 10n + 24$

$$(n-6)(n-4)$$

3.2 21) $5x^2 - 38x + 21$

$$(5x-3)(x-7)$$

3.2 22) $15p^2 + 115p + 150$

$$5(3p+5)(p+6)$$

This page: 3.4

23) $25x^2 - 9$

$(5x+3)(5x-3)$

24) $9a^2 - 16$

$(3a+4)(3a-4)$

25) $x^2 - 9$

$(x+3)(x-3)$

26) $50a^2 + 2$

$2(5a+i)(5a-i)$

27) $4k^2 + 9$

$(2k+3i)(2k-3i)$

28) $16x^2 + 25$

$(4x+5i)(4x-5i)$

29) $x^2 - 13$

$(x+\sqrt{13})(x-\sqrt{13})$

30) $4x^2 - 12$

$4(x+\sqrt{3})(x-\sqrt{3})$

31) $16x^2 + 63$

$(4x+3i\sqrt{7})(4x-3i\sqrt{7})$

32) $x^2 + 72$

$(x+6i\sqrt{2})(x-6i\sqrt{2})$

4.2 Solve each equation by taking square roots.

33) $-8x^2 = 48$

$$x = \pm i\sqrt{6}$$

34) $p^2 - 8 = 84$

$$p = \pm 2\sqrt{23}$$

4.1 Solve each equation by factoring.

35) $k^2 + 2k - 3 = 0$

$$k = 1, -3$$

36) $x^2 - 14x + 48 = 0$

$$x = 8, 6$$

37) $k^2 + 4k - 5 = 0$

$$k = 1, -5$$

38) $3a^2 - 11a - 4 = 0$

$$a = -\frac{1}{3}, 4$$

39) $6x^2 - 15x - 75 = 0$

$$x = -\frac{5}{2}, 5$$

40) $7x^2 - 3x - 4 = 0$

$$x = -\frac{4}{7}, 1$$

4.3
Solve each equation by completing the square.

41) $a^2 + 2a + 50 = -10$

$$a = -1 \pm i\sqrt{59}$$

42) $n^2 + 18n - 21 = -3$

$$n = -9 \pm 3\sqrt{11}$$

43) $p^2 - 6p - 17 = 5$

$$p = 3 \pm \sqrt{31}$$

4.4
Solve each equation with the quadratic formula.

44) $3r^2 = -10r - 9$

$$r = \frac{-5 \pm i\sqrt{2}}{3}$$

45) $5p^2 + 7p = -5$

$$p = \frac{-7 \pm i\sqrt{51}}{10}$$

46) $9k^2 - 9k = 3$

$$k = \frac{3 \pm \sqrt{21}}{6}$$