

Name _____

**Solve the quadratic equation by the square root property.
If possible, simplify radicals or rationalize denominators.**

1) $13z^2 - 11 = 0$

2) $3z^2 - 7 = 0$

3) $7x^2 = 36$

4) $(x + 2)^2 = 24$

5) $(x + 9)^2 = 28$

6) $49y^2 = 9$

7) $3z^2 - 5 = 0$

8) $2z^2 - 11 = 0$

9) $4x^2 = 60$

10) $(3x + 4)^2 = 10$

Solve the equation by the method of your choice.
Simplify irrational solutions, if possible.

$$11) \frac{r^2}{8} - \frac{3}{2}r + \frac{9}{2} = 0$$

$$12) x^2 + 3x = 0$$

$$13) \frac{r^2}{10} - \frac{2}{5}r + \frac{2}{5} = 0$$

$$14) (3x + 2)^2 = 5$$

$$15) (4x + 5)^2 = 7$$

$$16) x^2 + 5x = 0$$

Solve the quadratic equation using the quadratic formula.

$$17) 6x^2 = 7x - 5$$

$$18) 8x^2 = -9x - 6$$

$$19) x^2 + x + 9 = 0$$

$$20) x^2 = 20x - 111$$

$$21) y^2 - 16y = -352$$

$$22) 7x^2 = -9x - 4$$

Determine if the parabola whose equation is given opens upward or downward.

23) $y = -3x^2 - 3x - 9$

24) $y = x^2 - 2x + 1$

25) $y = -x^2 + 2x - 6$

26) $y = 4x^2 + 3x - 9$

27) $y = -4x^2 - 2x - 5$

28) $y = -4x^2 + 2x - 8$

Find the vertex for the parabola whose equation is given.

29) $y = -3x^2 + 12x - 8$

30) $y = -x^2 - 10x - 2$

31) $y = x^2 - 9x + 7$

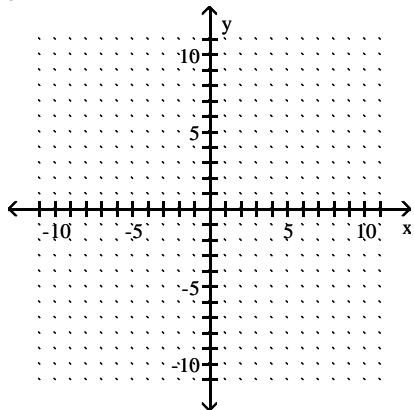
32) $y = 2x^2 + 12x - 1$

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

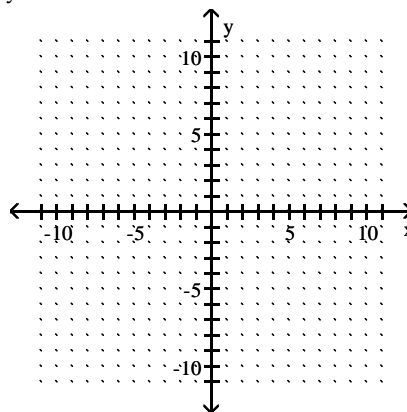
34) $y = -(x + 1)^2 + 9$

Graph the parabola whose equation is given.

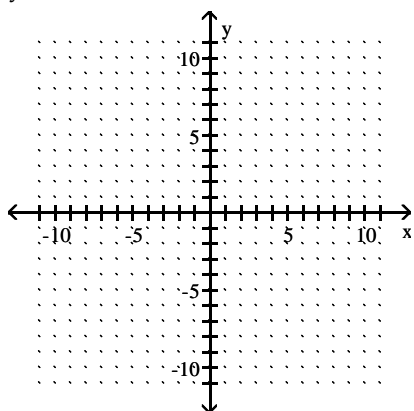
35) $y = x^2 - 2x - 8$



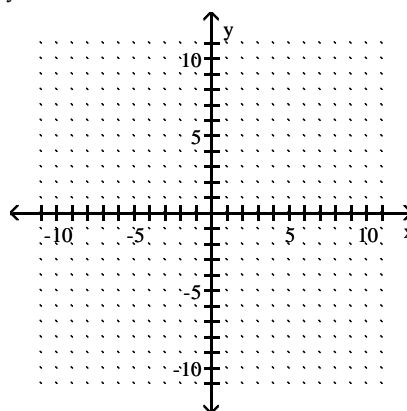
37) $y = x^2 - 4x - 5$



36) $y = -x^2 - 4x - 3$



38) $y = -x^2 - 6x - 5$



Use the coordinates of the vertex to solve the problem.

Round your answer to the nearest tenth, if necessary.

- 39) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.004x^2 + 2.8x - 200$. Find the number of pretzels that must be sold to maximize profit.

- 40) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 30x + 225$. Find the number of automobiles that must be produced to minimize cost.

- 41) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.002x^2 + 1.2x - 50$. Find the number of pretzels that must be sold to maximize profit.

- 42) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 5x^2 - 50x + 225$. Find the number of automobiles that must be produced to minimize cost.

- 43) An arrow is fired into the air with an initial velocity of 160 feet per second. The formula $y = -16x^2 + 160x$ models the arrow's height above the ground, y , in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

- 44) An arrow is fired into the air with an initial velocity of 96 feet per second. The formula $y = -16x^2 + 96x$ models the arrow's height above the ground, y , in feet, x seconds after it was shot into the air. When does the arrow reach its maximum height? What is that height?

- 45) The profit that the vendor makes per day by selling x pretzels is given by the function $P(x) = -0.002x^2 + 1.6x - 350$. Find the number of pretzels that must be sold to maximize profit.

- 46) The cost, in millions of dollars, for a company to manufacture x thousand automobiles is given by the function $C(x) = 3x^2 - 12x + 32$. Find the number of automobiles that must be produced to minimize cost.

Give the domain and range for the relation.

47) $\{(5, 0), (10, 0), (9, 0), (-6, 0)\}$

48) $\{(2, 4), (7, -1), (-6, 5), (6, -4), (11, -3)\}$

49) $\{(-1, 5), (-1, -9), (-3, 9), (-6, 2), (12, -7)\}$

50) $\{(7, -1), (9, -7), (-3, -3), (-3, 5)\}$

51) $\{(8, 8), (-5, -3), (3, 9), (-1, -7)\}$

52) $\{(-4, 0), (7, 0), (11, 0), (-2, 0)\}$

Decide whether the relation is a function.

53) $\{(-8, -8), (-8, 8), (1, -8), (3, -2), (9, -7)\}$

54) $\{(2, -8), (2, 3), (4, -2), (7, -8), (12, 9)\}$

55) $\{(-9, 6), (-9, 4), (1, -4), (4, 6), (7, 7)\}$

56) $\{(-5, 9), (-3, 4), (4, 1), (4, 7)\}$

57) $\{(-4, 2), (-2, 1), (4, 5), (8, -5)\}$

58) $\{(-2, -9), (3, -6), (4, 9), (9, 8), (11, 1)\}$

Evaluate the function at the given value.

59) $f(t) = \sqrt{t + 133} + 2$; $f(11)$

60) $f(x) = -6x + 4$; $f(-3)$

61) $f(x) = -5x - 3$; $f(-2)$

62) $f(x) = 9x - 17$; $f(0)$

63) $f(x) = x^2 + 3x + 5$; $f(-2)$

64) $h(x) = |x - 8|$; $h(11)$

65) $h(x) = -3$; $h(8)$

66) $g(x) = -11x$; $g(-2)$

67) $f(x) = x^2 + 3x$; $f(-8)$

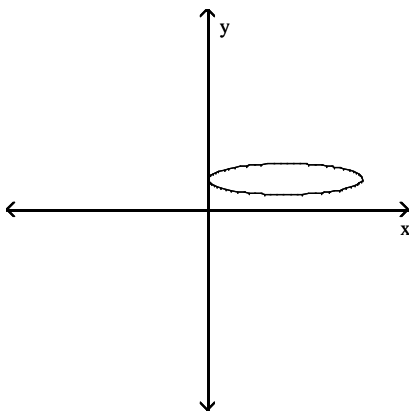
68) $f(t) = \sqrt{t + 133} + 2$; $f(11)$

69) $f(r) = \frac{5r}{|5r|}$; $f(-11)$

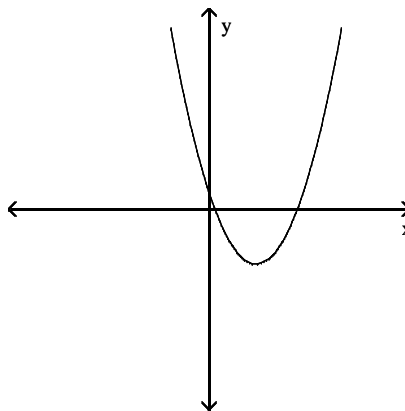
70) $f(r) = \frac{3r}{|3r|}$; $f(-4)$

Use the vertical line test on the graph to determine if y is a function of x .

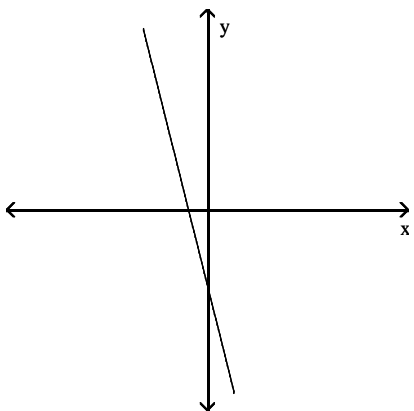
71)



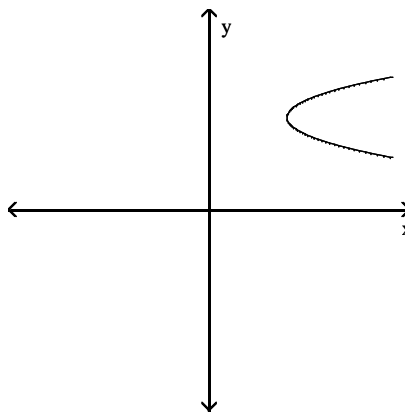
73)



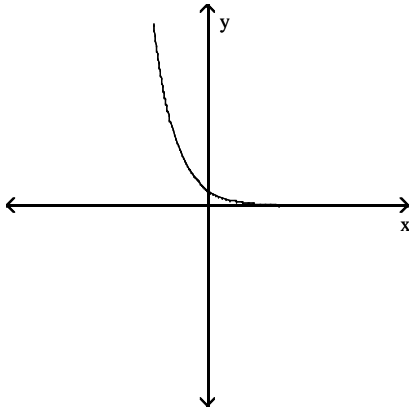
72)



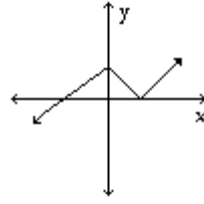
74)



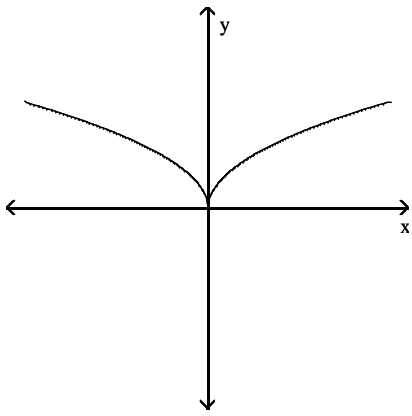
75)



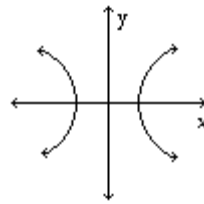
77)



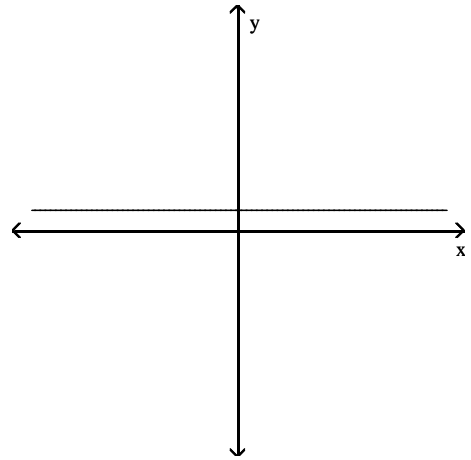
76)



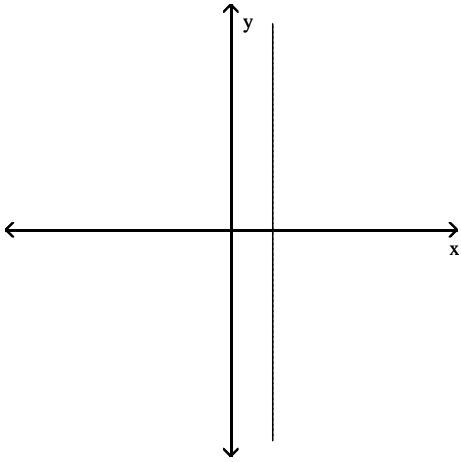
78)



79)



80)



83) A rocket is 24 feet from a satellite when it begins accelerating away from the satellite at a constant rate of 10 feet per second per second. The distance, in feet, between the rocket and the satellite is given by the polynomial $P(t) = 5t^2 + 24$, where t is the number of seconds since the rocket started accelerating. Find and interpret $P(3)$.

84) The function $W(g) = 0.62g^2 - 0.03g + 7.7$ models the average weight in ounces for a mouse who is fed g grams of a special food per day. Use the function to find and interpret $W(20)$.

Solve.

81) The monthly cost of a certain long distance service is given by the linear function $C(t) = 0.05t + 7.95$, where $C(t)$ is in dollars and t is the amount of minutes used in a month. Find and interpret $C(180)$.

82) The polynomial $P(x) = 0.25x - 88$ models the relationship between the number of pretzels x that a certain vendor sells and the profit the vendor makes. Find and interpret $P(500)$.

Answer Key

Testname: EXAM2_7.1-7.6_8.1-8.6_PREPV01

1) $\left\{ \pm \frac{\sqrt{143}}{13} \right\}$

2) $\left\{ \pm \frac{\sqrt{21}}{3} \right\}$

3) $\left\{ \pm \frac{6\sqrt{7}}{7} \right\}$

4) $\{-2 \pm 2\sqrt{6}\}$

5) $\{-9 \pm 2\sqrt{7}\}$

6) $\left\{ \pm \frac{3}{7} \right\}$

7) $\left\{ \pm \frac{\sqrt{15}}{3} \right\}$

8) $\left\{ \pm \frac{\sqrt{22}}{2} \right\}$

9) $\{\pm\sqrt{15}\}$

10) $\left\{ \frac{-4 \pm \sqrt{10}}{3} \right\}$

11) $\{6\}$

12) $\{-3, 0\}$

13) $\{2\}$

14) $\left\{ \frac{-2 \pm \sqrt{5}}{3} \right\}$

15) $\left\{ \frac{-5 \pm \sqrt{7}}{4} \right\}$

16) $\{-5, 0\}$

17) $\left\{ \frac{7 \pm i\sqrt{71}}{12} \right\}$

18) $\left\{ \frac{-9 \pm i\sqrt{111}}{16} \right\}$

19) $\left\{ \frac{-1 \pm i\sqrt{35}}{2} \right\}$

20) $\{10 \pm i\sqrt{11}\}$

21) $\{8 \pm 12i\sqrt{2}\}$

22) $\left\{ \frac{-9 \pm i\sqrt{31}}{14} \right\}$

23) Downward

24) Upward

25) Downward

26) Upward

27) Downward

28) Downward

29) (2, 4)

30) (-5, 23)

Answer Key

Testname: EXAM2_7.1-7.6_8.1-8.6_PREPV01

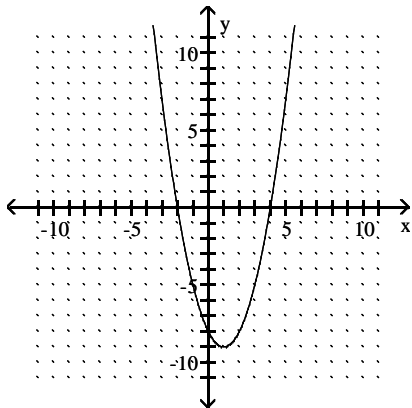
31) $\left(\frac{9}{2}, -\frac{53}{4}\right)$

32) $(-3, -19)$

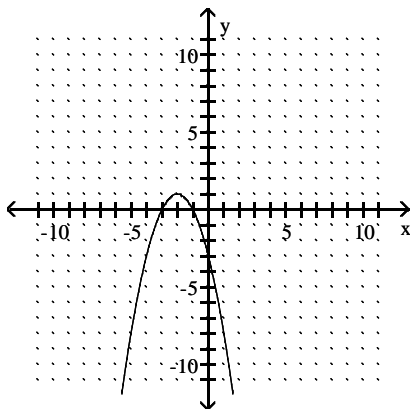
33) $(4, -16)$

34) $(-1, 9)$

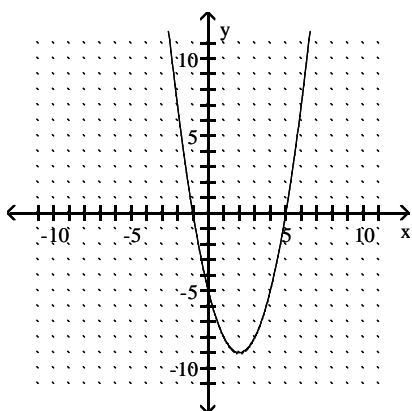
35)



36)



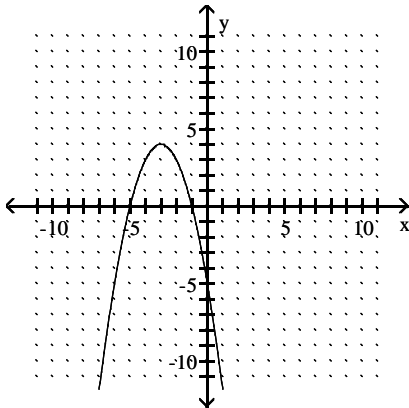
37)



Answer Key

Testname: EXAM2_7.1-7.6_8.1-8.6_PREPV01

38)



- 39) 350 pretzels
- 40) 5 thousand automobiles
- 41) 300 pretzels
- 42) 5 thousand automobiles
- 43) 5 seconds; 400 feet
- 44) 3 seconds; 144 feet
- 45) 400 pretzels
- 46) 2 thousand automobiles
- 47) Domain: $\{9, -6, 10, 5\}$; range: $\{0\}$
- 48) Domain: $\{2, 11, 7, -6, 6\}$; range: $\{4, -3, -1, 5, -4\}$
- 49) Domain: $\{12, -6, -1, -3\}$; range: $\{-7, 2, -9, 9, 5\}$
- 50) Domain: $\{-3, 9, 7\}$; range: $\{-3, -7, -1, 5\}$
- 51) Domain: $\{8, -5, 3, -1\}$; range: $\{8, -3, 9, -7\}$
- 52) Domain: $\{-4, -2, 11, 7\}$; range: $\{0\}$
- 53) Not a function
- 54) Not a function
- 55) Not a function
- 56) Not a function
- 57) Function
- 58) Function
- 59) 14
- 60) 22
- 61) 7
- 62) -17
- 63) 3
- 64) 3
- 65) -3
- 66) 22
- 67) 40
- 68) 14
- 69) -1
- 70) -1
- 71) Not a function
- 72) Function
- 73) Function
- 74) Not a function
- 75) Function

Answer Key

Testname: EXAM2_7.1-7.6_8.1-8.6_PREPV01

76) Function

77) Function

78) Not a function

79) Function

80) Not a function

81) 16.95; it costs \$16.95 to use 180 minutes of a certain long distance service in a month.

82) 37; \$37 is the profit the vendor makes from selling 500 pretzels.

83) 69; after 3 seconds, the distance between the rocket and the satellite is 69 feet.

84) 255.1; when a mouse is fed 20 grams of the special food per day, its average weight is 255.1 ounces.