

Additional Exercises 8.1**Form I**

The Square Root Property and Completing the Square

Solve the equation by the square root property. If possible, simplify radicals or rationalize denominators. Express imaginary solutions in the form $a + bi$.

1. $x^2 = 25$ 1. _____

2. $4x^2 = 400$ 2. _____

3. $8x^2 = 48$ 3. _____

4. $9x^2 = 64$ 4. _____

5. $16x^2 + 49 = 0$ 5. _____

6. $(x + 2)^2 = 49$ 6. _____

7. $(x + 2)^2 = 20$ 7. _____

8. $\left(x + \frac{5}{3}\right)^2 = \frac{6}{9}$ 8. _____

9. $\left(x - \frac{1}{2}\right)^2 = \frac{121}{4}$ 9. _____

Complete the square for the binomial. Then factor the resulting perfect square trinomial.

10. $x^2 + 10x$ 10. _____

11. $x^2 - 12x$ 11. _____

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12. $x^2 + 16x$ 12. _____

13. $x^2 - 18x$ 13. _____

Solve the quadratic equation by completing the square.

14. $x^2 - 8x + 15 = 0$ 14. _____

15. $x^2 + 14x + 34 = 0$ 15. _____

16. $x^2 - 4x + 2 = 0$ 16. _____

17. $x^2 + 6y = 1$ 17. _____

Solve.

18. A square sheet of paper measures 50 centimeters on each side. What is the length of the diagonal of the paper? 18. _____

19. A ladder that is 5 feet long is 3 feet from the base of the wall. How far up the wall does the ladder reach? 19. _____

20. The function $s(t) = 16t^2$ models the distance, $s(t)$, in feet, that an object falls in t seconds. Find the number of seconds a sky diver is in free fall after jumping from a plane and falling 704 feet before opening a parachute. Express answers in simplified radical form. 20. _____

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Additional Exercises 8.2
Form I
The Quadratic Formula

Solve the equation by using the quadratic formula. Simplify solutions, if possible.

1. $x^2 - 14x + 40 = 0$ 1. _____

2. $2x^2 + x - 21 = 0$ 2. _____

3. $x^2 - 8x = -10$ 3. _____

4. $3x^2 = 7$ 4. _____

Compute the discriminant. Then determine whether the following equation has solutions that are two rational solutions; two irrational solutions; one real solution; or two imaginary solutions.

5. $x^2 - 4x + 4 = 0$ 5. _____

6. $x^2 - 5x + 6 = 0$ 6. _____

7. $x^2 + 6x + 10 = 0$ 7. _____

8. $2x^2 - 7x + 1 = 0$ 8. _____

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

9. $(x - 6)^2 = 17$ 9. _____

10. $x^2 + 4x = 0$ 10. _____

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11. $4x^2 + 6x + 1 = 0$

11. _____

12. $11x^2 = -704$

12. _____

Write a quadratic equation in standard form with the given solution set.

13. $\{8, 3\}$

13. _____

14. $\{-4, 10\}$

14. _____

15. $\left\{\frac{3}{4}, \frac{1}{8}\right\}$

15. _____

16. $\left\{0, \frac{-4}{5}\right\}$

16. _____

17. $\{-2\sqrt{3}, 2\sqrt{3}\}$

17. _____

18. $\{-7i, 7i\}$

18. _____

Solve the problem.

19. The hypotenuse of an isosceles triangle is 7 feet longer than either of its legs. Find the length of each side. Round to the nearest tenth of an inch.

19. _____

20. A rectangular sign must have an area of 45 yards. Its length must be 4 yards more than its width. Find the dimensions of the sign. Round to the nearest tenth of a yard.

20. _____

Additional Exercises 8.3
Form I
Quadratic Functions and Their Graphs

The graph of a quadratic function is given. Choose from the following options the function's equation.

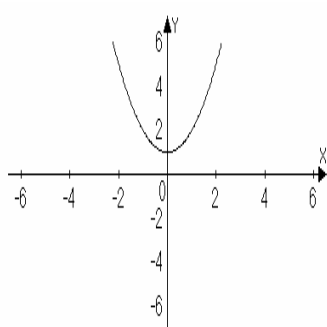
$$f(x) = (x+1)^2$$

$$g(x) = x^2 + 1$$

$$h(x) = (x-1)^2$$

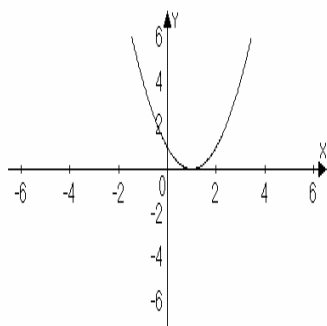
$$j(x) = x^2 - 1$$

1.



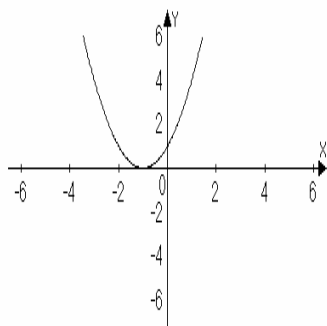
1. _____

2.



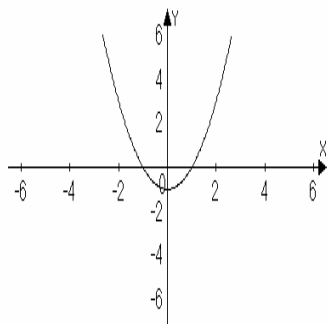
2. _____

3.



3. _____

4.



4. _____

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Find the coordinates of the vertex for the parabola defined by the given quadratic equation.

5. $f(x) = x^2$ 5. _____

6. $f(x) = (x + 3)^2 + 3$ 6. _____

7. $f(x) = x^2 + 3$ 7. _____

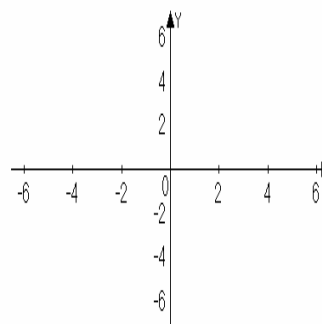
8. $f(x) = (x + 9)^2 - 5$ 8. _____

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

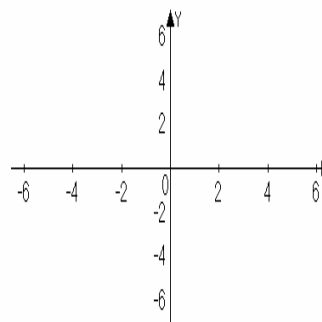
10. $f(x) = -6x^2 + 12x + 3$ 10. _____

Use the vertex and intercepts to sketch the graph of each quadratic function.

11. $f(x) = x^2 - 4$



12. $f(x) = x^2 - 4x + 3$



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Determine whether the given quadratic function has a (a) minimum value or maximum value. (b) Find the coordinates of the minimum or maximum point. (c) Identify the function's domain and range.

13. $f(x) = x^2 + 2x - 2$ 13a. _____

b. _____

c. _____

14. $f(x) = -x^2 + 4x$ 14a. _____

b. _____

c. _____

15. $f(x) = x^2 - 8x + 16$ 15a. _____

b. _____

c. _____

Solve the problem.

16. You have 52 feet of fencing to enclose a rectangular region. Find the dimensions of the rectangle that maximize the enclosed area. 16. _____

17. The profit that a vendor makes per day by selling x pretzels is given by the function $P(x) = -0.003x^2 + 1.2x + 25$. Find the number of pretzels that must be sold to maximize profit. 17. _____

18. Among all pairs of numbers whose sum is 30, find a pair whose product is as large as possible. 18. _____

19. A person standing close to the edge on top of a 88-foot building throws a baseball vertically upward. The quadratic function $s(t) = -16t^2 + 64t + 88$ models the ball's height above the ground, $s(t)$, in feet, t seconds after it was thrown. How many seconds does it take until the ball finally hits the ground? Round to the nearest tenth of a second if necessary. 19. _____

Additional Exercises 8.4
Form I
Equations Quadratic in Form

Solve the equation by making an appropriate substitution.

1. $x^4 - 40x + 144 = 0$ 1. _____

2. $x - 4\sqrt{4} - 32 = 0$ 2. _____

3. $x - 16x^{\frac{1}{2}} - 512 = 0$ 3. _____

4. $(x - 4)^2 + 3(x - 4) - 18 = 0$ 4. _____

5. $x^4 - 9x^2 + 20 = 0$ 5. _____

6. $x^{-2} + x^{-1} - 1 = 0$ 6. _____

7. $2x^{-2} - x^{-1} - 1 = 0$ 7. _____

8. $6x^4 + x^2 - 5 = 0$ 8. _____

9. $(2a - 3)^2 - 9(2a - 3) + 20 = 0$ 9. _____

10. $x - 3\sqrt{x} + 2 = 0$ 10. _____

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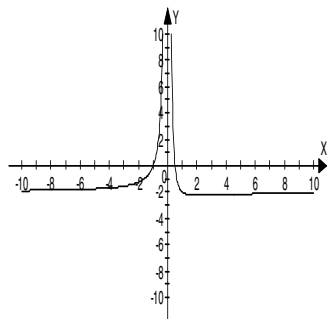
Date _____

11. $x - 7\sqrt{x} = -10$

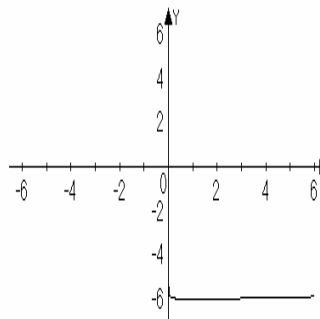
11. _____

For exercises 12-15 , Match the graph to the appropriate equation.

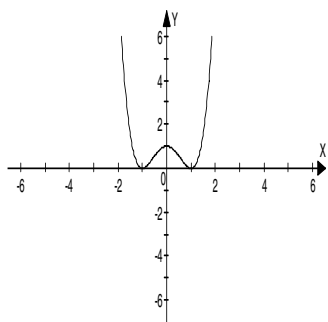
a.



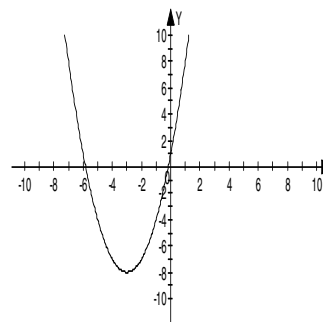
b.



c.



d.



12. $f(x) = x^4 - 2x^2 + 1$

12. _____

13. $f(x) = x^{-2} - x^{-1} - 2$

13. _____

14. $f(x) = x^{\frac{1}{3}} - 2x^{\frac{1}{6}} - 5$

14. _____

15. $f(x) = (x+2)^2 + 2(x-2) + 1$

15. _____

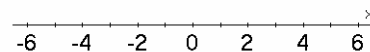
Additional Exercises 8.5
Form I
Polynomial and Rational Inequalities

(a) Solve the quadratic inequality and (b) graph the solution set on a number line. Express the solution set in interval notation.

1. $x^2 - 13x + 42 > 0$

1a. _____

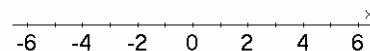
b.



2. $(x+1)(x-4) < 0$

2a. _____

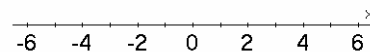
b.



3. $x^2 - 2x - 3 \leq 0$

3a. _____

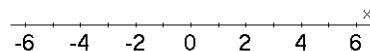
b.



4. $x^2 - 4x \geq -3$

4a. _____

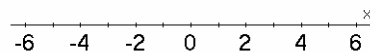
b.



5. $(x-3)(x+4) > 0$

5a. _____

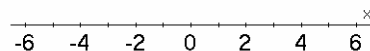
b.



6. $x^2 - 6x + 9 > 0$

6a. _____

b.

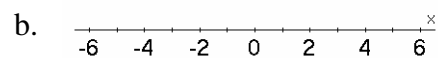


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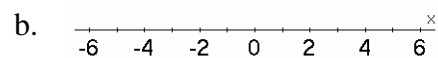
7. $x^2 + 18x + 81 < 0$

7a. _____



8. $x^2 + 4x + 4 \geq 0$

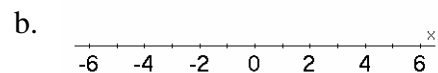
8a. _____



(a) Solve the rational inequality and (b) graph the solution set on a real number line.

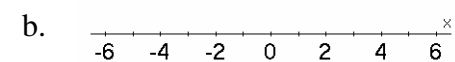
9. $\frac{x-2}{x+3} < 0$

9a. _____



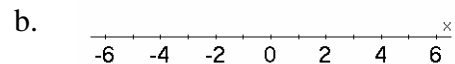
10. $\frac{x-5}{x+4} > 0$

10a. _____



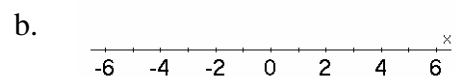
11. $\frac{x+2}{x+5} < 0$

11a. _____



12. $\frac{x+6}{x+3} < 0$

12a. _____

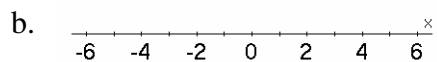


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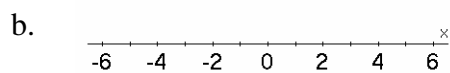
13. $\frac{-x+3}{x-4} \geq 0$

13a. _____



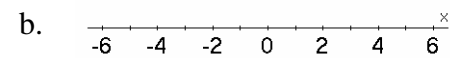
14. $\frac{x}{x-2} > 0$

14a. _____



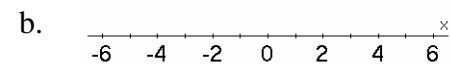
15. $\frac{x+6}{x} > 0$

15a. _____



16. $\frac{x+2}{x-1} < 0$

16a. _____



8.1 Form I

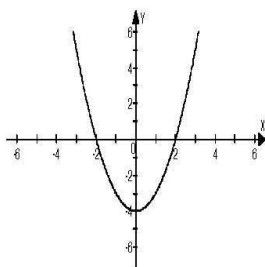
1. $\{\pm 5\}$ 2. $\{\pm 10\}$ 3. $\{\pm \sqrt{6}\}$ 4. $\left\{\pm \frac{8}{3}\right\}$ 5. $\left\{\pm \frac{7}{4}i\right\}$ 6. $\{-9, 5\}$ 7. $\{-2 \pm 2\sqrt{5}\}$
 8. $\left\{\pm \frac{-5 \pm \sqrt{6}}{3}\right\}$ 9. $\{-5, 6\}$ 10. $25; x^2 + 10x + 25 = (x+5)^2$
 11. $36; x^2 - 12x + 36 = (x-6)^2$ 12. $64; x^2 + 16x + 64 = (x+8)^2$
 13. $81; x^2 - 18x + 81 = (x-9)^2$ 14. $(3, 5)$ 15. $\{-7 \pm \sqrt{15}\}$ 16. $\{2 \pm \sqrt{2}\}$ 17. $\{-3 \pm \sqrt{10}\}$
 18. $50\sqrt{2}$ cm 19. 4 feet 20. $2\sqrt{11}$ seconds

8.2 Form I

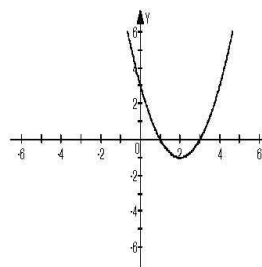
1. $\{4, 10\}$ 2. $\left\{\frac{-7}{2}, 3\right\}$ 3. $\{4 \pm \sqrt{6}\}$ 4. $\left\{\pm \frac{\sqrt{21}}{3}\right\}$ 5. 0, one real rational solution
 6. 1, two real rational solutions 7. -4 , two imaginary solutions
 8. 41, two real irrational solutions 9. $\{6 \pm \sqrt{17}\}$ 10. $\{-4, 0\}$ 11. $\left\{\frac{-3 \pm \sqrt{5}}{4}\right\}$ 12. $\{\pm 8i\}$
 13. $x^2 - 11x + 24 = 0$ 14. $x^2 - 6x - 40 = 0$ 15. $32x^2 - 28x + 3 = 0$ 16. $5x^2 + 4x = 0$
 17. $x^2 - 12 = 0$ 18. $x^2 + 49 = 0$ 19. 16.9 ft. 20. 5 yards by 9 yards

8.3 Form I

1. $g(x) = x^2 + 1$ 2. $h(x) = (x-1)^2$ 3. $f(x) = (x+1)^2$ 4. $j(x) = x^2 - 1$ 5. $(0, 0)$
 6. $(-3, 3)$ 7. $(0, 3)$ 8. $(-9, -5)$ 9. $(1, 3)$ 10. $(1, 9)$
 11.



12.



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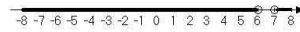
13. a. minimum b. $(-1, -3)$ c. domain $(-\infty, \infty)$; range $[-3, \infty)$
 14. a. maximum b. $(2, 4)$ c. domain $(-\infty, \infty)$; range $[4, -\infty)$
 15. a. minimum b. $(4, 0)$ c. domain $(-\infty, \infty)$; range $[0, \infty)$
 16. 13 feet by 13 feet 17. 200 pretzels 18. 15 and 15 19. 5.1 seconds

8.4 Form I

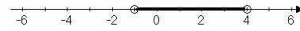
1. $\{-2, 2, -6, 6\}$ 2. $\{64\}$ 3. $\{1024\}$ 4. $\{-2, 7\}$ 5. $\{-\sqrt{5}, \sqrt{5}, -2, 2\}$ 6. $\left\{-\frac{1}{6}, \frac{1}{5}\right\}$
 7. $\{-2, 1\}$ 8. $\left\{\frac{-\sqrt{30}}{6}, \frac{\sqrt{30}}{6}, -i, i\right\}$ 9. $\left\{\frac{7}{2}, 4\right\}$ 10. $\{1, 4\}$ 11. $\{4, 25\}$ 12. c 13. a
 14. b 15. d

8.5 Form I

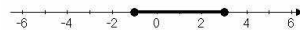
1. $(-\infty, 6) \cup (7, \infty)$



2. $(-1, 4)$



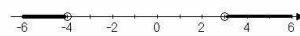
3. $[-1, 3]$



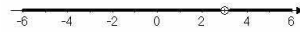
4. $(-\infty, 1] \cup [3, \infty)$



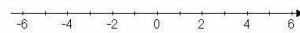
5. $(-\infty, -4) \cup (3, \infty)$



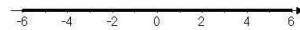
6. $(-\infty, 3) \cup (3, \infty)$



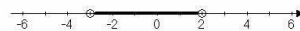
7. $\emptyset$



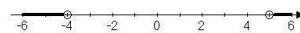
8. $(-\infty, \infty)$



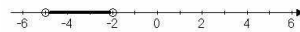
9. $(-3, 2)$



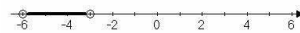
10. $(-\infty, -4) \cup (5, \infty)$



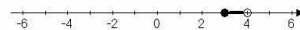
11. $(-5, -2)$



12. $(-6, -3)$



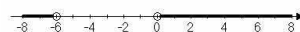
13. $[3, 4)$



14. $(-\infty, 0) \cup (2, \infty)$



15. $(-\infty, -6) \cup (0, \infty)$



16. $(-2, 1)$

