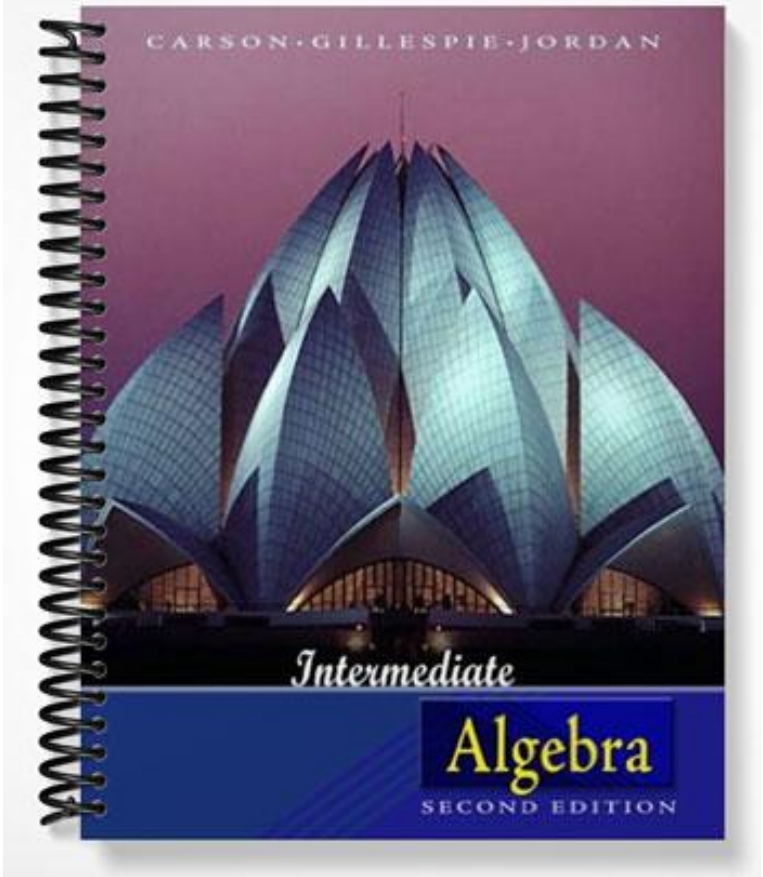
TEST BANK


CARSON · GILLESPIE · JORDAN
Intermediate
Algebra
SECOND EDITION

DIAGNOSTIC TESTS AND ANSWERS

INTERMEDIATE ALGEBRA **Name:** _____

Chapter 1 Diagnostic Test

For Exercises 1–5, simplify. [Sections 1.1 and 1.3]

1. $|-4.37|$ 1. _____

2. $-\left|-\frac{5}{11}\right|$ 2. _____

3. $\sqrt{144}$ 3. _____

4. $\sqrt[3]{64}$ 4. _____

5. $\sqrt[4]{\frac{81}{16}}$ 5. _____

For Exercises 6 and 7, indicate whether the expression illustrates the commutative property of addition, the associative property of addition, the commutative property of multiplication, the associative property of multiplication, or the distributive property of multiplication over addition. [Section 1.2]

6. $4(3 + 5) = 12 + 20$ 6. _____

7. $8 + (7 + 2) = (8 + 7) + 2$ 7. _____

For Exercises 8–19, simplify. [Sections 1.2 and 1.3]

8. $3 + (-7)$ 8. _____

9. $\frac{5}{8} - \frac{2}{3}$ 9. _____

10. $(-3.4)(-1.2)$ 10. _____

11. $(-2)^4$ 11. _____

12. $-\frac{5}{7} \div \frac{3}{14}$ 12. _____

13. $\sqrt[5]{32}$ 13. _____

14. $-36 \div 9 \cdot 3$ 14. _____

15. $-2^2 + 18 - 3(6-4)$ 15. _____

16. $\sqrt[3]{8} + 7 - (3-5)^3$ 16. _____

17. $-8 \div |8-6| + 2^5$ 17. _____

18. $(2-4)^5 - (6-7)^2$ 18. _____

19. $\sqrt{36-20} + [(15-8)+4]$ 19. _____

20. Mark has a balance of –$123.45 on a credit card. Find his balance after the following transactions. [Section 1.2] 20. _____

Description	Amount
Outback Steakhouse	–$23.48
Hess Gas	–$24.24
Payment	$100
Best Buy	–$79.45

21. Find the GPA. [Section 1.3] 21. _____

Course	Course Credits	Grade
MAT 120	3	A
ENG 101	3	C
HIS 101	3	D
PSY 201	3	B

22. Evaluate $-|3x + 4y^2|$ when $x = -2$ and $y = -3$. [Section 1.4] 22. _____

23. Evaluate $\sqrt{a-b}$ when $a = 27$ and $b = -37$. [Section 1.4] 23. _____

24. Use the distributive property to write an equivalent expression for $-2(5y - 9)$. [Section 1.4] 24. _____

25. Simplify $3.6x - 7 + 5.4x + 9.2$. [Section 1.4] 25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 2 Diagnostic Test

1. Find the intersection and union of the given sets. [Section 2.4]
   $A = \{1, 2, 3, 4\}$ $B = \{2, 4, 6, 8, 10\}$

1. _____

For Exercises 2–8, solve. [Sections 2.1 and 2.5]

2. $-(2x + 1) - (3 + 4x) + 5x = 3x - 8$

2. _____

3. $2x + 3.6 = 4x - 8.9$

3. _____

4. $-\frac{1}{2}(2x-4) = \frac{3}{5}(5x-10)$

4. _____

5. $|3x-5| = 16$

5. _____

6. $|3-3z|-1 = 11$

6. _____

7. $|5-2x| = |x+2|$.

7. _____

8. $|6x-5| = -8$

8. _____

9. Solve for the indicated variable. $A = P + Prt$; r [Section 2.1]

9. _____

10. Solve for the indicated variable. $V = \frac{1}{3}Bh$; h [Section 2.1]

10. _____

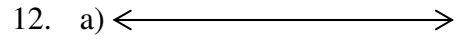
For Exercises 11–20, solve, and then

a) Graph the solution set.
b) Write the solution set in set builder notation.
c) Write the solution set in interval notation.
[Sections 2.3, 2.4 and 2.6]

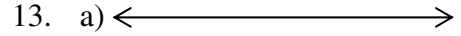
11. $-4 \le 2x - 6 < 6$

11. a) ⟷
b) _____
c) _____

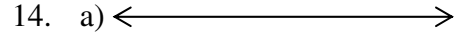
12. $6 < -2x - 4 \le 16$

12. a) 
b)_____
c)_____

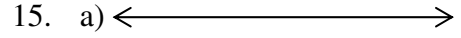
13. $-6 \le 3x + 3 < 3$

13. a) 
b)_____
c)_____

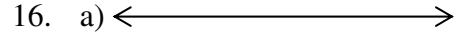
14. $3 - 6x \le -3$ or $3 - 6x > 3$

14. a) 
b)_____
c)_____

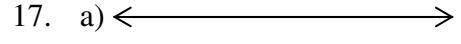
15. $|y - 1| < 5$

15. a) 
b)_____
c)_____

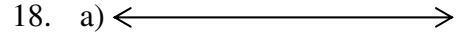
16. $2|x - 5| > 4$

16. a) 
b)_____
c)_____

17. $5 - 3|x + 2| > -7$

17. a) 
b)_____
c)_____

18. $|3y - 5| < -5$

18. a) 
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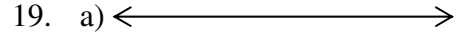
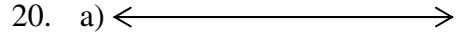
c)_____

19. $|2x - 4| \ge -4$

19. a) 
b)_____
c)_____

20. $3|2x - 1| \le 12$

20. a) 
b)_____
c)_____

For Exercises 21–25, translate and then solve.
[Sections 2.2 and 2.4]

21. Five times the difference of a number and two is the same as four times the number. Find the number. 21. _____

22. A Best Buy ad has a television on sale for 20% off of the regular price. If the regular price is $899, what is the sale price? 22. _____

23. Charlie has some $5 bills and some $10 bills in his wallet. If he has a total of 16 bills worth a total of $110, how many of each bill is in his wallet? 23. _____

24. How many ounces of water must be added to 100 ounces of 40% antifreeze solution to obtain a 16% solution? 24. _____

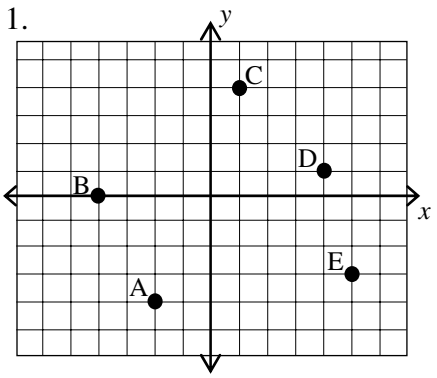
25. In a math class you need an average of at least 91 to receive an A. Tom has grades of 84, 93, 88, and 97. What range of grades will he need to earn on his fifth test in order to get an A? 25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 3 Diagnostic Test

1. Determine the coordinates for each point. [Section 3.1]

1.



2. State the quadrant in which $(-321,\ 4\frac{2}{3},)$ is located. [Section 3.1]

2. _____

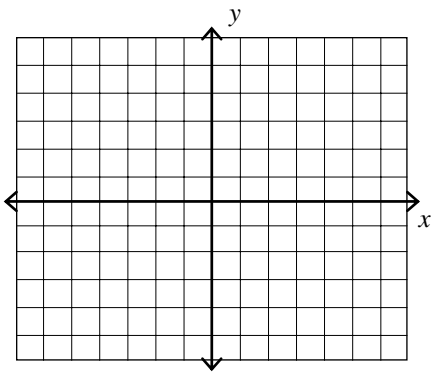
3. Determine whether $(3,\ \frac{2}{5})$ is a solution for $y = -\frac{2}{5}x + 8$ [Section 3.2]

3. _____

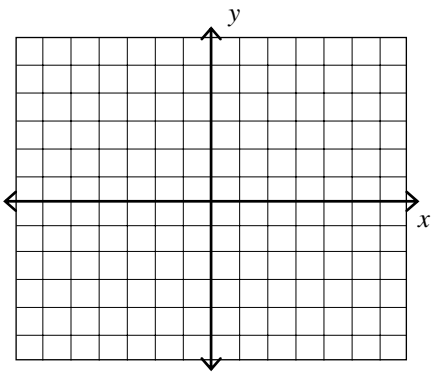
For Exercises 4 and 5, determine the slope and the coordinates of the y-intercept, then graph. [Section 3.2]

4. $y = -\frac{5}{3}x + 4$

4. _____



5. $3x - 6y = 9$ 5. _____



For Exercises 6 and 7, determine the slope of the line through the given points. [Section 3.2]

6. (1, 3), (5, 2) 6. _____

7. (3, –1), (–3, 3) 7. _____

8. Write the equation of the line in slope-intercept form with y-intercept (0, –4) and slope $\frac{1}{2}$. [Section 3.3] 8. _____

9. Write the equation of the line in slope-intercept form with y-intercept (0, 2) and slope $\frac{4}{3}$. [Section 3.3] 9. _____

10. Write the equation of the line in slope-intercept form that passes through the points (2, –5), (3, –2). [Section 3.3] 10. _____

11. Write the equation of a line through the points (4, 2), and (2, 6) in the form $Ax + By = C$ where A, B, and C are integers and $A > 0$. [Section 3.3] 11. _____

12. Write the equation of a line in the form $Ax + By = C$ through the point (2, –3) and perpendicular to the line $y = -\frac{1}{2}x - 2$. [Section 3.3] 12. _____

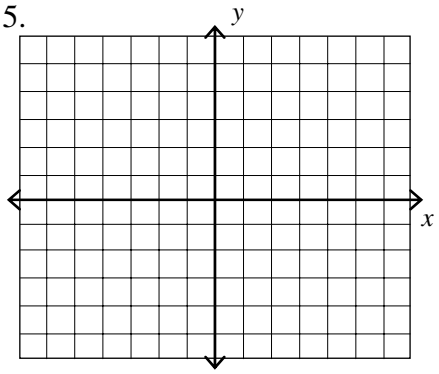
13. Are the graphs of $y = \frac{1}{3}x - 5$ and $y = -3x + 5$ parallel, perpendicular, or neither? [Section 3.3] 13. _____

14. Determine whether (–2, –3) is a solution for the linear inequality $y \le 5x + 7$. [Section 3.4] 14. _____

For Exercises 15 and 16, graph the inequality. [Section 3.4]

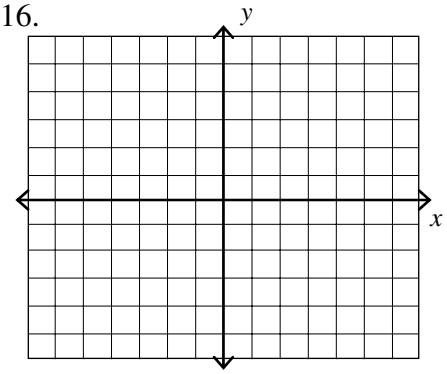
15. $y \geq \frac{5}{4}x - 3$

15.



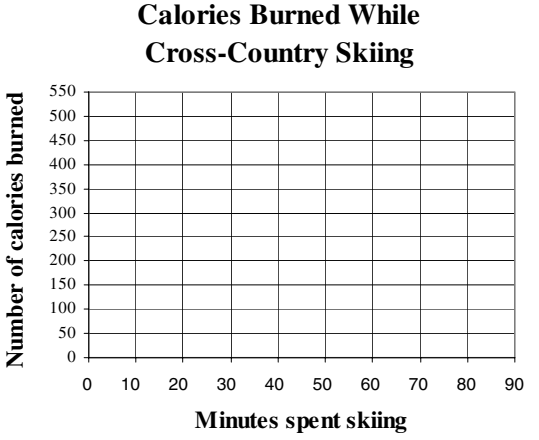
16. $2x - 5y < -4$

16.



17. The number of calories burned by an average cross-country skier is 360 for 45 minutes and 480 for 60 minutes. [Section 3.6]
   a) Plot the two data points on the coordinate plane at right, then draw a line connecting them.
   b) Find the slope of the line.
   c) Write the equation of the line in slope-intercept form.
   d) Determine the number of calories burned for 150 minutes.

17. a)



b) _____

c) _____

d) _____

For Exercise 18, identify the domain and range and then determine if the relation is a function. [Section 3.5]

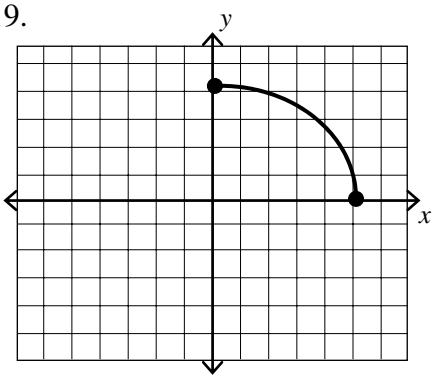
18. The following relation shows enrollment at a technical college for the last 6 years. Is the relation a function?

18. _____

Year	Enrollment
2000	8,927
2001	9,153
2002	9,899
2003	10,213
2004	11,795
2005	10,676

19. Determine whether the graph is the graph of a function. [Section 3.5]

19.



20. For what value(s) is the function $f(x) = \dfrac{3x-5}{x+3}$ undefined? [Section 3.5]

20. _____

21. Find the indicated value of the function:

$f(x) = \dfrac{3x^2 - 2x}{2x+1}$

a) $f(1)$

b) $f(0)$

c) $f(-1)$

[Section 3.5]

21. a) _____

b) _____

c) _____

22. Find the indicated value of the function:
$f(x) = \sqrt{x^2 - 2x}$ [Section 3.5]

a) $f(3)$

b) $f(0)$

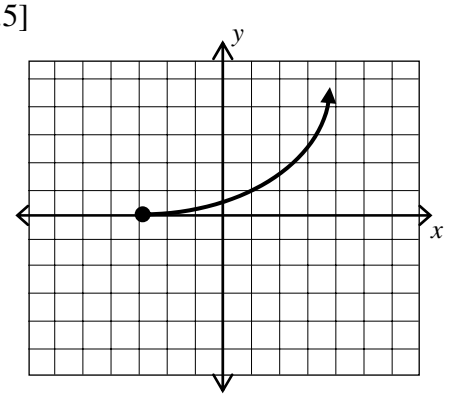
c) $f(-3)$

22. a) _____

b) _____

c) _____

23. Give the domain and range of the function. [Section 3.5]



23. Domain: _____

Range: _____

$f(-3)$: _____

24. A pool cover is to be designed so that the maximum perimeter of the cover is 192 feet. [Section 3.4]

a) Write an inequality in terms of l and w that describes the perimeter of the cover.

b) If the pool length is 60 feet, what range of values must the width be?

24. _____

25. A landscaper charges \$40 per visit plus \$20 per hour of labor. [Section 3.4]

a) If c represents the total cost of a visit and t represents the time in hours that he works, write an equation using function notation that describes the total cost.

b) Find the total cost if the labor is 1.5 hours.

c) If the total charges are \$160, how many hours of labor was the client charged?

25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 4 Diagnostic Test

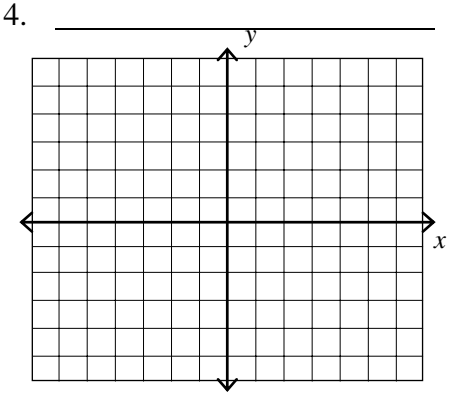
For Exercises 1–3, determine whether the given ordered pair or triple is a solution to the given system of equations.

1. $(-2, 6)$; $\begin{cases} x + y = 4 \\ 2x + 2y = 8 \end{cases}$ [Section 4.1] 1. _____

2. $(-2, 9)$; $\begin{cases} 2x + y = 5 \\ 2x + 3y = 6 \end{cases}$ [Section 4.1] 2. _____

3. $(-3, 0, 4)$; $\begin{cases} 2x + y + z = -2 \\ 3x - 5y + 4z = 7 \\ 2x - y + 3z = 6 \end{cases}$ [Section 4.4] 3. _____

4. Solve $\begin{cases} x + y = 6 \\ 2x - y = 3 \end{cases}$ by graphing. [Section 4.1] 4. _____



For Exercises 5–11, solve the system of equations using substitution or elimination. Note that some systems may be inconsistent or consistent with dependent equations.

5. $\begin{cases} 3x - y = 6 \\ 2x + y = 9 \end{cases}$ [Section 4.2–4.3] 5. _____

6. $\begin{cases} 4x + 3y = -1 \\ x + 3y = -7 \end{cases}$ [Section 4.2–4.3] 6. _____

7. $\begin{cases} 4x - 2y = 6 \\ 6x - 3y = 9 \end{cases}$ [Section 4.2–4.3] 7. _____

8. $\begin{cases} 3x+4y=10 \\ 4x+5y=14 \end{cases}$ [Section 4.2 –4.3] 8. _____

9. $\begin{cases} x+y+z=4 \\ x-2y-z=1 \\ 2x-y-2z=-1 \end{cases}$ [Section 4.4] 9. _____

10. $\begin{cases} x-2y+2z=4 \\ 3x-y+4z=4 \\ 2x+y-3z=5 \end{cases}$ [Section 4.4] 10. _____

11. $\begin{cases} y-2z=5 \\ 2x+z=4 \\ 3x+y-z=4 \end{cases}$ [Section 4.4] 11. _____

For Exercises 12–14, solve the system of equations using the echelon method. [Section 4.5]

12. $\begin{cases} 5x-3y=-1 \\ 2x-7y=17 \end{cases}$ 12. _____

13. $\begin{cases} 4x+9y=-7 \\ 2x-y=13 \end{cases}$ 13. _____

14. $\begin{cases} -2x+y-2z=0 \\ 3x-2y+2z=-3 \\ 4x+2y+2z=-6 \end{cases}$ 14. _____

For Exercises 15–17, solve the system of equations using Cramer's Rule. [Section 4.6]

15. $\begin{cases} 3x+2y=-3 \\ 2x-5y=17 \end{cases}$ 15. _____

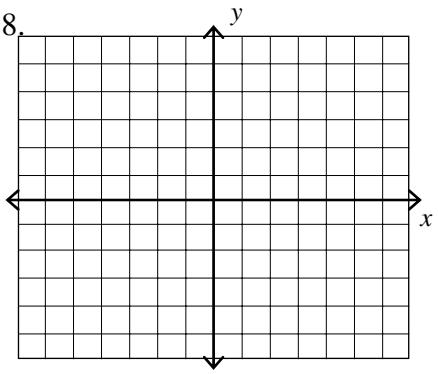
16. $\begin{cases} 3x-2y=7 \\ 5x-2y=13 \end{cases}$ 16. _____

17. $\begin{cases} x+2y- \ \ z=-4 \\ 2x-3y+5z=\ 27 \\ 5x-\ \ y+4z=\ 27 \end{cases}$ 17. _____

For Exercise 18, graph the solution set for the system of inequalities. [Section 4.7]

18. $\begin{cases} x-y\geq -3 \\ 2x+y\leq \ \ 4 \end{cases}$

18.



For Exercises 19–25, solve. [Section 4.2–4.7]

19. The sum of two numbers is 26. Three times the smaller plus twice the larger is 60. What are the numbers? 19. _____

20. Jan wishes to mix 30 pounds of coffee to sell for a total cost of $100. To obtain the mixture, she will mix coffee that sells for $3 per pound with coffee that sells for $5 per pound. How many pounds of each type of coffee should she use? 20. _____

21. A plane can travel 540 mph with the wind and 490 mph against the wind. Find the rate of the plane in still air. 21. _____

22. Kim has 30 coins consisting of dimes and nickels. If the value of the coins is $2.30, how many of each type does she have? 22. _____

23. Solution A is 30% alcohol. Solution B is 50% alcohol. How many ounces of each would be needed to obtain 40 ounces of a mixture that is 45% alcohol? 23. _____

24. A Recreation Center sold 5000 tickets to its basketball tournament. The total receipts were $14,000. The tickets were priced at $2, $3, and $5. If there were three times as many $2 tickets sold as $5 tickets, how many tickets at each price were sold?

24. _____

25. Tim is planning a rectangular fenced in area for his dogs in his backyard. Since he already has 200 feet of fencing materials, the perimeter needs to be at most 200 feet. He wants the length to be at least 20 feet more than the width.

    a) Write a system of inequalities to describe the situation.
    b) Give two possible solutions for the fenced in area.

25. a) _____

    b) _____

INTERMEDIATE ALGEBRA Name:

Chapter 5 Diagnostic Test

1. Write 830,000 in scientific notation. [Section 5.1] 1. _____

2. Write 6.572×10^{-4} in standard form. [Section 5.1] 2. _____

For Exercises 3–8, simplify. [Section 5.1]

3. $(6x^2y^3)(-7xy^5)$ 3. _____

4. $(-3x^2y^4)^{-3}$ 4. _____

5. $\dfrac{12m^6n^2}{4m^4n^3}$ 5. _____

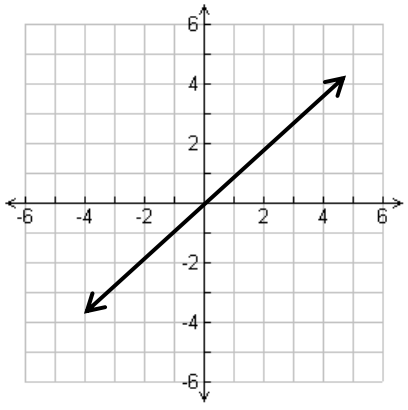
6: $\left(-\dfrac{1}{2}x^4y^3z^2\right)^4$ 6. _____

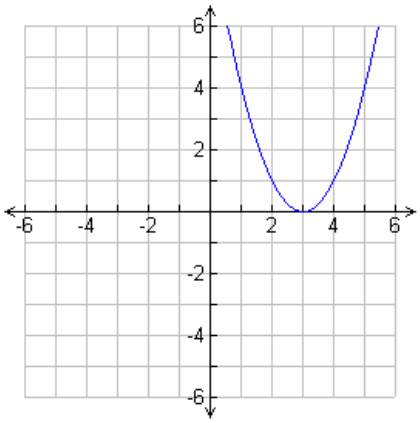
7. $\left(4\times10^4\right)\left(2.1\times10^3\right)$ 7. _____

8. $\dfrac{8.4\times10^4}{2.1\times10^7}$ 8. _____

For Exercises 9 and 10, indicate whether the function is a constant function, a linear function, a quadratic function, or a cubic function. [Section 5.2]

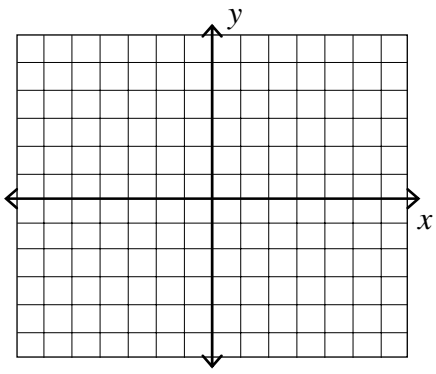
9. 9. _____



10. 

10. _____

11. Graph $f(x) = x^2 - 4$. [Section 5.2]

11. 

For Exercises 12–18, perform the indicated operation and write the resulting polynomial in descending order. [Sections 5.2 and 5.3]

12. $(5x^4 - 3x^3 + 2x^2 - 4) + (4x^3 - 2x^2 - 3x + 6)$

12. _____

13. $(-9x^2 + 7xy - 5) - (-2x^2 - 4xy + 6)$

13. _____

14. $(5x - 3y)(7x + 4y)$

14. _____

15. $-3x^2y^2(5x^4y - 4x^3y^2 - 7xy)$

15. _____

16. $(3x - 7)^2$

16. _____

17. $(2x - 5)(3x^2 + 5x - 7)$

17. _____

18. $(5x - 3)(5x + 3)$

18. _____

For Exercises 19 and 20, use $f(x) = 5x - 3$, and $g(x) = -3x + 23$. [Sections 5.2 and 5.3]

19. Find $(f - g)(x)$. 19. _____

20. Find $(f \cdot g)(3)$. 20. _____

For Exercises 21 and 22, divide. [Section 5.4]

21. $\dfrac{12x^3 - 8x^2 - 6x}{2x}$ 21. _____

22. $\dfrac{12x^2 + 4x - 1}{2x - 1}$ 22. _____

23. Divide $\dfrac{3x^3 + 5x^2 - 13x - 3}{x + 3}$ using synthetic division. [Section 5.5] 23. _____

24. For $P(x) = x^3 - 3x^2 - 5x + 1$, use the remainder theorem to find $P(-2)$. [Section 5.5] 24. _____

25. A chemical company produces a cleaning solvent. The function $R(x) = 0.1x^2 + x + 2400$ describes the revenue the company makes from sales where x represents the number of bottles of solvent sold. The function $C(x) = 12x + 1440$ describes the cost of producing those bottles. [Section 5.6] 25. a) _____ b) _____

a) Find a function, $P(x)$, that describes the profit.

b) Find the profit if the company sells 100 bottles.

INTERMEDIATE ALGEBRA Name:

Chapter 6 Diagnostic Test

1. Find the GCF of $15x^3y^5$ and $10x^7y^2$. [Section 6.1] 1. _____

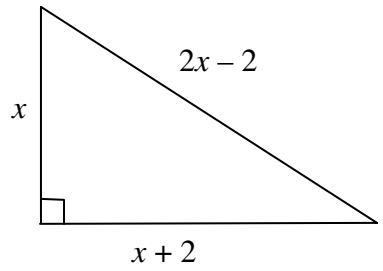
For Exercises 2–16, factor completely. [Sections 6.1–6.3]

2. $4xy + 8x^4y^3 - 12x^2y^3$ 2. _____
3. $x^3 - 2x^2 + 6x - 12$ 3. _____
4. $x^2 - 64$ 4. _____
5. $8x^3 + 125$ 5. _____
6. $4x^2 - 28x + 49$ 6. _____
7. $2x^2 - 11x + 14$ 7. _____
8. $10x^2 - 15x - 45$ 8. _____
9. $4 - 36a^2$ 9. _____
10. $6x^2 + x - 15$ 10. _____
11. $4x^3 - 32y^3$ 11. _____
12. $a^5 + b^2c + a^2c + a^3b^2$ 12. _____
13. $x^4 - 64$ 13. _____
14. $4x^2 - 37x - 30$ 14. _____
15. $8a^2 - 85a + 50$ 15. _____
16. $-3x^4 + 48$ 16. _____

For Exercises 17–20 solve. [Section 6.4]

17. $x(x - 6) + 12 = 3$ 17. _____
18. $2y^2 - 7y = 15$ 18. _____
19. $8y^2 + 10y = 3$ 19. _____
20. $-5x^3 + 5x^2 = -30x$ 20. _____

21. Find the length of each side of the right triangle shown. [Section 6.4]



21. _____

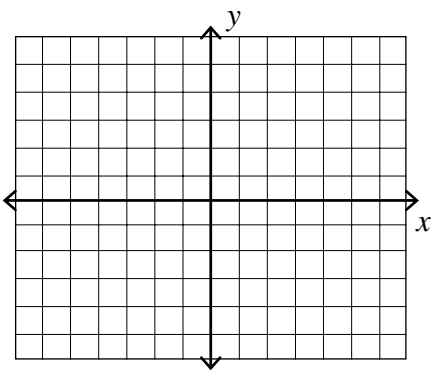
22. A person is standing on top of a 40 foot high building. If the person projects an object upwards with an initial velocity of 72 feet per second, the height of the object from the ground after t seconds is given by $-16t^2 + 72t + 40$. Find the time it takes for the object to hit the ground [Section 6.4]

22. _____

For Exercises 23–25, find the x-intercepts and graph the function. [Section 6.4]

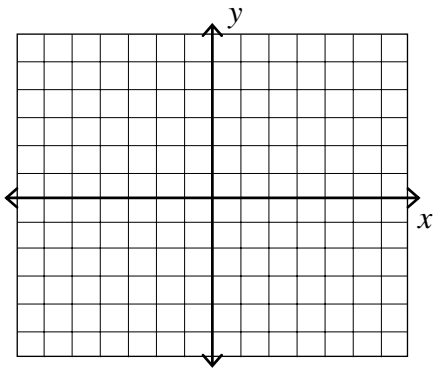
23. $f(x) = 4 - x^2$

23. _____



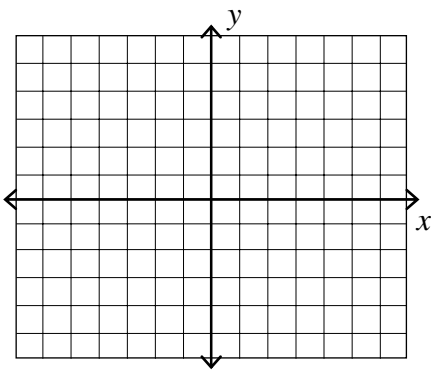
24. $f(x) = x^2 + 3x - 10$

24. _____



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

25. _____



INTERMEDIATE ALGEBRA Name:

Chapter 7 Diagnostic Test

1. Given $f(x) = \dfrac{x-2}{2x^2-8x+16}$, find the following:

   a) $f(-2)$

   b) $f(0)$

   c) $f(2)$

   [Section 7.1]

   1. a)_____
      b)_____
      c)_____

2. Find the domain of $f(x) = \dfrac{5+3x}{x^2-2x-48}$.

   [Section 7.1]

   2. _____

For Exercises 3–5, simplify. [Section 7.1]

3. $\dfrac{3x-x^2}{x^2-x-6}$

   3. _____

4. $\dfrac{3x-x^2}{x^2-6x+9}$

   4. _____

5. $\dfrac{x^3-5x^2-4x+20}{x^2-10x+25}$

   5. _____

For Exercises 6–8, find the products or quotients. [Section 7.1]

6. $\dfrac{4xy}{7a^2b^2} \div \dfrac{8x^2y}{21a^3b^3}$

   6. _____

7. $\dfrac{3x^2-6x}{a^5} \cdot \dfrac{a^3}{2x^2-4x}$

   7. _____

8. $\dfrac{10x^2-5x}{2x^2+9x-5} \cdot \dfrac{x^2-25}{5x}$

   8. _____

9. Find the LCD for $\frac{5y}{y^2-6y+9}$ and $\frac{2}{y^2-9}$. [Section 7.2]

9. _____

For Exercises 10–13, find the sums or differences. [Section 7.2]

10. $\frac{3}{x^2-9}+\frac{x+1}{x^2+3x}$

10. _____

11. $\frac{a}{4a+32}-\frac{16}{a^2+8a}$

11. _____

12. $\frac{-36}{9-x^2}+\frac{x-9}{x-3}$

12. _____

13. $\frac{x}{2-x}+\frac{3}{x-2}-\frac{3x-2}{x^2-4}$

13. _____

For Exercises 14–17, simplify. [Section 7.3]

14. $\dfrac{\frac{a^2-4a+4}{2}}{\frac{a-2}{4}}$

14. _____

15. $\dfrac{7+\frac{1}{2y}}{5-\frac{1}{2y}}$

15. _____

16. $\dfrac{1+\frac{6}{x}+\frac{8}{x^2}}{1+\frac{1}{x}-\frac{12}{x^2}}$

16. _____

17. $\dfrac{x^{-2}-y^{-2}}{x^{-1}-y^{-1}}$

17. _____

For Exercises 18–22, solve. [Section 7.4]

18. $\frac{y}{5} = \frac{y}{2} - \frac{1}{2}$ 18. _____

19. $\frac{1}{x-2} + \frac{1}{2x-4} = \frac{3}{2}$ 19. _____

20. $\frac{2a+3}{a^2+5a+6} + \frac{2-5a}{a^2-4} = \frac{2-3a}{a^2+a-6}$ 20. _____

21. Bob can paint a room in four hours, but it takes his wife, Mary, five hours to paint the same room. How long will it take them to paint the room if they work together? 21. _____

22. Driving from Charlotte to Baltimore, Sean averaged 60 miles per hour. He figured that if he had averaged 70 miles per hour, his driving time would decrease an hour. How far is it from Charlotte to Baltimore? 22. _____

For Exercises 23–25, solve the variations. [Section 7.5]

23. The weight M of an object on Mars is directly proportional to its weight E on Earth. A person who weighs 95 pounds on Earth weighs 38 pounds on Mars. How many pounds would a 200 pound person weigh on Mars? 23. _____

24. A quantity I varies jointly with x and y and inversely with z. If $x = 15$, $y = 5$, and $z = 10$. Find the constant of variation k, when $I = 30$. 24. _____

25. The value of a boat usually varies inversely with its age. If a boat is worth \$7,000 when it is 3 years old, how much will it be worth when it is 7 years old? 25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 8 Diagnostic Test

For Exercises 1 and 2, evaluate the square root if possible.

1. $\sqrt{25}$ [Section 10.1] 1. _____

2. $\sqrt{-36}$ [Section 10.1] 2. _____

For Exercises 3–12, simplify. Assume variables represent nonnegative numbers.

3. $\sqrt{64x^7y^4}$ [Section 10.3] 3. _____

4. $\sqrt[3]{48}$ [Section 10.3] 4. _____

5. $\sqrt[3]{4x^5} \cdot \sqrt[3]{16x^3}$ [Section 10.3] 5. _____

6. $-\sqrt[5]{-32x^{10}}$ [Section 10.3] 6. _____

7. $\dfrac{\sqrt{3}}{\sqrt{27}}$ [Section 10.3] 7. _____

8. $\dfrac{\sqrt[4]{1}}{\sqrt[4]{256}}$ [Section 10.3] 8. _____

9. $5\sqrt{3} - \sqrt{3}$ [Section 10.4] 9. _____

10. $\left(\sqrt{7} - 1\right)^2$ [Section 10.4] 10. _____

11. $a^{\frac{1}{2}} \cdot a^{-\frac{1}{3}}$ [Section 10.2] 11. _____

12. $\left(\sqrt[3]{5}-2\right)\left(\sqrt[3]{25}+7\right)$ [Section 10.4] 12. _____

For Exercises 13 and 14, write in exponential form. [Section 10.2]

13. $\sqrt[3]{5y^2}$ 13. _____

14. $\left(\sqrt[5]{7xy}\right)^3$ 14. _____

For Exercises 15 and 16, rationalize the denominator and simplify. [Section 10.5]

15. $\dfrac{4}{\sqrt[3]{2}}$ 15. _____

16. $\dfrac{\sqrt{y}}{\sqrt{x}-\sqrt{y}}$ 16. _____

For Exercises 17 and 18, solve the equation. [Section 10.6]

17. $\sqrt{2x+12}=4$ 17. _____

18. $\sqrt{2x+8}-4=6$ 18. _____

For Exercises 19 – 22, simplify and write the answer in standard form (a + bi). [Section 10.7]

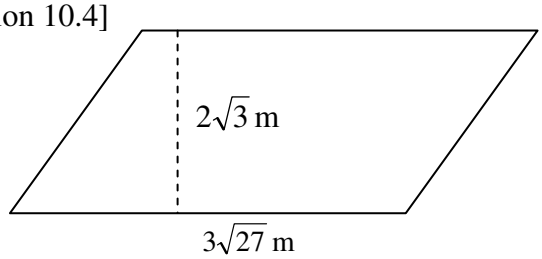
19. $(2-5i)-(3+i)$ 19. _____

20. $(4i)(-9i)$ 20. _____

21. $(3-i)(3+2i)$ 21. _____

22. $\dfrac{5}{3-4i}$ 22. _____

23. Write an expression for the area of the figure. [Section 10.4]



23. _____

24. Find the distance an object has fallen by using the formula $t = \sqrt{\frac{h}{16}}$, when t is the time in seconds and h is the distance in feet that the object has fallen.

    a) Write an expression in simplest form for the exact amount of time an object falls a distance of 64 feet.
    b) Find the distance an object falls in 4 seconds. [Section 10.6]

24. a) _____
    b) _____

25. Use the formula $T = 2\pi\sqrt{\frac{L}{9.8}}$ where T is the period of a pendulum in seconds and L is the length of the pendulum in meters. Find the period of a pendulum with a length of 88.2 meters. [Section 10.6]

25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 9 Diagnostic Test

For Exercises 1 and 2, use the square root principle to solve and check. [Section 11.1]

1. $x^2 = 49$ 1. _____

2. $(y + 2)^2 = 20$ 2. _____

For Exercises 3and 4, solve by completing the square. [Section 11.1]

3. $x^2 - 6x = 16$ 3. _____

4. $2x^2 - 4x = 8$ 4. _____

For Exercises 5 and 6, solve by using the quadratic formula. [Section 11.2]

5. $2x^2 + 2x + 3 = 0$ 5. _____

6. $x^2 - 4x + 1 = 0$ 6. _____

For Exercises 7–12, solve using any method. [Section 11.1–11.3]

7. $y^2 - 35 = -2y$ 7. _____

8. $2x^2 = 18$ 8. _____

9. $3x^2 - 2x - 6 = 0$ 9. _____

10. $5x^2 + 20x = 0$ 10. _____

11. $x^2 + 25 = 0$ 11. _____

12. $2y^2 = -7y$ 12. _____

For Exercises 13–16, solve. [Section 11.1–11.3]

13. $\dfrac{3}{x-2}+\dfrac{3}{x+2}=2$ 13. _____

14. $6x^{\frac{2}{5}}+10x^{\frac{1}{5}}+4=0$ 14. _____

15. $7\sqrt{x}+14=0$ 15. _____

16. $\sqrt{x+7}-x=-5$ 16. _____

For Exercises 17 and 18, solve using substitution. [Section 11.3]

17. $x^4-12x^2+32=0$ 17. _____

18. $(3x-7)^2-9(3x-7)+18=0$ 18. _____

19. For $f(x) = x^2 + 2x - 8$ 19. a) _____

a) State whether the parabola opens upwards or downwards. b) _____

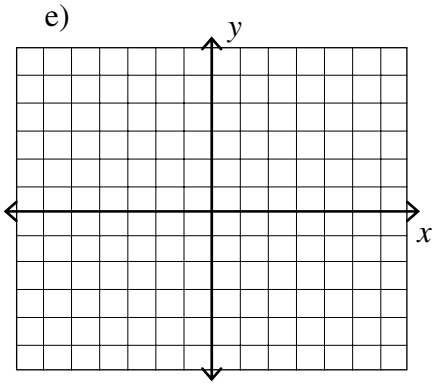
b) Find the x- and y-intercepts. c) _____

c) Find the coordinates of the vertex. d) _____

d) Write the equation of the axis of symmetry. e)

e) Graph.

[Section 11.4]



For Exercises 20 and 21,

a) Solve the inequality.

b) Graph the solution set on a number line.

[Section 11.5]

20. $(x+9)(x-5)>0$

20. _____

21. $\dfrac{4x+7}{x-2}\le 0$

21. _____

For Exercises 22–25, solve.

22. A ball is thrown downward from a window in a tall building. The distance traveled by the ball is given by the equation $h=16t^2+32t$, where t is the time traveled in seconds and h is the height of the ball. How long will it take the ball to fall 320 feet? Round to the nearest tenth of a second. [Section 11.4]

22. _____

23. A lot is in the shape of a right triangle. The shorter leg measures 150 meters. The hypotenuse is 50 meters longer than the length of the longer leg. What is the length of the longer leg? [Section 11.2]

23. _____

24. A ball is thrown upward with an initial velocity of 32 ft/sec. Its height h, after t seconds is given by $h=-16t^2+32t$.

    a) What is the maximum height that the ball reaches?

    b) At what time will the ball hit the ground?

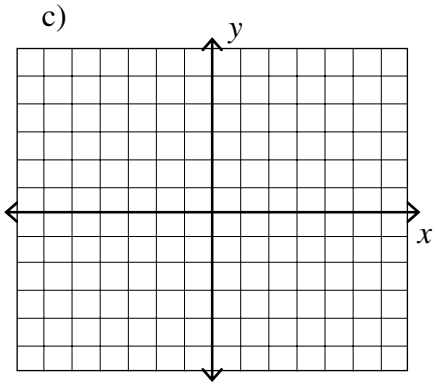
    c) Graph the trajectory.

    [Section 11.4]

24. a) _____

    b) _____

    c)



25. A rectangular enclosure must have an area of at least 2800 yd^2. If 220 yards of fencing is to be used, and the width cannot exceed the length, within what limits must the width of the enclosure lie? [Section 11.5]

25. _____

INTERMEDIATE ALGEBRA **Name:**

Chapter 10 Diagnostic Test

1. If $f(x) = 8x + 6$ and $g(x) = 2x - 1$, find $f[g(x)]$. [Section 12.1]

1. _____

2. If $f(x) = 7x - 5$, find the following

   a) $f^{-1}(x)$

   b) Verify that $f[f^{-1}(x)]$ and $f^{-1}[f(x)] = x$

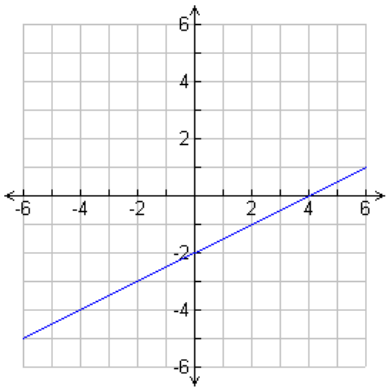
   [Section 12.1]

2. a)_____

   b)_____

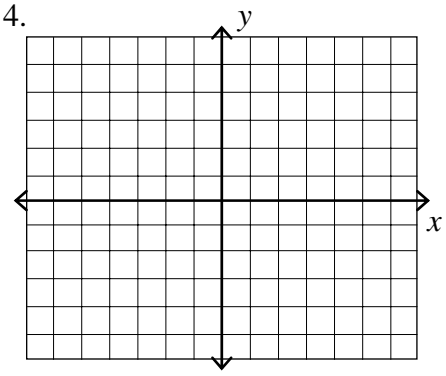
3. Below is the graph of a function f. On the same set of axes, sketch the graph of f^{-1}. [Section 12.1]

3. _____



4. Sketch the graph of $y = 2^{2x-1}$. [Section 12.1]

4.



5. Solve $6^{3-2x} = 36$ for x. [Section 12.2]

5. _____

6. Solve $2^{6-2x} = 16$ for x. [Section 12.2]

6. _____

7. A sum of \$9000 is invested at 6% compounded quarterly.
   a) Find the amount in the account after 8 years.
   b) Find the number of years until there is \$20,000 in the account. [Section 12.2]

7. a)_____
   b)_____

8. The isotope Iodine (I^{131}) has a half-life of 8.07 days.
   a) How much of a 100 gram sample remains after 30 days?
   b) How long will it take until there are only 35 grams remaining? [Section 12.2]

8. a)_____
   b)_____

9. It is estimated that the value of a car depreciates 20% per year for the first five years. If the original price of a car is P, the value A, and the formula for the value of the car after t years is $A = P(0.80)^t$, find the value of a car that originally cost \$27,500 after 5 years. [Section 12.2]

9. _____

For Exercises 10–11, convert the logarithm into exponential form. [Section 12.3]

10. $\log_5 25 = 2$

10. _____

11. $\log_9 \frac{1}{81} = -2$

11. _____

For Exercises 12–14, find the exact solution of each equation. [Section 12.3]

12. $\log_7 \frac{1}{49} = x$

12. _____

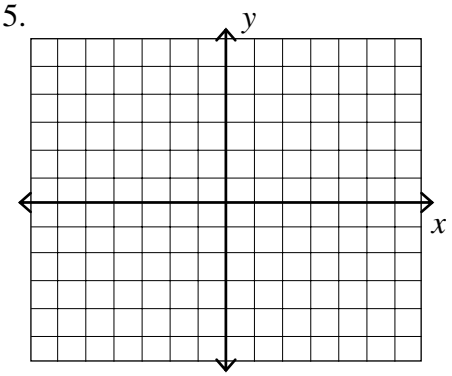
13. $\log_x 64 = 3$

13. _____

14. $\log_x 32 = 5$

14. _____

15. Graph $y = \log_4 x$. [Section 12.3]

15. 

For Exercises 16 and 17, write as a sum or difference of multiples of logarithms. [Section 12.4]

16. $\log_b \dfrac{x^5}{y^3}$ 16. _____

17. $\log_3 x^4 \sqrt[3]{y}$ 17. _____

For Exercises 18 and 19, write as a single logarithm. [Section 12.4]

18. $\dfrac{1}{5}\log_2 x - 7\log_2 y$ 18. _____

19. $5\log_4 x - 6\log_4 y$ 19. _____

For Exercises 20–24, solve each equation for x. Approximate to four decimal places. [Section 12.6]

20. $2^x = 10$ 20. _____

21. $e^{-2x} = 0.5$ 21. _____

22. $6^{x+1} = 9^x$ 22. _____

23. $\log_2 x + \log_2 (x - 7) = 3$ 23. _____

24. $\log_4 (x + 2) - \log_4 (x - 1) = 1$ 24. _____

25. The amount of radioactive element R in grams present t years from now is given by the formula $R = 9.7e^{-0.003t}$.

    a) How much of R was present initially?

    b) How much is left after 25 years? Round to the nearest tenth of a gram. [Section 12.6]

25. a)_____

    b)_____

INTERMEDIATE ALGEBRA **Name:**

Chapter 11 Diagnostic Test

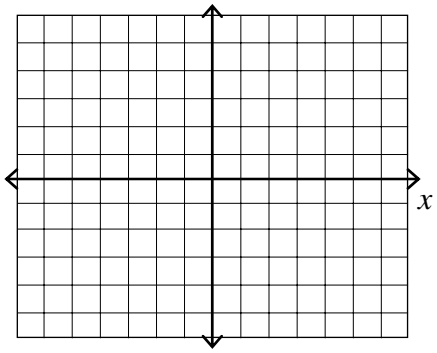
For Exercises 1–2, find the direction the parabola opens, the coordinates of the vertex, and the equation of the axis of symmetry. Draw the graph. [Section 13.1]

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

1. a)_____

b)_____

c)_____

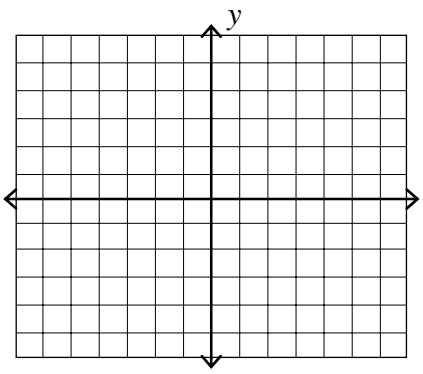


2. $x = -2(y+3)^2 - 1$

2. a)_____

b)_____

c)_____

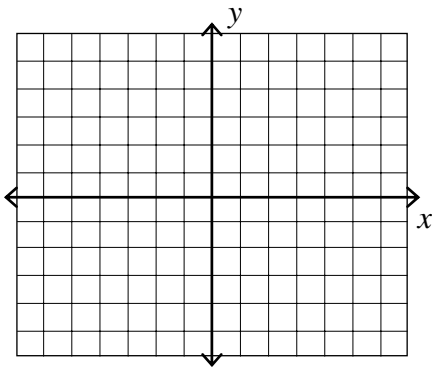


3. Given $y = -x^2 + 4x + 10$. Find the direction the parabola opens, the coordinates of the vertex, and the equation of the axis of symmetry. Draw the graph. [Section 13.1]

3. a)_____

b)_____

c)_____



4. Find the distance between the points whose coordinates are (3, 2) and (8, 4). [Section 13.1]

4. _____

5. Find the distance between the points whose coordinates are (2, –3) and (–5, –6). [Section 13.1]

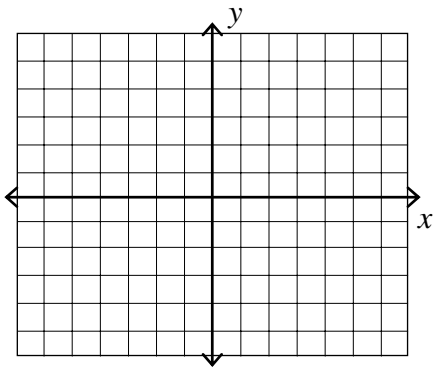
5. _____

For Exercises 6 and 7, find the center and radius. Draw the graph. [Section 13.1]

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

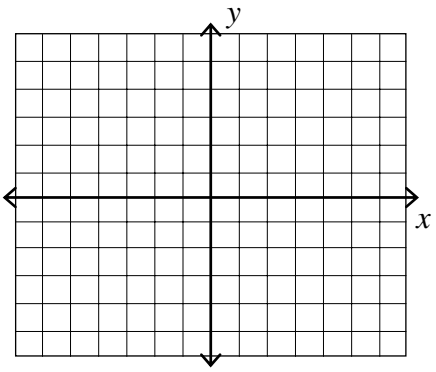
6. _____

_____



7. $x^2 + y^2 - 2x + 4y - 20 = 0$

7. _____



8. Write the equation of the circle with center (–2, 4) and passes through the point (–6, 0). [Section 13.1]

8. _____

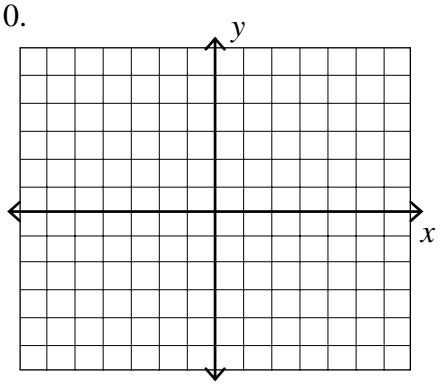
9. Write the equation of the circle with center (–3, 2) and passes through the point (–1, –3). [Section 13.1]

9. _____

For Exercises 10–13, sketch the graph of each equation. [Section 13.2]

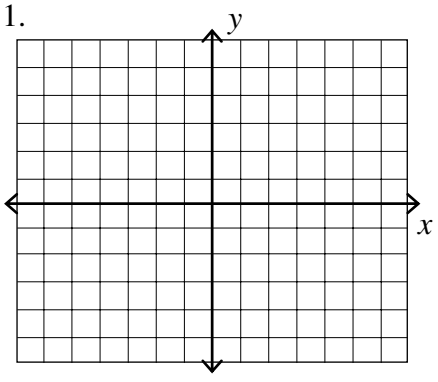
10. $\frac{x^2}{4} + \frac{y^2}{25} = 1$

10.



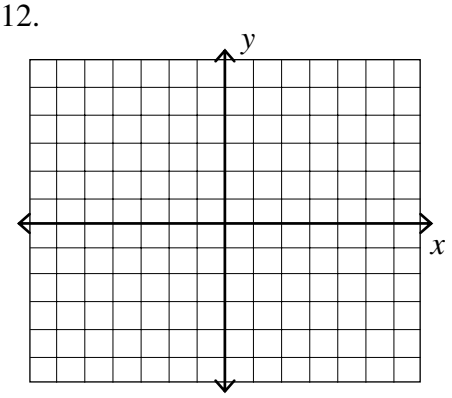
11. $\frac{y^2}{4} - \frac{x^2}{9} = 1$

11.



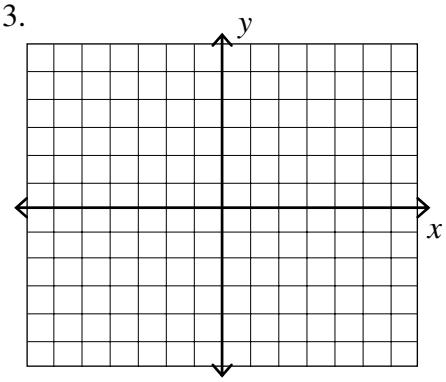
12. $4y^2 + 25x^2 = 100$

12.



13. $y^2 - 4x^2 = 16$

13.



For Exercises 14–18, find the solution set of each system of equations. [Section 13.3]

14. $\begin{cases} 8x^2 + 32y^2 = 256 \\ x - 2y = 0 \end{cases}$

14. _____

15. $\begin{cases} x^2 + y^2 = 2 \\ x + y = 2 \end{cases}$

15. _____

16. $\begin{cases} x^2 + y^2 = 13 \\ x^2 - y^2 = 5 \end{cases}$

16. _____

17. $\begin{cases} 6x^2 + 8y^2 = 182 \\ 8x^2 - 3y^2 = 24 \end{cases}$

17. _____

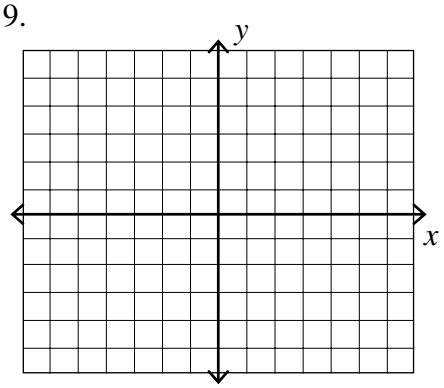
18. $\begin{cases} 4x^2 + y^2 = 16 \\ 4x^2 - y^2 = 16 \end{cases}$

18. _____

For Exercises 19–21, draw the graph. [Section 13.4]

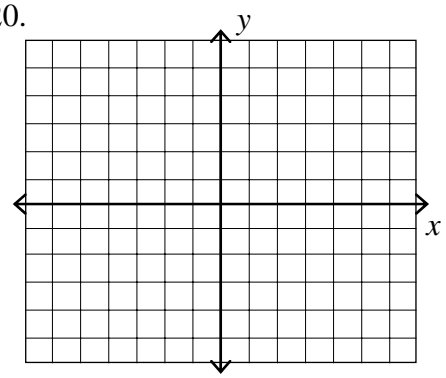
19. $x^2 < 3 - y$

19.



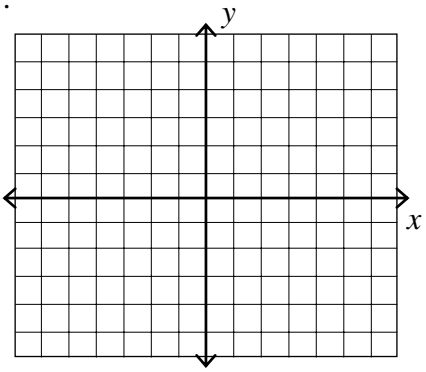
20. $\frac{y^2}{16} - \frac{x^2}{9} \geq 1$

20.



21. $\frac{x^2}{16} - \frac{y^2}{4} \geq 1$

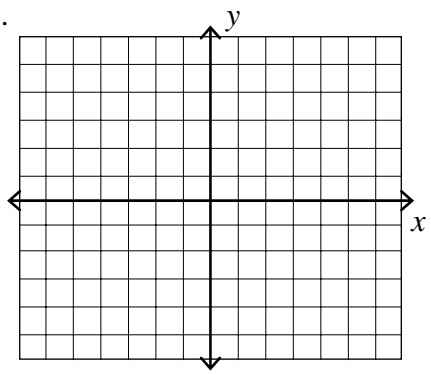
21.



For Exercise 22 and 23, graph the solution set for the following system of inequalities. [Section 13.4]

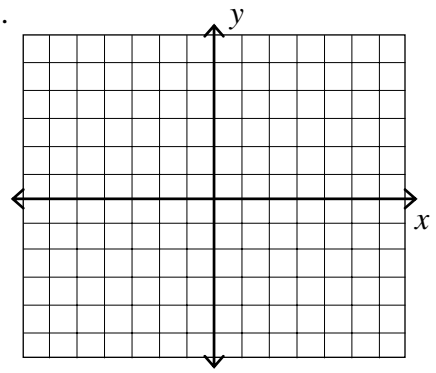
22. $\begin{cases} x^2 - y^2 \geq 1 \\ x^2 + y^2 \leq 16 \end{cases}$

22.



23. $\begin{cases} y^2 - x^2 > 4 \\ x^2 + y^2 > 16 \end{cases}$

23.



24. An arch is in the shape of a parabola and is 30 feet high and 24 feet wide at the base. If the vertex is placed at the origin, find the equation of the parabola. [Section 13.1]

24. _____

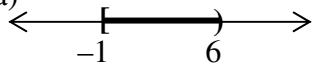
25. The path of a planet with an elliptical orbit has a length of 400 miles and a height of 160 miles. What is the equation of the path of the planet? [Section 13.2]

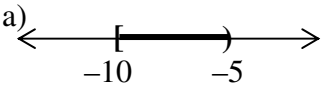
25. _____

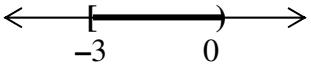
CHAPTER 1 DIAGNOSTIC TEST

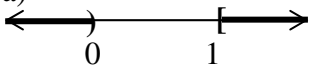
1. 4.37
2. $-\frac{5}{11}$
3. 12
4. 4
5. $\frac{3}{2}$
6. Distributive property of multiplication over addition
7. Associative property of addition
8. –4
9. $-\frac{1}{24}$
10. 4.08
11. 16
12. $-\frac{10}{3}$ or $-3\frac{1}{3}$
13. 2
14. −12
15. 8
16. 17
17. 28
18. –33
19. 15
20. – $150.62
21. 2.5
22. –30
23. 8
24. $-10y + 18$
25. $9x + 2.2$

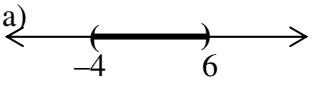
CHAPTER 2 DIAGNOSTIC TEST

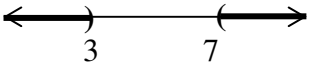
1. $\{2, 4\}$
   $\{1, 2, 3, 4, 6, 8, 10\}$
2. 1
3. 6.25
4. 2
5. $-3\frac{2}{3}, 7$
6. –3, 5
7. 1, 7
8. No solution
9. $r = \frac{A - P}{Pt}$
10. $h = \frac{3V}{B}$
11. a) 

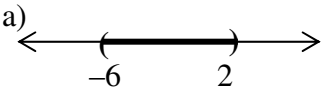
    b) $\{x \mid -1 \le x < 6\}$
    c) $[-1, 6)$
12. a) 

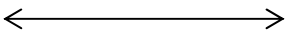
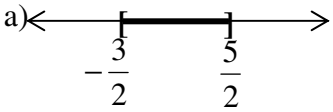
    b) $\{x \mid -10 \le x < -5\}$
    c) $[-10, -5)$
13. a) 

    b) $\{x \mid -3 \le x < 0\}$
    c) $(-3, 0)$
14. a) 

    b) $\{x \mid x < 0 \text{ or } x \ge 1\}$
    c) $(-\infty, 0) \cup [1, \infty)$
15. a) 

    b) $\{y \mid -4 < y < 6\}$
    c) $(-4, 6)$
16. a) 

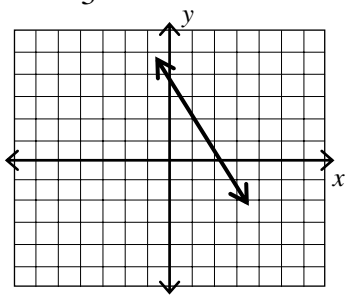
    b) $\{x \mid x < 3 \text{ or } x > 7\}$
    c) $(-\infty, 3) \cup (7, \infty)$
17. a) 

    b) $\{x \mid -6 < x < 2\}$
    c) $(-6, 2)$
18. a) 
    b) $\varnothing$
    c) No solution
19. a) 
    b) All real numbers
    c) $(-\infty, \infty)$
20. a) a) 

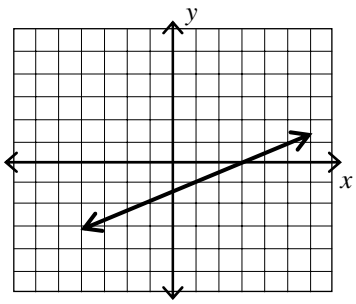
    b) $\left\{x \mid -\frac{3}{2} \le x \le \frac{5}{2}\right\}$
    b) $\left[-\frac{3}{2}, \frac{5}{2}\right]$
21. 10
22. \$719.20
23. 10 \$5 bills, 6 \$10 bills
24. 150 ounces
25. $x \ge 93$

CHAPTER 3 DIAGNOSTIC TEST

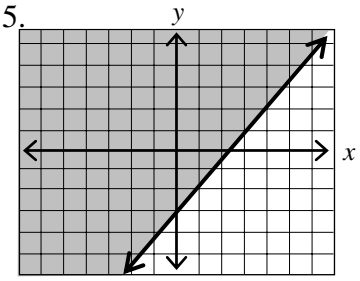
1. A (–2, –4), B (–4, 0), C (1, 4), D (4, 1), E (5, –3)
2. Quadrant II
3. No
4. $-\frac{5}{3}$; (0, 4)



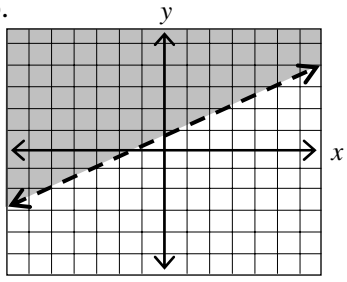
5. $\frac{1}{2}$; $\left(0, -\frac{3}{2}\right)$



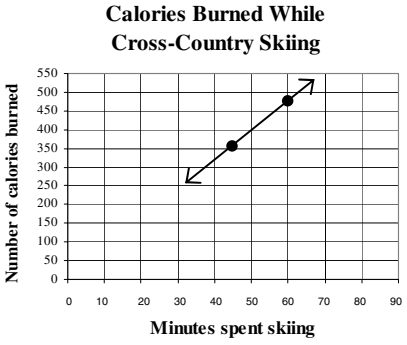
6. $-\frac{1}{4}$
7. $-\frac{2}{3}$
8. $y = \frac{1}{2}x - 4$
9. $y = \frac{4}{3}x + 2$
10. $y = 3x - 11$
11. $2x + y = 10$
12. $2x - y = 7$
13. Perpendicular
14. Yes
15.



16.



17. a)

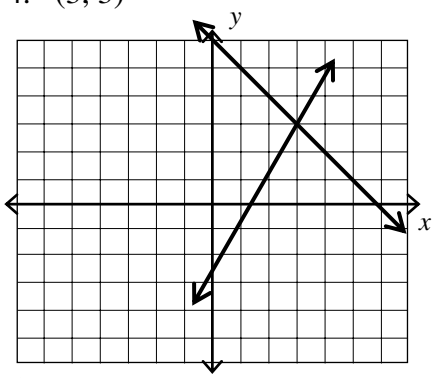


b) $m = 8$
c) $y = 8x$
d) 1200 calories

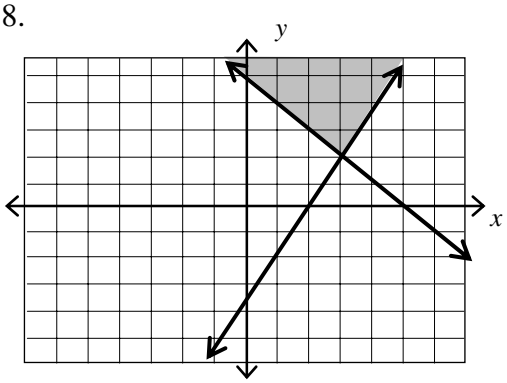
18. Yes
Domain: $\{x \mid 2000 \le x \le 2005\}$
Range: {8927; 9153; 9899; 10,213; 11,795; 10,676}
19. Yes
20. $x = -3$
21. a) $\frac{1}{3}$
b) 0
c) –5
22. a) $\sqrt{3}$
b) 0
c) $\sqrt{15}$
23. a) Domain: $\{x \mid x \ge -3\}$
b) Range: $\{y \mid y \ge 0\}$
c) $f(-3) = 0$
24. a) $2\ell + 2w \le 192$
b) $w \le 36$ feet
25. a) $c(t) = 40 + 20t$
b) \$70
c) 6 hours

CHAPTER 4 DIAGNOSTIC TEST

1. Yes
2. No
3. Yes
4. (3, 3)

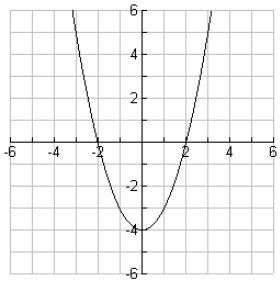


5. (3, 3)
6. (2, –3)
7. Infinitely many along $2x - y = 3$
8. (6, –2)
9. (2, –1, 3)
10. (2, –2, –1)
11. (–5, 33, 14)
12. (–2, –3)
13. (5, –3)
14. (–3, 0, 3)
15. (1, –3)
16. (3, 1)
17. (2, –1, 4)
18.



19. 8 and 18
20. 25 lbs of \$3, 5 lbs of \$5
21. 515 mph
22. 16 dimes, 14 nickels
23. 10 ounces of A, 30 ounces of B
24. 3000 \$2 tickets
    1000 \$3 tickets
    1000 \$5 tickets
25. a) $2\ell + 2w \le 200$
    $\ell - w \ge 20$
    b) 60 ft by 40 ft, 62 ft by 38 ft
    Answers may vary.

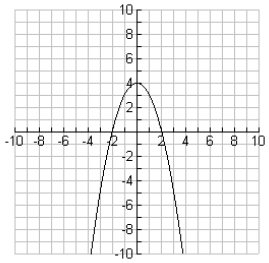
CHAPTER 5 DIAGNOSTIC TEST

1. 8.3×10^5
2. 0.0006572
3. $-42x^3y^8$
4. $\dfrac{-1}{27x^6y^{12}}$
5. $\dfrac{3m^2}{n}$
6. $\dfrac{x^{16}y^{12}z^8}{16}$
7. 8.4×10^7
8. 4×10^{-3}
9. linear
10. quadratic
11. 

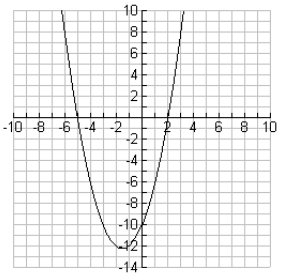
12. $5x^4 + x^3 - 3x + 2$
13. $-7x^2 + 11xy - 11$
14. $35x^2 - xy - 12y^2$
15. $-15x^6y^3 + 12x^5y^4 + 21x^3y^3$
16. $9x^2 - 42x + 49$
17. $6x^3 - 5x^2 - 39x + 35$
18. $25x^2 - 9$
19. $(f - g)(x) = 8x - 26$
20. $(f \cdot g)(3) = 168$
21. $6x^2 - 4x - 3$
22. $6x + 5 + \dfrac{4}{2x-1}$
23. $3x^2 - 4x - 1$
24. -9
25. a) $0.1x^2 - 11x + 960$
    b) \$860

CHAPTER 6 DIAGNOSTIC TEST

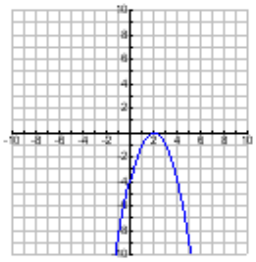
1. $5x^3y^2$
2. $4xy(1 + 2x^3y^2 - 3xy^2)$
3. $(x^2 + 6)(x - 2)$
4. $(x + 8)(x - 8)$
5. $(2x + 5)(4x^2 - 10x + 25)$
6. $(2x - 7)^2$
7. $2x - 7)(x - 2)$
8. $5(2x + 3)(x - 3)$
9. $4(1 + 3a)(1 - 3a)$
10. $(3x + 5)(2x - 3)$
11. $4(x - 2y)(x^2 + 2xy + 4y^2)$
12. $(a^3 + c)(a^2 + b^2)$
13. $(x^2 + 8)(x^2 - 8)$
14. $(4x + 3)(x - 10)$
15. $(8a - 5)(a - 10)$
16. $-3(x^2 + 4)(x + 2)(x - 2)$
17. 3
18. $-\frac{3}{2}, 5$
19. $-\frac{3}{2}, \frac{1}{4}, 0$
20. –2, 3
21. 6, 8, 10
22. 5 seconds
23. (–2, 0), (2, 0)
    $y = 4 - x^2$



24. (–5, 0), (2, 0)
    $f(x) = x^2 + 3x - 10$



25. (2, 0)
    $y = -x^2 + 4x - 4$



CHAPTER 7 DIAGNOSTIC TEST

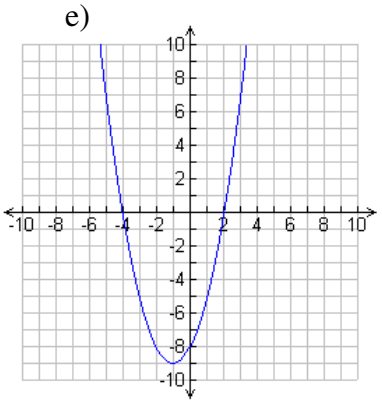
1. a) $-\frac{1}{10}$
   b) $-\frac{1}{8}$
   c) 0
2. $\{x \mid x \neq -6, 8\}$
3. $\frac{-x}{x+2}$
4. $\frac{-x}{x-3}$
5. $\frac{(x+2)(x-2)}{x-5}$
6. $\frac{3ab}{2x}$
7. $\frac{3}{2a^2}$
8. $x-5$
9. $(y-3)^2(y+3)$
10. $\frac{x^2+x-3}{x(x+3)(x-3)}$
11. $\frac{a-8}{4a}$
12. $\frac{x-3}{x+3}$
13. $-\frac{x+4}{x+2}$
14. $2a-4$
15. $\frac{14y+1}{10y-1}$
16. $\frac{x+2}{x-3}$
17. $\frac{y+x}{xy}$
18. $\frac{5}{3}$
19. 3
20. $-\frac{2}{5}$
21. $\frac{20}{9}$ *or* $2\frac{2}{9}$ hours
22. 420 miles
23. 80 pounds
24. 4
25. \$3000

CHAPTER 8 DIAGNOSTIC TEST

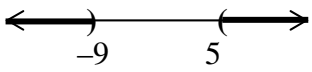
1. 5
2. $6i$
3. $8x^3y^2\sqrt{x}$
4. $2\sqrt[3]{6}$
5. $4x^2\sqrt[3]{x^2}$
6. $2x^2$
7. $\frac{1}{3}$
8. $\frac{1}{4}$
9. $4\sqrt{3}$
10. $8-2\sqrt{7}$
11. $a^{\frac{1}{6}}$
12. $-9+7\sqrt[3]{5}-2\sqrt[3]{25}$
13. $5^{\frac{1}{3}}y^{\frac{2}{3}}$
14. $(7xy)^{\frac{3}{5}}$
15. $2\sqrt[3]{4}$
16. $\frac{\sqrt{xy}+y}{x-y}$
17. 2
18. 46
19. $-1-6i$
20. 36
21. $11+3i$
22. $\frac{3}{5}+\frac{4}{5}i$
23. 54 m^2
24. a) 2 seconds
    b) 256 feet
25. 6π seconds

CHAPTER 9 DIAGNOSTIC TEST

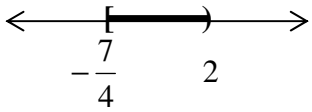
1. ± 7
2. $-2 \pm 2\sqrt{5}$
3. –2, 8
4. $1 \pm \sqrt{5}$
5. $\dfrac{-1 \pm i\sqrt{5}}{2}$
6. $2 \pm \sqrt{3}$
7. –7, 5
8. ± 3
9. $\dfrac{1 \pm \sqrt{19}}{3}$
10. –4, 0
11. $\pm 5i$
12. $-\dfrac{7}{2}, 0$
13. –1, 4
14. $-\dfrac{32}{243}, -1$
15. No solution
16. 9
17. $\pm 2, \pm 2\sqrt{2}$
18. $\dfrac{13}{3}, \dfrac{10}{3}$
19. a) Upwards
    b) (–4, 0), (2, 0), (0, –8)
    c) (–1, –9)
    d) $x = -1$
    e)



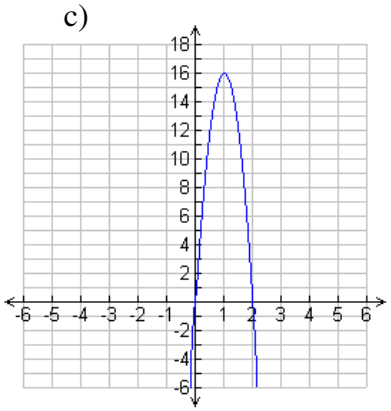
20. $(-\infty, -9) \cup (5, \infty)$



21. $\left[-\dfrac{7}{4}, 2\right)$



22. $-1 + \sqrt{21} \approx 3.6$ seconds
23. 200 meters
24. a) 16 feet
    b) 2 seconds
    c)

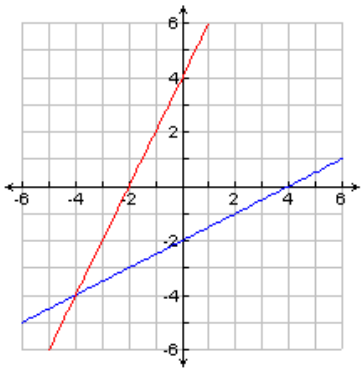


25. 40 yd $\le w \le$ 55 yd

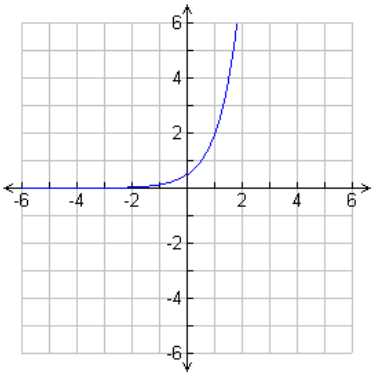
CHAPTER 10 DIAGNOSTIC TEST

1. $16x - 2$
2. a) $f^{-1}(x) = \dfrac{x+5}{7}$

   b) The graphs are symmetric about the line $y = x$ or $f\left[f^{-1}(x)\right] = f^{-1}\left[f(x)\right] = x$
3. y = $\dfrac{x-4}{2}$ and $2x + 4$



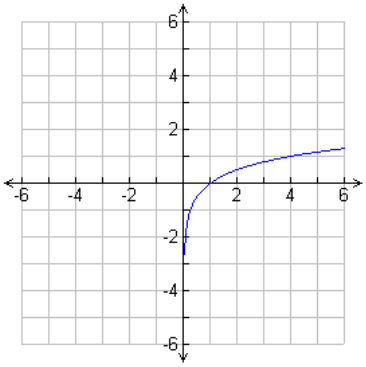
4. $y = 2^{2x-1}$



5. $\dfrac{1}{2}$
6. 1
7. a) \$14,492.92

   b) ≈13.4 years
8. a) ≈ 7.6 grams

   b) ≈ 12.2 days
9. \$9011.20
10. $5^2 = 25$
11. $9^{-2} = \dfrac{1}{81}$
12. –2
13. 4
14. 2
15. $y = \log_4 x$

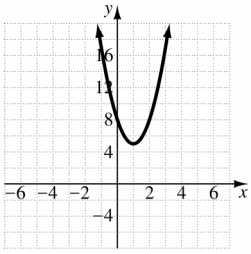


16. $5\log_b x - 3\log_b y$
17. $4\log_3 x + \dfrac{1}{3}\log_3 y$
18. $\log_2 \dfrac{\sqrt[5]{x}}{y^7}$
19. $\log_4 \dfrac{x^5}{y^6}$
20. ≈3.3219
21. ≈0.3466
22. 4.4190
23. 8
24. 2
25. a) 9.7 grams

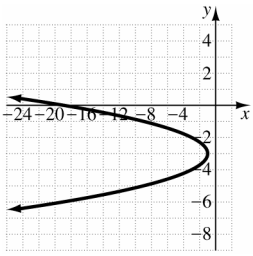
    b) 9.0 grams

CHAPTER 11 DIAGNOSTIC TEST

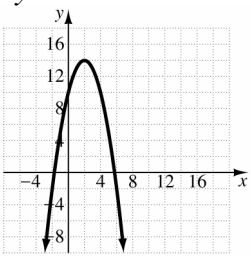
1. a) Upwards
   b) (1, 5)
   c) $x = 1$
   $y = 3(x - 1)^2 + 5$



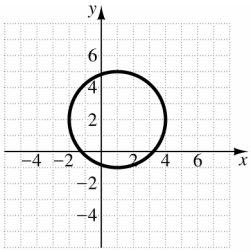
2. a) Left
   b) (–1, –3)
   c) $y = -3$
   $x = -2(y + 3)^2 - 1$



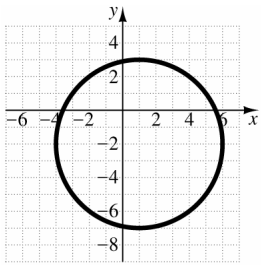
3. a) Downwards
   b) (2, 14)
   c) $x = 2$
   $y = -x^2 + 4x + 10$



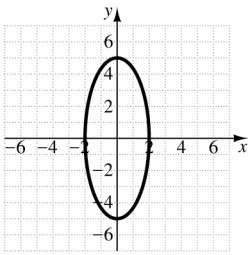
4. $\sqrt{29}$
5. $\sqrt{58}$
6. (1, 2); 3
   $(x - 1)^2 + (y - 2)^2 = 9$



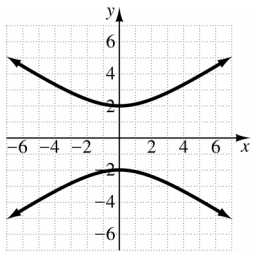
7. (1, –2); 5
   $x^2 + y^2 - 2x + 4y - 20 = 0$



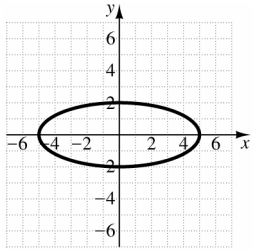
8. $(x + 2)^2 + (y - 4)^2 = 32$
9. $(x + 3)^2 + (y - 4)^2 = 29$
10. $\dfrac{x^2}{4} + \dfrac{y^2}{25} = 1$



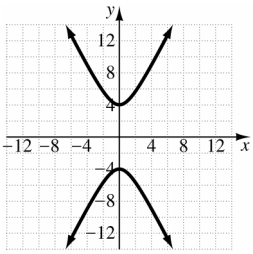
11. $\dfrac{y^2}{4} - \dfrac{x^2}{9} = 1$



12. $4x^2 + 25y^2 = 100$



13. $y^2 - 4x^2 = 16$



14. (–4, –2), (4, 2)
15. (1, 1)
16. (3, 2), (3, –2),
    (–3, 2), (–3, –2)

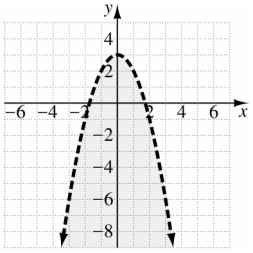
CHAPTER 11 DIAGNOSTIC TEST (Cont)

17. (3, 4), (3, –4),

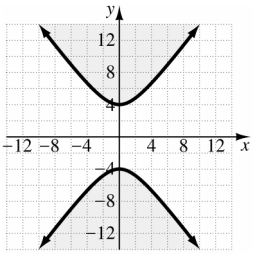
(–3, 4), (–3, –4)

18. (2, 0), (–2, 0)

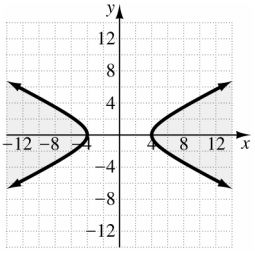
19. $x^2 < 3 - y$



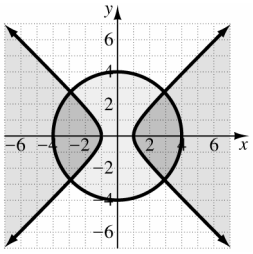
20. $\frac{y^2}{16} - \frac{x^2}{9} \geq 1$



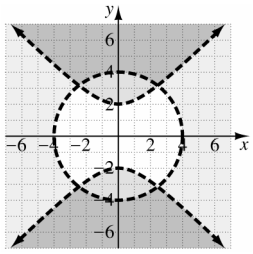
21. $\frac{x^2}{16} - \frac{y^2}{4} \geq 1$



22. $\begin{cases} x^2 - y^2 \geq 1 \\ x^2 + y^2 \leq 16 \end{cases}$



23. $\begin{cases} y^2 - x^2 > 4 \\ x^2 + y^2 > 16 \end{cases}$



24. $y = -\frac{5}{24}x^2$

25. $\frac{x^2}{40{,}000} + \frac{y^2}{6400} = 1$