

College Algebra 13th edition Lial Test Bank

SKU: 9780135821992-TEST-BANK

CHAPTER 2, FORM A
COLLEGE ALGEBRA

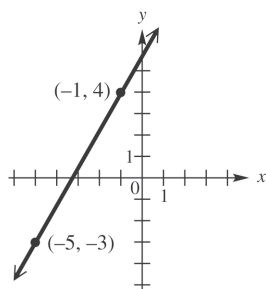
NAME _____
DATE _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

I	II
a. Domain of $f(x) = \sqrt{x-3}$	A. $(-\infty, \infty)$
b. Range of $f(x) = \sqrt{x} - 3$	B. $[3, \infty)$
c. Domain of $f(x) = x^2 - 16$	C. $[0, 2]$
d. Range of $y = 2x^2$	D. $[0, \infty)$
e. Domain of $f(x) = \sqrt[3]{x-2}$	E. $[-3, 3]$
f. Range of $f(x) = \sqrt[3]{x} + 2$	F. $(-\infty, -2]$
g. Domain of $f(x) = x+2 $	G. $[-3, \infty)$
h. Range of $f(x) = x + 3$	H. $[-7, \infty)$
i. Domain of $y = 2s^2$	
j. Range of $f(x) = x^2 - 7$	

1. a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
g. _____
h. _____
i. _____
j. _____

The graph shows the line that passes through the points $(-5, -3)$ and $(-1, 4)$. Refer to it to answer Exercises 2–6.



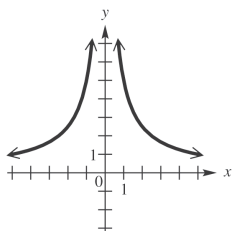
2. What is the slope of the line?
3. What is the distance between the two points shown?
4. What are the coordinates of the midpoint of the *segment* joining the two points?
5. Find the standard form of the equation of the line.
6. Write the linear function defined by $f(x) = ax + b$ that has this line as its graph.

2. _____
3. _____
4. _____
5. _____
6. _____

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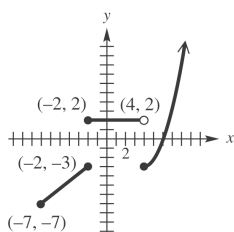
Tell whether each graph is that of a function. Give the domain and the range. If it is a function, give the intervals where it is increasing, decreasing, or constant.

7.



7. _____

8.



8. _____

9. Suppose point P has coordinates $\left(\frac{3}{5}, \frac{4}{7}\right)$.

- a. What is the equation of the vertical line through P ?
 b. What is the equation of the horizontal line through P ?

9. a. _____
 b. _____

10. Find the slope-intercept form of the equation of the line passing through $(2, 5)$ and

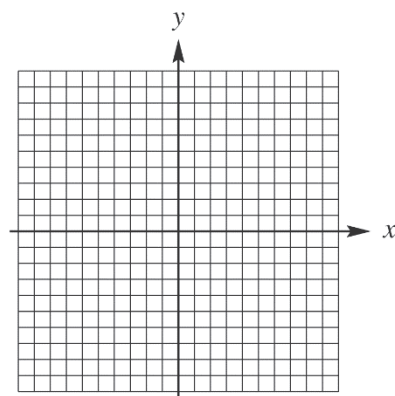
- a. parallel to the graph of $y = 4x - 7$;
 b. perpendicular to the graph of $y = 4x - 7$.

10. a. _____
 b. _____

Graph each relation.

11. $x = 2|y - 3| + 1$

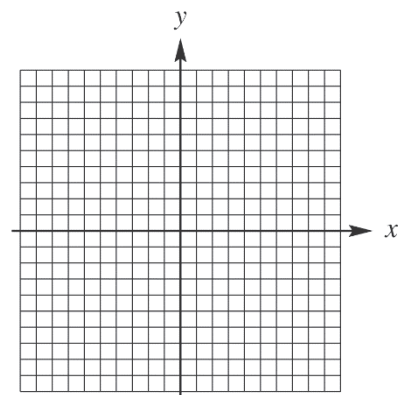
11.



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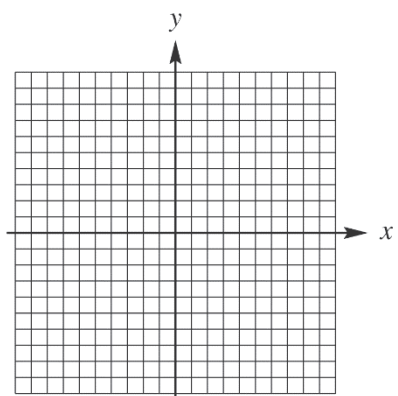
12. $f(x) = \llbracket x \rrbracket + 2$

12.



13. $f(x) = \begin{cases} 2x-1 & \text{if } x < 0 \\ -3x-1 & \text{if } x \geq 0 \end{cases}$

13.



14. Explain how the graph of $y = -\frac{1}{2}\sqrt{x+3} + 5$ can be obtained from the graph of $y = \sqrt{x}$.

14. _____

15. Determine whether the graph of $2x^2 + 3y^2 = 1$ is symmetric with respect to

15. a. _____

b. _____

c. _____

a. the x-axis,

b. the y-axis,

c. the origin.

Given $f(x) = x^2 - 1$ and $g(x) = 2x + 1$, find each of the following. Simplify the expressions when possible.

16. $(fg)(x)$

16. _____

17. $(f+g)(x)$

17. _____

18. the domain of $\frac{g}{f}$

18. _____

CHAPTER 2, FORM A

19. $\frac{f(x+h) - f(x)}{h}$

20. $(f - g)(1)$

21. $\left(\frac{f}{g}\right)(2)$

22. $(f \circ g)(x)$

23. $(f \circ g)(-2)$

24. $(g \circ f)(x)$

25. $(g \circ f)(-2)$

19. _____

20. _____

21. _____

22. _____

23. _____

24. _____

25. _____

CHAPTER 2, FORM B
COLLEGE ALGEBRA

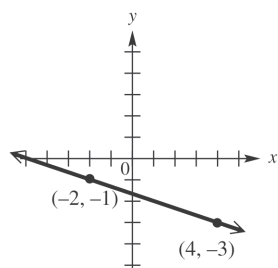
NAME _____
DATE _____

1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

I	II
a. Domain of $f(x) = \sqrt{x-4}$	A. $(-\infty, \infty)$
b. Range of $f(x) = \sqrt{x} - 2$	B. $[-2, \infty)$
c. Domain of $f(x) = 3x^2$	C. $[0, 2]$
d. Range of $f(x) = x^2 + 5$	D. $[0, \infty)$
e. Domain of $f(x) = \sqrt[3]{x-8}$	E. $[-3, 3]$
f. Range of $f(x) = \sqrt[3]{x} - 1$	F. $(-\infty, -2]$
g. Domain of $f(x) = x-2 $	G. $[5, \infty)$
h. Range of $f(x) = x + 5$	H. $[4, \infty)$
i. Domain of $x = 2y^2$	
j. Range of $x = 2y^2$	

1. a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
g. _____
h. _____
i. _____
j. _____

The graph shows the line that passes through the points $(-2, -1)$ and $(4, -3)$. Refer to it to answer Exercises 2–6.

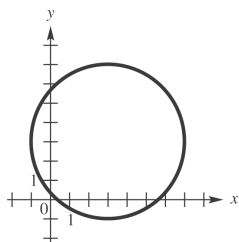


- | | |
|--|----------|
| 2. What is the slope of the line? | 2. _____ |
| 3. What is the distance between the two points shown? | 3. _____ |
| 4. What are the coordinates of the midpoint of the segment joining the two points? | 4. _____ |
| 5. Find the standard form of the equation of the line. | 5. _____ |
| 6. Write the linear function defined by $f(x) = ax + b$ that has this line as its graph. | 6. _____ |

CHAPTER 2, FORM B

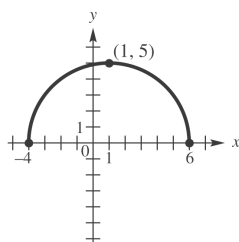
Tell whether each graph is that of a function. Give the domain and the range. If it is a function, give the intervals where it is increasing, decreasing, or constant.

7.



7. _____

8.

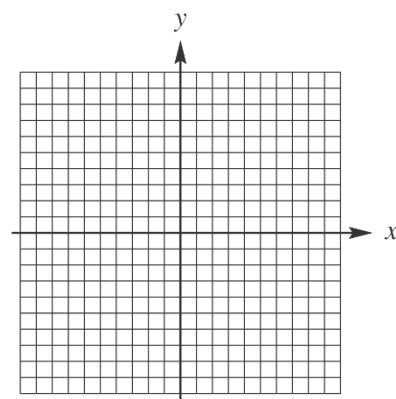


8. _____

Graph each relation.

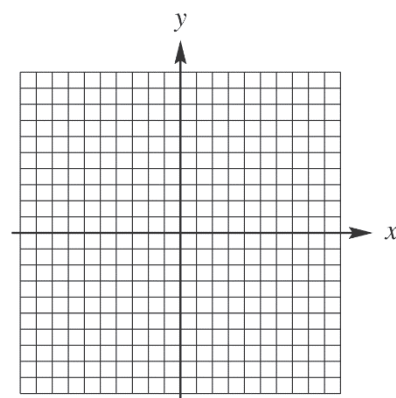
9. $f(x) = 2 - |3x|$

9.



10. $f(x) = \left\lfloor \frac{1}{2}x \right\rfloor$

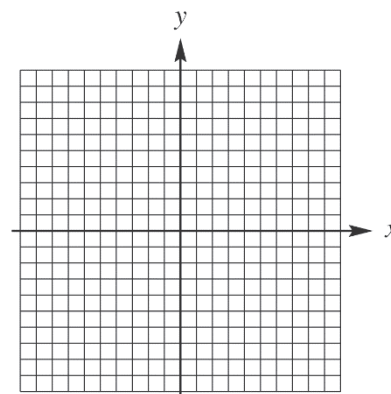
10.



CHAPTER 2, FORM B

11.
$$f(x) = \begin{cases} -2x & \text{if } x < -3 \\ 4 & \text{if } -3 \leq x \leq 2 \\ x - 4 & \text{if } x \geq 2 \end{cases}$$

11.



12. Suppose point P has coordinates $\left(-\frac{3}{8}, \frac{5}{9}\right)$.

- a. What is the equation of the vertical line through P ?
 b. What is the equation of the horizontal line through P ?

12. a. _____

b. _____

13. Find the slope-intercept form of the equation of the line passing through $(-6, 3)$ and

- a. parallel to the graph of $y = -3x - 12$;
 b. perpendicular to the graph of $y = -3x - 12$.

13. a. _____

b. _____

14. Explain how the graph of $y = -\frac{1}{3}\sqrt{x+4} + 2$ can be obtained from the graph of $y = \sqrt{x}$.

14. _____

15. Determine whether the graph of $y^2 = 3x$ is symmetric with respect to

- a. the x -axis,
 b. the y -axis,
 c. the origin.

15. a. _____

b. _____

c. _____

Given $f(x) = 2x^2 + 7x + 6$ and $g(x) = 3x - 2$, find each of the following. Simplify the expressions when possible.

16. $(fg)(x)$

16. _____

17. $(f - g)(x)$

17. _____

18. the domain of $\frac{g}{f}$

18. _____

CHAPTER 2, FORM B

19. $\frac{f(x+h) - f(x)}{h}$

20. $(f+g)(1)$

21. $\left(\frac{g}{f}\right)(1)$

22. $(f \circ g)(x)$

23. $(f \circ g)(0)$

24. $(g \circ f)(x)$

25. $(g \circ f)(0)$

19. _____

20. _____

21. _____

22. _____

23. _____

24. _____

25. _____

CHAPTER 2, FORM C
COLLEGE ALGEBRA

NAME _____
DATE _____

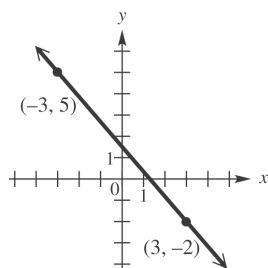
1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

- I**
- a. Domain of $f(x) = \sqrt{x+2}$
 - b. Range of $f(x) = \sqrt{x} - 4$
 - c. Domain of $f(x) = x^2 - 1$
 - d. Range of $f(x) = x^2 - 16$
 - e. Domain of $f(x) = \sqrt[3]{x-2}$
 - f. Range of $f(x) = \sqrt[3]{x} + 2$
 - g. Domain of $f(x) = |x+3|$
 - h. Range of $f(x) = |x| - 3$
 - i. Domain of $y = 2x^2$
 - j. Range of $y = x^2 - 3$

- II**
- A. $(-\infty, \infty)$
 - B. $[-4, \infty)$
 - C. $[0, 2]$
 - D. $[0, \infty)$
 - E. $[-3, 3]$
 - F. $(-\infty, -3]$
 - G. $[-1, \infty)$
 - H. $[-2, \infty)$

1. a. _____
b. _____
c. _____
d. _____
e. _____
f. _____
g. _____
h. _____
i. _____
j. _____

The graph shows the line that passes through the points $(-3, -5)$ and $(3, -2)$. Refer to it to answer Exercises 2–6.



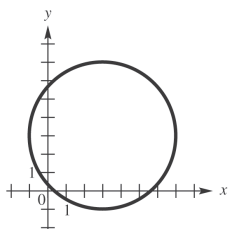
2. What is the slope of the line?
3. What is the distance between the two points shown?
4. What are the coordinates of the midpoint of the *segment* joining the two points?
5. Find the standard form of the equation of the line.
6. Write the linear function defined by $f(x) = ax + b$ that has this line as its graph.

2. _____
3. _____
4. _____
5. _____
6. _____

CHAPTER 2, FORM C

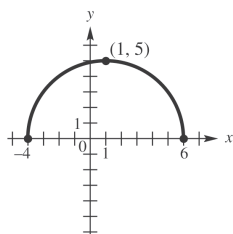
Tell whether each graph is that of a function. Give the domain and the range. If it is a function, give the intervals where it is increasing, decreasing, or constant.

7.



7. _____

8.



8. _____

9. Suppose point P has coordinates $\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{5}}{3}\right)$.

- a. What is the equation of the vertical line through P ?
 b. What is the equation of the horizontal line through P ?

9. a. _____
 b. _____

10. Find the slope-intercept form of the equation of the line passing through $(4, -2)$ and

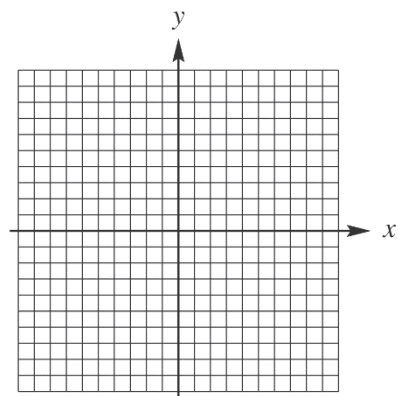
- a. parallel to the graph of $x = \frac{5}{4}y - 2$;
 b. perpendicular to the graph of $x = \frac{5}{4}y - 2$;

10. a. _____
 b. _____

CHAPTER 2, FORM C*Graph each relation.*

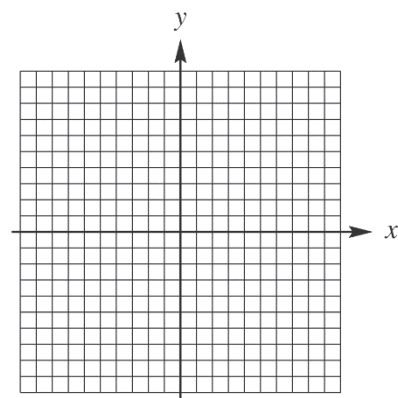
11. $f(x) = \frac{1}{2}|x+1| - 2$

11.



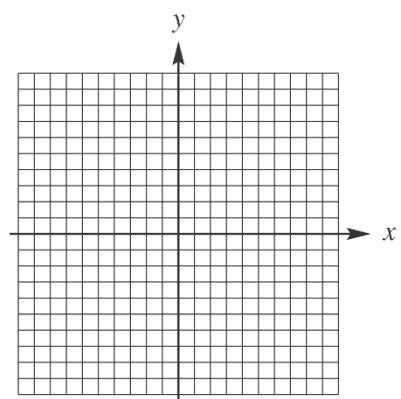
12. $f(x) = \lfloor 2x \rfloor - 2$

12.



13. $f(x) = \begin{cases} x+1 & \text{if } x \leq -2 \\ -1 & \text{if } x > -2 \end{cases}$

13.



CHAPTER 2, FORM C

14. Explain how the graph of $y = 3|x + 4| + 2$ can be obtained from the graph of $y = |x|$. 14. _____

15. Determine whether the graph of $y = 3x^2 + 7$ is symmetric with respect to 15. a. _____
b. _____

a. the x -axis, c. _____

b. the y -axis,

c. the origin.

Given $f(x) = 3x^2 - 2$ and $g(x) = 4x + 4$, find each of the following. Simplify the expressions when possible.

16. $(fg)(x)$ 16. _____

17. $(g - f)(x)$ 17. _____

18. $g(-2)$ 18. _____

19. $\frac{f(x+h) - f(x)}{h}$ 19. _____

20. $(f + g)(0)$ 20. _____

21. $\left(\frac{f}{g}\right)(-2)$ 21. _____

22. $(f - g)(x)$ 22. _____

23. $(f \circ g)(x)$ 23. _____

24. $(g \circ f)(x)$ 24. _____

25. $(g \circ f)(1)$ 25. _____

CHAPTER 2, FORM D
COLLEGE ALGEBRA

NAME _____
DATE _____

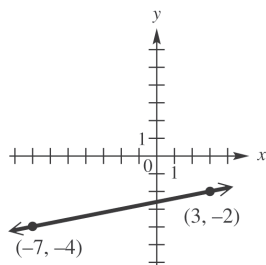
1. Match the set described in Column I with the correct interval notation from Column II. Choices in Column II may be used once, more than once, or not at all.

- I**
- a. Domain of $f(x) = \sqrt{x+1}$
 - b. Range of $f(x) = \sqrt{x} + 1$
 - c. Domain of $f(x) = x^2 - 25$
 - d. Range of $f(x) = x^2 - 1$
 - e. Domain of $f(x) = \sqrt[3]{x-2}$
 - f. Range of $f(x) = \sqrt[3]{x} + 2$
 - g. Domain of $f(x) = |x+4|$
 - h. Range of $f(x) = |x| - 4$
 - i. Domain of $y = 2x^2$
 - j. Range of $y = x^2 - 4$

- II**
- A. $(-\infty, -1]$
 - B. $(-\infty, \infty)$
 - C. $[0, 2]$
 - D. $[0, \infty)$
 - E. $[-3, 3]$
 - F. $[-3, \infty)$
 - G. $[-1, \infty)$
 - H. $[-4, \infty)$

1. a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____
- h. _____
- i. _____
- j. _____

The graph shows the line that passes through the points $(-7, -4)$ and $(3, -2)$. Refer to it to answer Exercises 2–6.



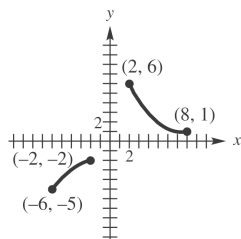
- 2. What is the slope of the line?
- 3. What is the distance between the two points shown?
- 4. What are the coordinates of the midpoint of the *segment* joining the two points?
- 5. Find the standard form of the equation of the line.
- 6. Write the linear function defined by $f(x) = ax + b$ that has this line as its graph.

- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____

CHAPTER 2, FORM D

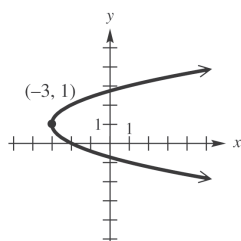
Tell whether each graph is that of a function. Give the domain and the range. If it is a function, give the intervals where it is increasing, decreasing, or constant.

7.



7.

8.

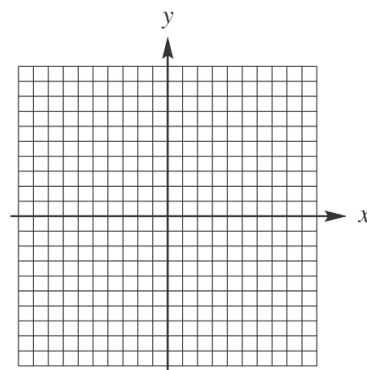


8.

Graph each relation.

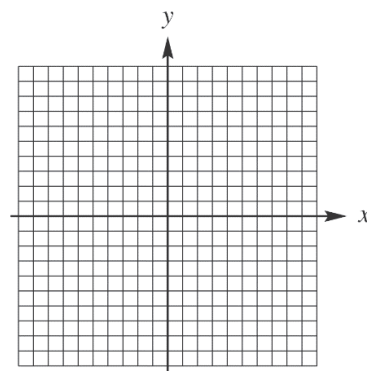
9. $f(x) = 3 + |x + 1|$

9.



10. $f(x) = \begin{cases} -x & \text{if } x < 0 \\ 2x & \text{if } x \geq 0 \end{cases}$

10.



CHAPTER 2, FORM D

11. Suppose point P has coordinates $(-\pi, 0.15)$.

- a. What is the equation of the vertical line through P ?
 b. What is the equation of the horizontal line through P ?

11. a. _____
 b. _____

12. Find the slope-intercept form of the equation of the line passing through $(1, -5)$ and

- a. parallel to the graph of $x = -\frac{3}{4}y + 5$;
 b. perpendicular to the graph of $x = -\frac{3}{4}y + 5$;

12. a. _____
 b. _____

13. Find the slope of the line through points $(11, -5)$ and $(-8, 6)$.
 from the graph of $y = \sqrt{x}$.

13. _____

14. Explain how the graph of $y = 3\sqrt{x-4} - 2$ can be obtained
 from the graph of $y = \sqrt{x}$.

14. _____

15. Determine whether the graph of $xy = -4$ is symmetric
 with respect to

- a. the x -axis,
 b. the y -axis,
 c. the origin.

15. a. _____
 b. _____
 c. _____

Given $f(x) = 2x^3 - 3x - 1$ and $g(x) = 2x + 1$, find each of the following. Simplify the expressions when possible.

16. $(f + g)(x)$

16. _____

17. $\left(\frac{f}{g}\right)(x)$

17. _____

18. $g(-1)$

18. _____

19. $\frac{f(x+h) - f(x)}{h}$

19. _____

20. $(g - f)(0)$

20. _____

21. $(fg)(-1)$

21. _____

22. $(f \circ g)(x)$

22. _____

CHAPTER 2, FORM D

23. $(f \circ g)(1)$

24. $(g \circ f)(x)$

25. $(g \circ f)(1)$

23. _____

24. _____

25. _____

**CHAPTER 2, FORM E
COLLEGE ALGEBRA**

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Choose the best answer.

1a. Which of the following is the domain of $f(x) = \sqrt{3-x}$?

- a. $[0, 3]$ b. $(-\infty, 3]$
c. $[3, \infty)$ d. $(-\infty, \infty)$

1a. _____

1b. Which of the following is the range of $f(x) = x^2 - 49$?

- a. $[-49, \infty)$ b. $[-7, \infty)$
c. $[-7, 7]$ d. $[0, \infty)$

1b. _____

1c. Which of the following is the domain of $f(x) = \sqrt[3]{x+7}$?

- a. $(-\infty, \infty)$ b. $(-\infty, 6]$
c. $[0, \infty)$ d. $[6, \infty)$

1c. _____

1d. Which of the following is the range of $f(x) = |x| + 1$?

- a. $[-1, 1]$ b. $[0, 1]$
c. $[0, \infty)$ d. $[1, \infty)$

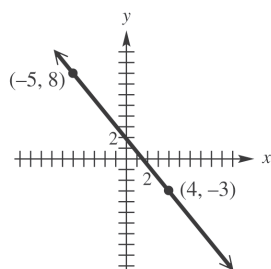
1d. _____

1e. Which of the following is the domain of $x = y^2$?

- a. $(-\infty, \infty)$ b. $[0, \infty)$
c. $(0, \infty)$ d. $(-\infty, 0]$

1e. _____

The graph shows the line that passes through $(-5, 8)$ and $(4, -3)$. Refer to it to answer Exercises 2-6.



2. What is the slope of the line?

- a. $-\frac{13}{7}$ b. $\frac{11}{9}$
c. $-\frac{11}{9}$ d. 0

2. _____

3. What is the distance between the two points shown?

- a. $\sqrt{26}$ b. $2\sqrt{5}$
c. $\sqrt{202}$ d. $\sqrt{122}$

3. _____

CHAPTER 2, FORM E

4. What are the coordinates of the midpoint of the segment joining the two points?

a. $\left(-\frac{1}{2}, \frac{5}{2}\right)$ b. $\left(-\frac{9}{2}, \frac{11}{2}\right)$
 c. $\left(\frac{3}{2}, \frac{1}{2}\right)$ d. $(-1, 5)$

4. _____

5. Find the standard form of the equation of the line.

a. $11x + 9y = 127$ b. $11x - 9y = 17$
 c. $11x + 9y = 17$ d. $11x - 9y = 127$

5. _____

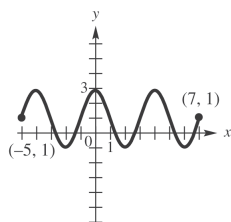
6. Find the standard form of the equation of the line.

a. $f(x) = \frac{11}{9}x - \frac{17}{9}$ b. $f(x) = -\frac{11}{9}x + \frac{17}{9}$
 c. $f(x) = \frac{11}{9}x + \frac{127}{9}$ d. $f(x) = \frac{11}{9}x - \frac{127}{9}$

6. _____

Tell whether each graph is that of a function. Give the domain and range.

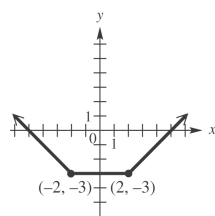
7.



7. _____

- a. Function; domain: $[-5, 7]$; range: $[-1, 3]$
 b. Function; domain: $(-\infty, \infty)$; range: $[-1, 3]$
 c. Function; domain: $[-1, 3]$; range: $[-5, 7]$
 d. Not a function; domain: $[-5, 7]$; range: $[-1, 3]$

8.



8. _____

- a. Not a function; domain: $(-\infty, \infty)$; range: $[-2, \infty)$
 b. Not a function; domain: $[-5, 5]$; range: $[-3, \infty)$
 c. Function; domain: $(-\infty, \infty)$; range: $[-2, \infty)$
 d. Function; domain: $(-\infty, \infty)$; range: $[-3, \infty)$

CHAPTER 2, FORM E

9. Suppose point P has coordinates $(-6, 1)$.

What is the equation of the vertical line through P ?

- a. $x = -6$ b. $y = 1$
c. $x = 1$ d. $y = 6$

9. _____

10. Find the slope-intercept form of the equation of the line passing.

through $(-2, 5)$ perpendicular to the graph of $y = -\frac{1}{8}x + \frac{19}{4}$.

- a. $y = 8x + 21$ b. $y = \frac{1}{3}x - 3$
c. $y = -8x - 13$ d. $y = -\frac{1}{3}x + 3$

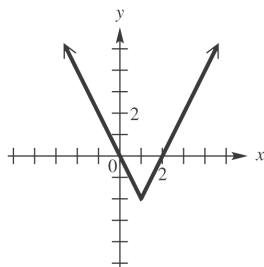
10. _____

Graph each function.

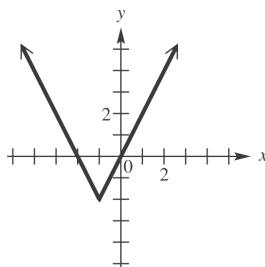
11. $f(x) = 2|x - 1| - 2$

11. _____

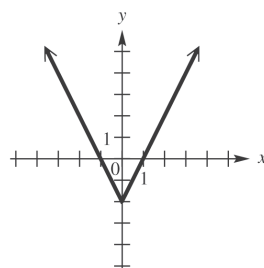
a.



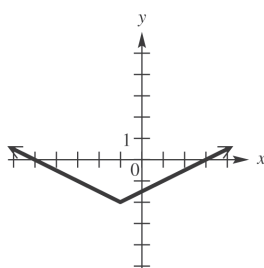
b.



c.



d.

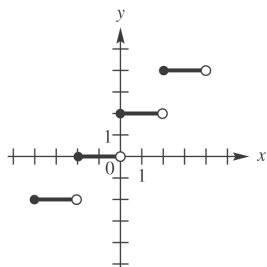


CHAPTER 2, FORM E

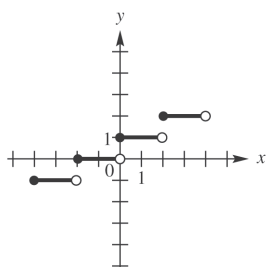
12. $f(x) = \left\lfloor \frac{1}{2}x \right\rfloor$

12. _____

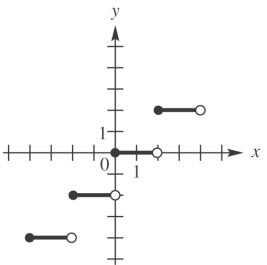
a.



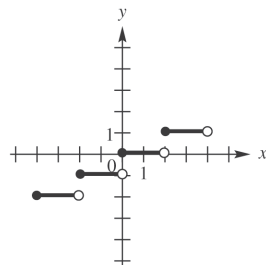
b.



c.



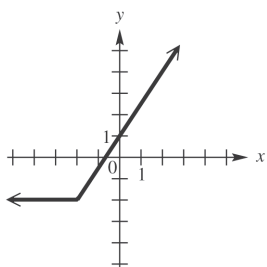
d.



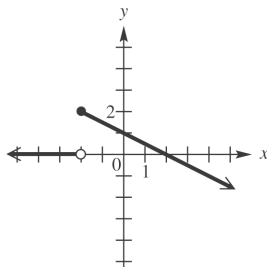
13. $f(x) = \begin{cases} 2 & \text{if } x < -2 \\ -\frac{1}{2}x + 1 & \text{if } x \geq -2 \end{cases}$

13. _____

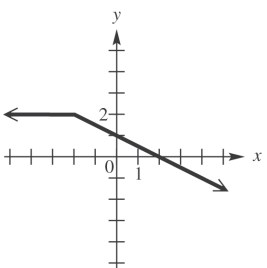
a.



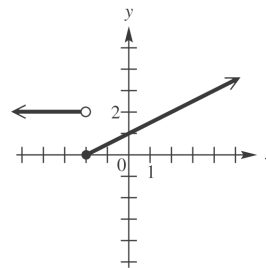
b.



c.



d.



CHAPTER 2, FORM E

14. Explain how the graph of $y = \sqrt{x+2} - 5$ can be obtained from the graph of $y = \sqrt{x}$. 14. _____
- Translate 2 unit to the right and 5 units up.
 - Translate 2 unit to the right and 5 units down.
 - Translate 2 unit to the left and 5 units up.
 - Translate 2 unit to the left and 5 units down.

15. Determine the symmetries of the graph of the relation $x^2 - 2xy + y^2 = 5$. 15. _____
- x -axis only
 - y -axis only
 - origin only
 - x -axis, y -axis, and origin

Given $f(x) = 5x - 4$ and $g(x) = x^2 + 3$, find each of the following.
Simplify the expressions when possible.

16. $(fg)(x)$ 16. _____
- $x^3 + 4x^2 - 12$
 - $5x^3 - 4x^2 + 15x - 12$
 - $5x^3 + 4x^2 + 3x - 12$
 - $-5x^3 + 4x^2 - 5x - 12$

17. $(g - f)(x)$ 17. _____
- $x^2 - 5x + 7$
 - $x^2 + 5x - 7$
 - $-x^2 - 5x + 1$
 - $x^2 + 5x + 1$

18. The domain of $\frac{g}{f}$ 18. _____
- $\left(-\infty, \frac{4}{5}\right) \cup \left(\frac{4}{5}, \infty\right)$
 - $\left(-\infty, \frac{5}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$
 - $\left(-\infty, \frac{1}{3}\right) \cup \left(\frac{1}{3}, \infty\right)$
 - $(-\infty, \infty)$

19. $\frac{f(x+h) - f(x)}{h}$ 19. _____
- h
 - 5
 - $5x + 2h$
 - $5x + 2h - 4$

20. $(f + g)(-1)$ 20. _____
- 1
 - 5
 - 2
 - 5

CHAPTER 2, FORM E

21. $\left(\frac{f}{g}\right)(0)$

a. $-\frac{3}{4}$

b. $\frac{1}{4}$

c. $-\frac{4}{3}$

d. $\frac{15}{2}$

21. _____

22. $(g \circ f)(x)$

a. $25x^2 + 40x - 19$

b. $25x^2 - 40x + 19$

c. $25x^2 - 40x - 19$

d. $25x^2 + 40x + 19$

22. _____

23. $(g \circ f)(1)$

a. -6

b. 4

c. 0

d. 1

23. _____

24. $(f \circ g)(x)$

a. $5x^2 - 11$

b. $5x^2 + 11$

c. $5x^2 + 19$

d. $5x^2 - 12$

24. _____

25. $(f \circ g)(0)$

a. -1

b. 0

c. 11

d. 15

25. _____

**CHAPTER 2, FORM F
COLLEGE ALGEBRA**

NAME _____
DATE _____

Choose the best answer.

1a. Which of the following is the domain of $f(x) = \sqrt{x-1}$?

- a. $[0, 1]$ b. $(-\infty, 1]$
c. $[1, \infty)$ d. $(-\infty, \infty)$

1a. _____

1b. Which of the following is the range of $f(x) = x^2 - 4$?

- a. $[-2, \infty)$ b. $[-4, \infty)$
c. $[-4, 4]$ d. $[0, \infty)$

1b. _____

1c. Which of the following is the domain of $f(x) = \sqrt[3]{x-7}$?

- a. $(-\infty, \infty)$ b. $(-\infty, 3]$
c. $[0, \infty)$ d. $[3, \infty)$

1c. _____

1d. Which of the following is the range of $f(x) = |x| + 2$?

- a. $[-2, 2]$ b. $[0, 2]$
c. $[2, \infty)$ d. $[0, \infty)$

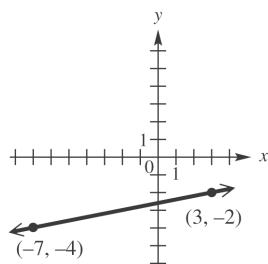
1d. _____

1e. Which of the following is the domain of $x = y^2$?

- a. $(-\infty, \infty)$ b. $[0, \infty)$
c. $(0, \infty)$ d. $(-\infty, 0]$

1e. _____

The graph shows the line that passes through $(-7, -4)$ and $(3, -2)$. Refer to it to answer Exercises 2-6.



2. What is the slope of the line?

- a. 0 b. $-\frac{1}{5}$
c. $\frac{1}{5}$ d. 5

2. _____

3. What is the distance between the two points shown?

- a. $\sqrt{122}$ b. $2\sqrt{26}$
c. $2\sqrt{13}$ d. $2\sqrt{34}$

3. _____

CHAPTER 2, FORM F

4. What are the coordinates of the midpoint of the *segment* joining the two points?

- a. $\left(\frac{1}{2}, -\frac{11}{2}\right)$ b. $(-2, -1)$
c. $(-5, -1)$ d. $(-2, -3)$

4. _____

5. Find the standard form of the equation of the line.

- a. $5x - y = 17$ b. $5x + y = -17$
c. $x - 5y = 13$ d. $x + 5y = -13$

5. _____

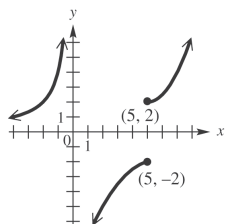
6. Find the standard form of the equation of the line.

- a. $f(x) = \frac{1}{5}x - \frac{13}{5}$ b. $f(x) = -5x + 17$
c. $f(x) = 5x - 17$ d. $f(x) = \frac{1}{5}x + \frac{13}{5}$

6. _____

Tell whether each graph is that of a function. Give the domain and range.

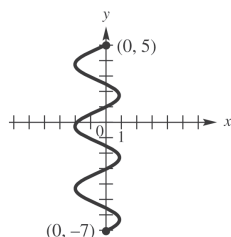
7.



7. _____

- a. not a function; domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, -2] \cup (0, \infty)$
b. not a function; domain: $(-\infty, \infty)$; range: $(-\infty, \infty)$
c. not a function; domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, \infty)$
d. not a function; domain: $(-\infty, 0) \cup (0, \infty)$; range: $(-\infty, -2] \cup (2, \infty)$

8.



8. _____

- a. not a function; domain: $[-2, 1]$; range: $(-\infty, \infty)$
b. not a function; domain: $[-7, 5]$; range: $[-2, 1]$
c. not a function; domain: $[-7, 5]$; range: $(-\infty, \infty)$
d. not a function; domain: $[-2, 1]$; range: $[-7, 5]$

CHAPTER 2, FORM F

9. Suppose point
- P
- has coordinates
- $(-6, 3)$
- .

What is the equation of the horizontal line through P ?

- a. $x = 3$ b. $y = 3$
 c. $x = -6$ d. $y = -6$

9. _____

10. Find the slope-intercept form of the equation of the line passing.

through $(1, 2)$ perpendicular to the graph of $y = -\frac{1}{8}x + \frac{1}{3}$.

10. _____

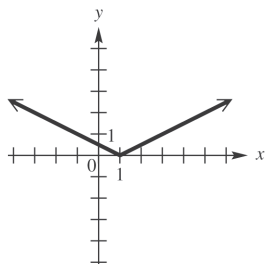
- a. $y = 8x - 3$ b. $y = \frac{1}{8}x - \frac{1}{3}$
 c. $y = -8x + 3$ d. $y = -\frac{1}{8}x + \frac{17}{8}$

Graph each relation.

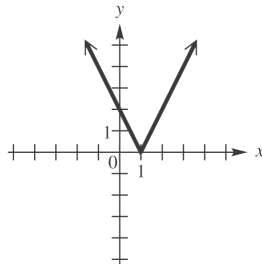
- 11.
- $f(x) = \frac{1}{2}|x+1|$

11. _____

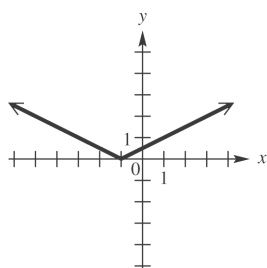
a.



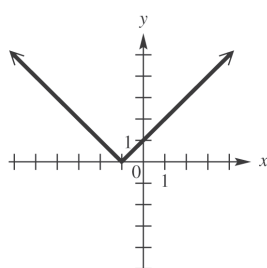
b.



c.



d.

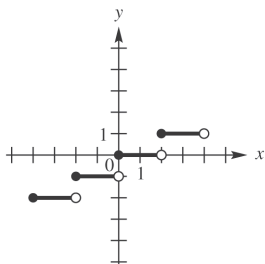


CHAPTER 2, FORM F

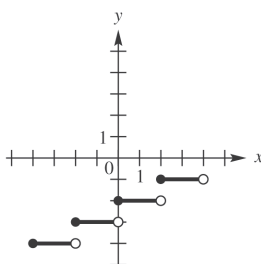
12. $f(x) = \left\lfloor \frac{1}{2}x \right\rfloor - 2$

12. _____

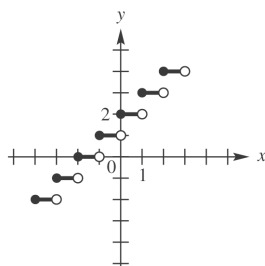
a.



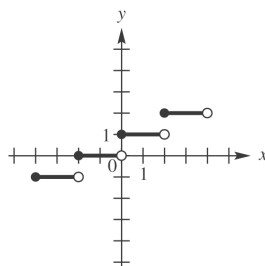
b.



c.



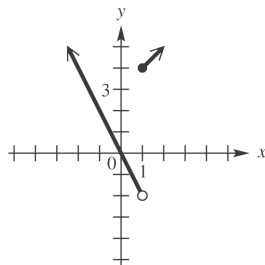
d.



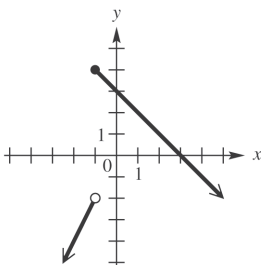
13. $f(x) = \begin{cases} -2x & \text{if } x < -1 \\ x+3 & \text{if } x \geq -1 \end{cases}$

13. _____

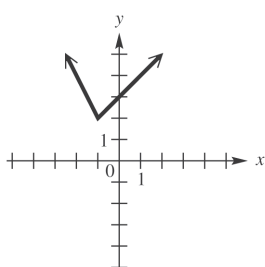
a.



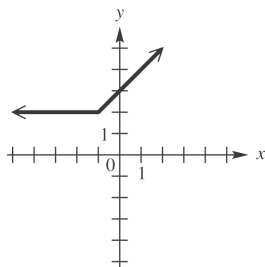
b.



c.



d.



14. Explain how the graph of $y = \sqrt{x+3} + 1$ can be obtained from the graph of $y = \sqrt{x}$.

14. _____

- Translate 3 units to the right and 1 unit up.
- Translate 3 units to the right and 1 unit down.
- Translate 3 units to the left and 1 unit up.
- Translate 3 units to the left and 1 unit down.

CHAPTER 2, FORM F

15. Determine the symmetries of the graph of the relation $4x^2 + 9y^2 = 36$.

- a. x -axis only b. y -axis only
c. Origin only d. x -axis, y -axis, and origin

15. _____

Given $f(x) = 6x^2 + 5x - 6$ and $g(x) = 2x - 8$, find each of the following.
Simplify the expressions when possible.

16. $f(-3)$

- a. -9 b. 21
c. 33 d. 51

16. _____

17. $\frac{f(x+h) - f(x)}{h}$

- a. $12x + 6h + 5$ b. $12x - 6h - 5$
c. $-12x = 6h + 5$ d. $-12x + 6h - 5$

17. _____

18. $(f \circ g)\left(\frac{3}{2}\right)$

- a. -131 b. 119
c. -181 d. 169

18. _____

19. $(f + g)(x)$

- a. $6x^2 + 7x - 14$ b. $6x^2 - 7x - 14$
c. $6x^2 + 7x - 2$ d. $6x^2 - 3x - 2$

19. _____

20. $(f + g)(0)$

- a. -15 b. -14
c. -27 d. 1

20. _____

CHAPTER R, FORM A

1. a. $\{\sqrt{49}\}$
b. $\left\{-9.6, \frac{54}{7}, 0, 2\overline{15}, \frac{16}{5}, \sqrt{49}\right\}$
c. $\{6\pi, \sqrt{13}\}$
2. $\frac{4}{49}$
3. a. distributive
b. inverse
c. associative
d. commutative
4. $9a^2 + 6ab + b^2 - 12a - 4b + 4$
5. $-3x^2 - 3x + 2$
6. $2x^3 - 5x^2 + 7x - 6$
7. $x^2 - 2xy + y^2 - 49$
8. $8x^3 + 60x^2 + 150x + 125$
9. $3y^2 - 5y - 8 - \frac{16}{y^2 - 2}$
10. $\frac{x+3}{x^2}$
11. $\frac{2x^2 + 19x + 1}{(x+4)(x-4)}$
12. 1
13. $\frac{x^2 y^2}{11(x+y)}$
14. $\frac{10}{21}$
15. $(x+2)(x^2 - 2x + 4)(y-2)(y+2)$
16. $8(a+2b)(a^2 - 2ab + 4b^2)$
17. $x^2(2x-7)(3x+5)$
18. $(14x+9)(2x-1)$
19. $\frac{9}{25}$
20. $\frac{z^2}{x^{11/2}y^{9/2}}$
21. $2xyz\sqrt{x^2z}$
22. $24x\sqrt{7x}$
23. $7 - 3\sqrt[3]{4} + 20\sqrt[3]{2}$
24. $-20 - 8\sqrt{7}$
25. 0.8, 80%
26. -70.6°F

CHAPTER R, FORM B

1. a. $\{17, \sqrt{25}\}$
b. $\left\{17, 0, -\frac{12}{3}, \sqrt{25}\right\}$
c. $\{-\pi, \sqrt{3}\}$
2. $-\frac{16}{5}$
3. a. associative
b. commutative
c. identity
d. inverse
4. $9x^2 - 6xy + y^2 - 6x + 2y + 1$
5. $x^4 - 4y^2$
6. $-4x^2 + x$
7. $x^2 - 6x + 9 - y^2$
8. $8x^3 - 36x^2y + 54xy^2 - 27y^3$
9. $2x^3 - x^2 + x - 3 - \frac{6}{3x-2}$
10. $\frac{x-1}{x}$
11. $\frac{x^2 + 4x + 5}{x(x+5)(x-5)}$
12. 3
13. $\frac{x^2 - 3x - 4}{x^2 + 5x - 3}$
14. $\frac{1}{19}$
15. $(8x+3)(x-7)$
16. $3(x+3)(x-3)(x+1)$
17. $y(x-1)(x^2+x+1)(y-4)(y+4)$
18. $3ab(2b-c)(2b+c)$
19. $\frac{16}{9}$
20. $\frac{a^{5/3}}{b^{10}c^2}$
21. $5x^8y^3z^5\sqrt{3y}$
22. $-3\sqrt{6x}$
23. $-54 - 9\sqrt[3]{5} + 8\sqrt[3]{25}$
24. $\frac{3\sqrt[3]{4}}{4}$
25. 1.6, 160%
26. approximately 55.6 mph

CHAPTER R, FORM C

1. a. $\left\{\frac{70}{10}, -\frac{1}{8}, 0, \sqrt{64}, 1.\overline{23}, -4, 2.76\right\}$

b. $\left\{\frac{70}{10}, -\frac{1}{8}, -2\pi, 0, \sqrt{64}, \sqrt{19}, 1.\overline{23}, -4, 2.76\right\}$

c. $\left\{\frac{70}{10}, 0, \sqrt{64}\right\}$

2. $\frac{1}{10}$

3. a. commutative

b. inverse

c. distributive

d. associative

4. $x^2 - 8xy + 16y^2 + 4x - 16y + 4$

5. $2x^2 - x$

6. $6x^3 - 5x^2y + 6xy^2 + 8y^3$

7. $a^2 + 10a + 25 - 4b^2$

8. $64b^3 - 144b^2c + 108bc^2 - 27c^3$

9. $x^2 - 2 + \frac{-x^2 + 5}{x^3 - 2}$

10. $\frac{(2x-3)(3x+2)}{(x-2)(2x^2-3)}$

11. $\frac{(x+5)^2}{x+4}$

12. -1

13. $\frac{x}{2+x}$

14. $-\frac{72}{5}$

15. $(5x-2y)(2x-3y)$

16. $(x-2)(x+2)(x^2+4)$

17. $(a-2b)(a+2b)^2$

18. $2x^2(x-3y)(x+3y)$

19. $\frac{256}{81}$

20. $\frac{a^{39/2}}{b^6c^9}$

21. $4a^2b^6\sqrt{5ab}$

22. 0

23. $9x - 4y$

24. $-3\sqrt{3} + 3\sqrt{7}$

25. $2.4, 240\%$

26. approximately 42.7 mph

CHAPTER R, FORM D

1. a. $\{\sqrt{49}, 8\}$
b. $\left\{-17.8, -3.\bar{6}, 0, -\frac{10}{2}, \sqrt{49}, \frac{5}{3}, 8\right\}$
c. $\left\{0, -\frac{10}{2}, \sqrt{49}, 8\right\}$
2. $\frac{1}{100}$
3. a. commutative
b. associative
c. identity
d. distributive
4. $4x^2 - 12xy + 9y^2 - 8x + 12y + 4$
5. $2x^4 - x^3 - 6x^2 + 7x - 2$
6. $x^4 + x^3 - x^2 + x - 2$
7. $r^2 + 4rs + 4s^2 - 16$
8. $8a^3 + 12a^2b + 6ab^2 + b^3$
9. $2y^2 - 2y - 5 - \frac{15}{y^2 - 3}$
10. $\frac{x+1}{5}$
11. $\frac{10}{(x-8)(x+7)}$
12. $\frac{1}{2-x}$
13. $\frac{x(3x+5)}{(x-2)(x+2)^2}$
14. $-\frac{4}{3}$
15. $(6x-1)(3x-4)$
16. $(3x^2-2)(2x^2+5)$
17. $(r-2s)^2(r^2+2rs+4s^2)$
18. $8(x+2y)(x^2-2xy+4y^2)$
19. $\frac{343}{64}$
20. $\frac{x^5z^{13/2}}{y^{31/2}}$
21. $2a^7b^9c^2\sqrt{21c}$
22. $6x^4\sqrt{3x}$
23. $-2 + 2\sqrt{15}$
24. $\frac{2\sqrt{3}}{9}$
25. $-0.375, -37.5\%$
26. approximately 35.2 m

CHAPTER R, FORM E

1. A. d B. c C. d
2. b
3. A. c B. d C. b D. a
4. b
5. c
6. c
7. b
8. c
9. d
10. d
11. b
12. c
13. b
14. c
15. d
16. d
17. c
18. c
19. c
20. a
21. c
22. c
23. b
24. c
25. a
26. a

CHAPTER R, FORM F

1. A. d B. b C. b
2. b
3. A. c B. a C. b D. c
4. b
5. c
6. d
7. d
8. d
9. d
10. c
11. b
12. b
13. c
14. b
15. a
16. b
17. a
18. c
19. a
20. b
21. d
22. a
23. a
24. b
25. a
26. b

CHAPTER 1, FORM A

1. $\emptyset$
2. $\left\{\frac{51}{5}\right\}$
3. $\left\{-\frac{3}{2}, \frac{5}{4}\right\}$
4. $\left\{\frac{1}{3} \pm \frac{1}{3}i\sqrt{5}\right\}$
5. $\left\{-\frac{1}{3}\right\}$
6. $\{2\}$
7. $\{-2, 1\}$
8. $\{\pm 2, \pm 3\}$
9. $\{-59, 6\}$
10. $\{1\}$
11. $\{0, -6\}$
12. $W = \frac{S - 2LH}{L + 2H}$
13. $17 - i$
14. $11 - 7i$
15. $\frac{9}{74} + \frac{17}{74}i$
16. i
17. $(-\infty, 1) \cup (4, \infty)$
18. $(6, 12]$
19. $(-\infty, -14)$
20. $(-\infty, -1] \cup [2, \infty)$
21. $(-\infty, -1) \cup (5, \infty)$
22. \$10,500 at 2%; \$11,500 at 4%
23. $7\frac{1}{2}$ hr
24. 1 sec and 3 sec
25. 2013

CHAPTER 1, FORM B

1. $\left\{-\frac{40}{9}\right\}$
2. $\left\{\frac{-3 \pm \sqrt{7}}{2}\right\}$
3. $\{25\}$
4. $\{3 \pm 2i\}$
5. $\{-32\}$
6. $\{\pm 2, \pm i\}$
7. $\{0\}$
8. $\{-5, 4\}$
9. $\left\{-5, -\frac{3}{2}\right\}$
10. $\{1, 2\}$
11. $\{-62, 10\}$
12. $\left\{\frac{3}{2}, \frac{5}{2}\right\}$
13. $-2 + 3i$
14. $-28 + 6i$
15. $-\frac{7}{13} - \frac{22}{13}i$
16. -1
17. $\left[\frac{1}{3}, \frac{1}{2}\right]$
18. $(-\infty, -6)$
19. $(-\infty, 2)$
20. $\left(-\frac{9}{2}, -\frac{1}{2}\right)$
21. $(-1, 2)$
22. 4 lb
23. 120 months
24. 2013
25. 3 sec, 3.75 sec

CHAPTER 1, FORM C

1. $\{1\}$
2. $\left\{\frac{29}{4}\right\}$
3. v
4. $\{5, -9\}$
5. $\left\{-\frac{175}{26}\right\}$
6. $\{-3, 3\}$
7. $\{-1\}$
8. $\left\{\frac{\pm\sqrt{2}}{2}, \frac{\pm\sqrt{6}}{3}\right\}$
9. $\left\{\frac{4}{3}, \frac{3}{2}\right\}$
10. $\{6\}$
11. $\left\{2, -\frac{8}{7}\right\}$
12. $x = \frac{2az - 3by}{a + 5b}$
13. $-7 - 8i$
14. $41 - 11i$
15. $\frac{2}{5} + \frac{4}{5}i$
16. 1
17. $(-\infty, 1) \cup (4, \infty)$
18. $(-\infty, 2)$
19. $\left(-\frac{1}{2}, -\frac{4}{9}\right)$
20. $\left[\frac{5}{3}, 3\right]$
21. $(-4, -1)$
22. 50 lb
23. 12 hr

24. $6\frac{3}{4}$ sec

25. 2016

CHAPTER 1, FORM D

1. $\{-4\}$
2. $\left\{-\frac{1}{2}\right\}$
3. $\left\{\frac{3}{5} \pm \frac{7}{5}i\right\}$
4. $\left\{\frac{-1 \pm \sqrt{61}}{10}\right\}$
5. No solution
6. $\{2, -1\}$
7. $\{2\}$
8. $\{\pm 4, \pm 4i\}$
9. $\{-2, 1, 3, 6\}$
10. $\emptyset$
11. $\left\{2, \frac{8}{5}\right\}$
12. $C = \frac{2}{P+N-1}$
13. $-22 + 29i$
14. $4 + 7i$
15. $\frac{1}{5} - \frac{7}{5}i$
16. i
17. $(-3, 2)$
18. $(-\infty, 16]$
19. $(-\infty, -1) \cup (3, \infty)$
20. $(-2, 1) \cup (3, 6)$
21. $\left(-\frac{1}{3}, \frac{19}{3}\right)$
22. 2 gal
23. \$16,500 at 3.5%; \$12,000 at 2.5%
24. 2 sec and 12 sec
25. 1987

CHAPTER 1, FORM E

1. b
2. c
3. b
4. b
5. d
6. c
7. c
8. c
9. a
10. d
11. d
12. b
13. b
14. b
15. c
16. a
17. a
18. d
19. a
20. c
21. c
22. c
23. b
24. c
25. c

CHAPTER 1, FORM F

1. a
2. a
3. c
4. c
5. c
6. b
7. d
8. a
9. d
10. d
11. c
12. d
13. c
14. c
15. c
16. a
17. c
18. b
19. b
20. b
21. a
22. c
23. d
24. c
25. b

CHAPTER 2, FORM A

1. a. B
b. G
c. A
d. D
e. A
f. A
g. A
h. B
i. A
j. H

2. $\frac{7}{4}$

3. $\sqrt{65}$

4. $\left(-3, \frac{1}{2}\right)$

5. $7x - 4y = -23$

6. $f(x) = \frac{7}{4}x + \frac{23}{4}$

7. Function; domain: $(-\infty, 0) \cup (0, \infty)$;
range: $(0, \infty)$; increasing: $(-\infty, 0)$;
decreasing: $(0, \infty)$

8. Not a function; domain: $[-7, \infty)$;
range: $[-7, \infty)$

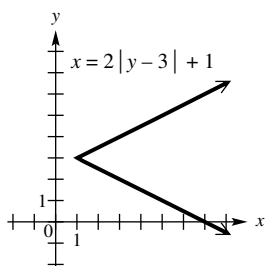
9. a. $x = \frac{3}{5}$

b. $y = \frac{4}{7}$

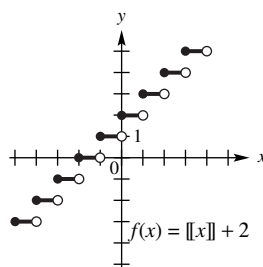
10. a. $y = 4x - 3$

b. $y = -\frac{1}{4}x + \frac{11}{2}$

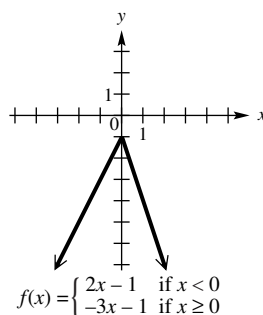
11.



12.



13.



14. Translate the graph of $y = \sqrt{x}$ to the left 3 units, stretch by a factor of $\frac{1}{2}$, reflect across the x -axis, and translate 5 units up.

15. a. Yes b. Yes c. Yes

16. $2x^3 + x^2 - 2x - 1$

17. $x^2 + 2x$

18. $x \neq 1, x \neq -1$

19. $2x + h$

20. -3

21. $\frac{3}{5}$

22. $4x^2 + 4x$

23. 8

24. $2x^2 - 1$

25. 7

CHAPTER 2, FORM B

1. a. H
b. B
c. D
d. A
e. A
f. A
g. A
h. G
i. D
j. A

2. $-\frac{1}{3}$

3. $2\sqrt{10}$

4. $(1, -2)$

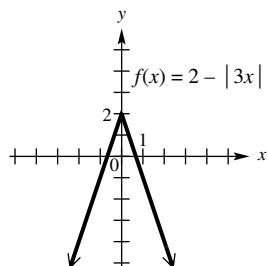
5. $x + 3y = -5$

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

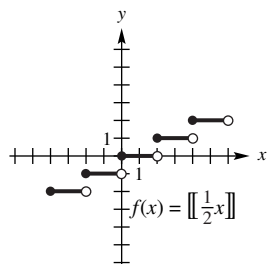
7. Function;
domain: $[-6, -2] \cup [2, 8]$;
range: $[-5, -2] \cup [1, 6]$;
increasing: $[-6, -2]$; decreasing: $[2, 8]$

8. Not a function; domain: $[-3, \infty)$;
range: $(-\infty, \infty)$

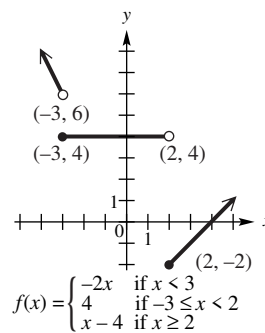
9.



10.



11.



12. a. $x = -\frac{3}{8}$

b. $y = \frac{5}{9}$

13. a. $y = -3x - 15$

b. $y = \frac{1}{3}x + 5$

14. Translate the graph of $y = \sqrt{x}$ to the left 4 units, stretch by a factor of $\frac{1}{3}$, and translate 2 units up.

15. a. Yes b. No c. No

16. $6x^3 + 17x^2 + 4x - 12$

17. $2x^2 + 4x + 8$

18. $x \neq -2, -\frac{3}{2}$

19. $4x + 2h + 7$

20. 16

21. $x = \frac{1}{15}$

22. $18x^2 - 3x$

23. 0

24. $6x^2 + 21x + 16$

25. 16

CHAPTER 2, FORM C

1. a. H
b. B
c. G
d. A
e. A
f. A
g. A
h. F
i. D
j. A

2. $-\frac{7}{6}$

3. $\sqrt{85}$

4. $\left(0, \frac{3}{2}\right)$

5. $7x + 6y = 9$

6. $f(x) = -\frac{7}{6}x + \frac{3}{2}$

7. Not a function; domain: $[-1, 7]$; range: $[-1, 7]$

8. Function; domain: $[-4, 6]$ range: $[0, 5]$;
increasing: $[-4, 1]$; decreasing: $[1, 6]$

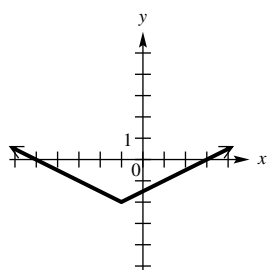
9. a. $x = \frac{\sqrt{2}}{2}$

b. $y = -\frac{\sqrt{5}}{3}$

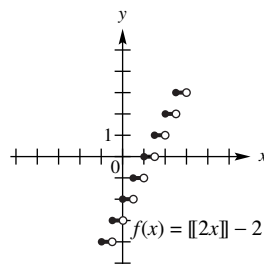
10. a. $y = \frac{4}{5}x - \frac{26}{5}$

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

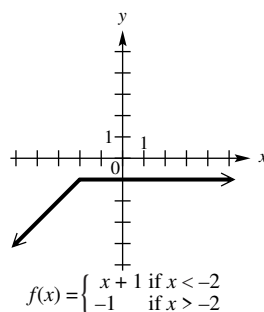
11.



12.



13.



14. Translate the graph of $y = |x|$ to the left 4 units, stretch by a factor of 3, and translate 2 unit up.

15. a. No b. Yes c. No

16. $12x^3 + 12x^2 - 8x - 8$

17. $-3x^2 + 4x + 6$

18. 10

19. $6x + 3h$

20. -4

21. $-\frac{5}{2}$

22. $3x^2 - 4x - 6$

23. $48x^2 + 96x + 46$

24. $12x^2 - 4$

25. 8

CHAPTER 2, FORM D

1. a. G
b. D
c. G
d. B
e. B
f. B
g. B
h. H
i. D
j. B

2. $\frac{1}{5}$

3. $2\sqrt{26}$

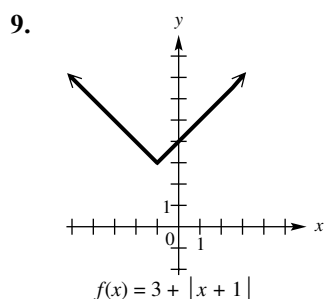
4. $(-2, -3)$

5. $x - 5y = 13$

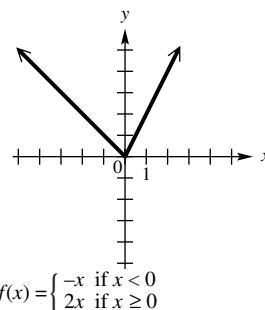
6. $f(x) = \frac{1}{5}x - \frac{13}{5}$

7. Function; domain: $[-6, -2] \cup [2, 8]$;
range: $[-6, -2] \cup [1, 6]$
increasing: $[-6, -2]$; decreasing: $[2, 8]$

8. Not a function; domain: $(-3, \infty)$;
range: $(-\infty, \infty)$



10.



11. a. $x = -\pi$

b. $y = 0.15$

12. a. $y = -\frac{4}{3}x - \frac{11}{3}$

b. $y = \frac{3}{4}x - \frac{23}{4}$

13. $-\frac{11}{19}$

14. Translate the graph of $y = \sqrt{x}$ to the right 1 unit, stretch by a factor of 3, and translate 2 units down.

15. a. No b. No c. Yes

16. $2x^3 - x$

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

18. -1

19. $6x^2 + 6xh + 2h^2 - 3$

20. 2

21. 0

22. $16x^3 + 24x^2 + 6x - 2$

23. 44

24. $4x^3 - 6x - 1$

25. -3

CHAPTER 2, FORM E

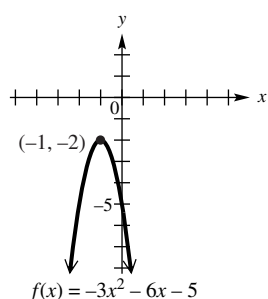
- 1a. d
- 1b. a
- 1c. a
- 1d. d
- 1e. b
- 2. c
- 3. c
- 4. a
- 5. c
- 6. b
- 7. a
- 8. d
- 9. a
- 10. a
- 11. a
- 12. d
- 13. c
- 14. d
- 15. c
- 16. b
- 17. a
- 18. a
- 19. b
- 20. b
- 21. c
- 22. b
- 23. b
- 24. b
- 25. c

CHAPTER 2 FORM F

- 1a. c
- 1b. b
- 1c. a
- 1d. c
- 1e. b
- 2. c
- 3. b
- 4. d
- 5. c
- 6. a
- 7. a
- 8. d
- 9. b
- 10. d
- 11. c
- 12. b
- 13. c
- 14. c
- 15. d
- 16. c
- 17. a
- 18. b
- 19. a
- 20. b

CHAPTER 3, FORM A

1.



x-intercepts: none

 y-intercept: -5

 vertex: $(-1, -2)$

 axis: $x = -1$

 domain: $(-\infty, \infty)$

 range: $(-\infty, -2]$

2. 85 ft

3. $x^4 - 3x^3 + 17x^2 + 3x + 17 + \frac{29}{x-1}$

4. $x^3 - 4x^2 + 2x - 3 + \frac{12}{x+4}$

5. 578

 6. No; when the polynomial is divided by $x - 2$, the remainder is 1.

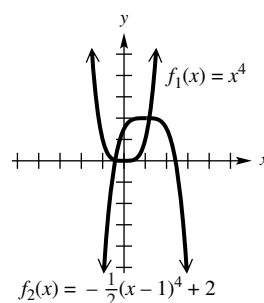
 7. $-1, 1, 8$

8. $f(x) = -3x^3 + 15x^2 - 3x + 15$

 9. a. $f(0) = 4 > 0$, while
 $f(-1) = -2 < 0$.

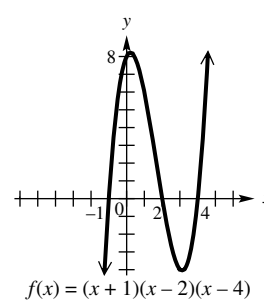
 b. $-2.22028; -654992; 1.37527$

10.

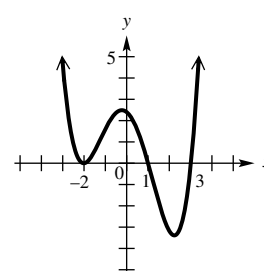

 To obtain the graph of f_2 , shift the graph of f_1 1 unit to the right, stretch by a factor of $1/2$, reflect across the x -axis, and shift 2 units up.

11. d

12.

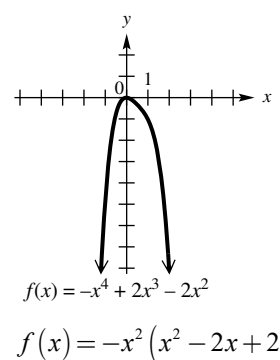


13.



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

14.

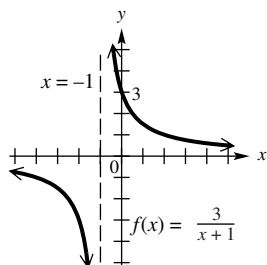


15. $f(x) = \frac{1}{2}x(x-3)(x+1)$

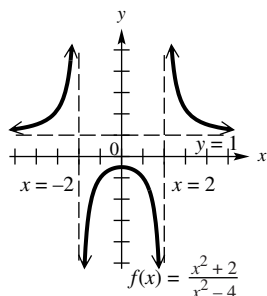
16. $(-\infty, -2) \cup (-2, 1)$

17. $[-3, 0) \cup (3, \infty)$

18.



19.



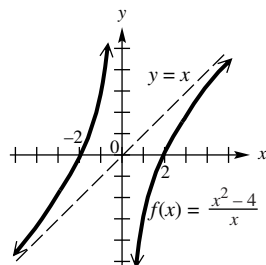
20. a. $y = x$

b. $-2, 2$

c. None

d. $x = 0$

e.

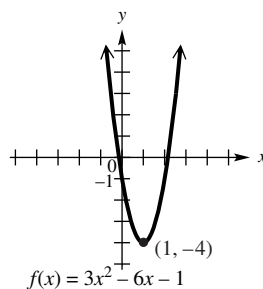


21. 16 newtons per sq m

22. 10 foot-candles

CHAPTER 3, FORM B

1.



$$x\text{-intercepts: } 1 \pm \frac{2\sqrt{3}}{3}$$

$$y\text{-intercept: } -1$$

$$\text{vertex: } (1, -4)$$

$$\text{axis: } x = 1$$

$$\text{domain: } (-\infty, \infty)$$

$$\text{range: } [-4, \infty)$$

2. a. \$751

b. 30 hotdogs; \$976

3. $q(x) : 4x^3 + 9x^2 + 27x + 80$

$$r : 245$$

4. $q(x) : x^3 + 2x^2 - 3x + 1$

$$r : 0$$

5. -49

6. Yes; $2x^4 - 3x^3 - x^2 + 4x - 6$

7. $-2, -4, 3$

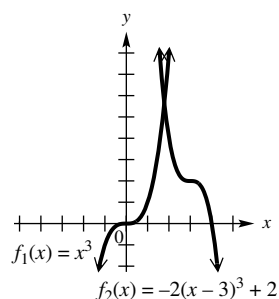
8. $f(x) = -x^4 - 2x^3 + 7x^2 - 2x + 8$

9. a. $f(-1) = 6 > 0$, while

$$f(-2) = -2 < 0.$$

b. 0.678363, -1.85577 ,
3.17741

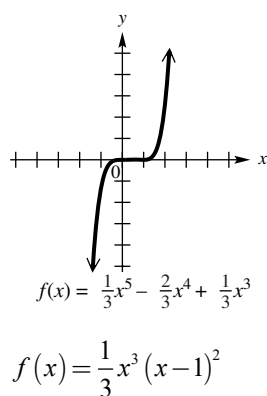
10.



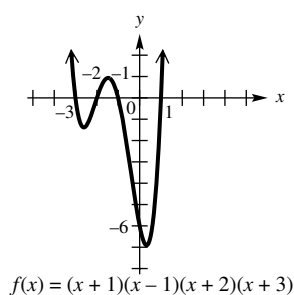
To obtain the graph of f_2 , shift the graph of f_1 3 units to the right, stretch by a factor of 2, reflect across the x -axis, and shift 2 units up.

11. a

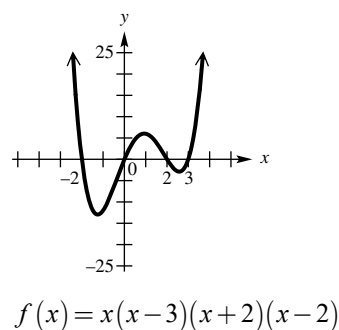
12.



13.



14.

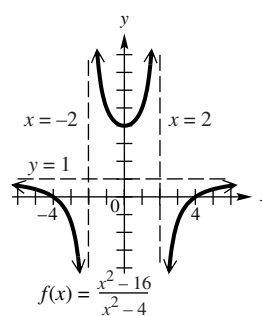


15. $f(x) = -2(x-2)^2(x+1)$

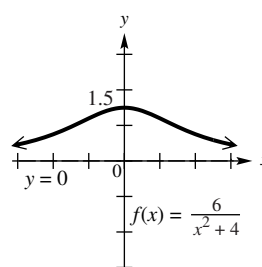
16. $(-\infty, -1] \cup (0, \infty)$

17. $[-4, 0) \cup (2, \infty)$

18.



19.

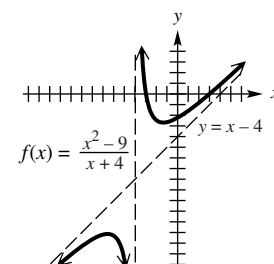


20. a. $y = x - 4$

b. 3, -3

c. $-\frac{9}{4}$

d. $x = -4$

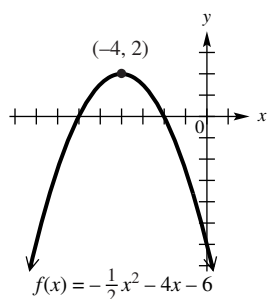


21. 2 ohms

22. 28 inches

CHAPTER 3, FORM C

1.


 x -intercepts: $-2, -6$
 y -intercept: -6

 vertex: $(-4, 2)$

 axis: $x = -4$

 domain: $(-\infty, \infty)$

 range: $(-\infty, 2]$

2. a. \$590

b. 23 umbrellas; \$1168

3. $5x^2 - 15x + 23 - \frac{13}{x+1}$

4. $x^4 + x^3 + x^2 + x + 1$

5. 384

 6. No; when the polynomial is divided by $x + 2$, the remainder is 114.

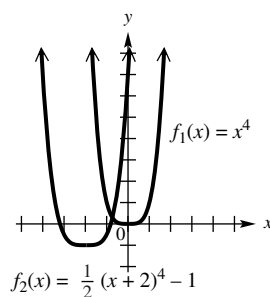
7. $-\frac{1}{2}, \frac{1}{2}, 3$

8. $f(x) = 2x^4 + 2x^3 - 22x^2 + 2x - 24$

 9. a. $f(-3) = 13 > 0$, while
 $f(-4) = -19 < 0$.

 b. 0.163097, 0.868150,
 -3.53124

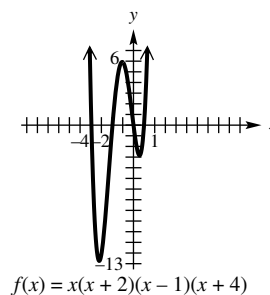
10.


 To obtain the graph of f_2 , shift the graph of f_1

 2 units to the left, stretch by a factor of $\frac{1}{2}$, and shift 1 unit down.

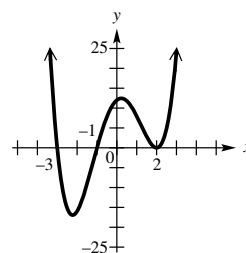
11. a

12.



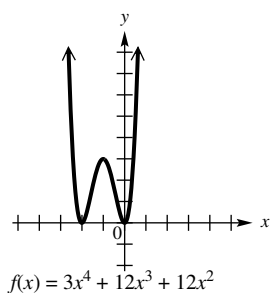
$$f(x) = x(x+2)(x-1)(x+4)$$

13.



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

14.



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

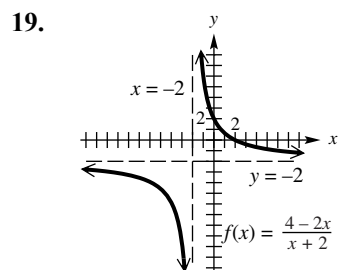
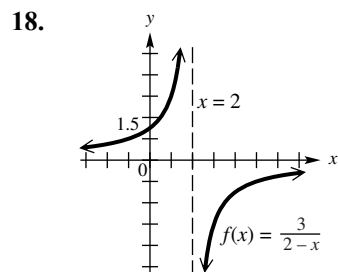
$$f(x) = 3x^2(x+2)^2$$

CHAPTER 3, FORM D

15. $f(x) = -\frac{1}{6}x(x-6)(x+3)$

16. $(0, 3)$

17. $(-1, 1) \cup \left[\frac{3}{2}, \infty\right)$

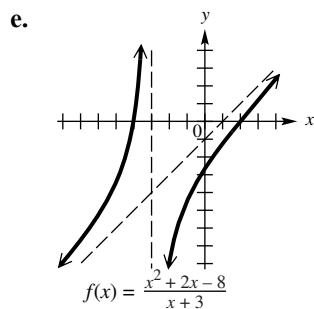


20. a. $y = x - 1$

b. $-4, 2$

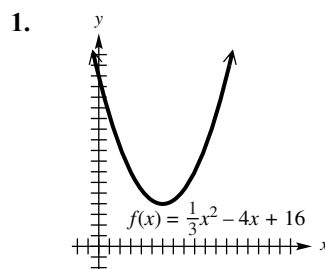
c. $-\frac{8}{3}$

d. $x = -3$



21. 375 g

22. .0054 cm



x -intercepts: none

y -intercept: 16

vertex: $(6, 4)$

axis: $x = 6$

domain: $(-\infty, \infty)$

range: $[4, \infty)$

2. a. 336 ft

b. 400 ft; 5 sec

3. $q(x) : 3x^3 - 2x^2 - 4x + 2 + \frac{7}{x-2}$

4. $q(x) : -5x^2 - 3x + 5$
 $r : 0$

5. 223

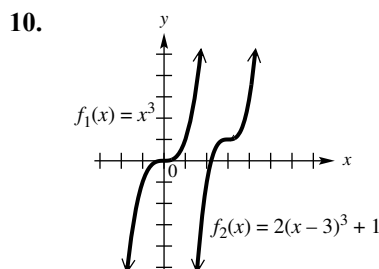
6. Yes; $x^3 + 2x^2 - 5x + 4$

7. $-4, -9$

8. $f(x) = x^3 - 13x + 12$

9. a. $f(4) = 14 > 0$, while
 $f(5) = -6 < 0$.

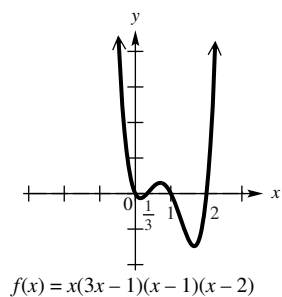
b. 0.794932; -1.57802 ; 4.78309



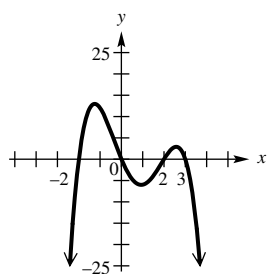
To obtain the graph of f_2 , shift the graph of f_1 3 units to the right, stretch by a factor of 2, and shift 1 unit up.

11. c

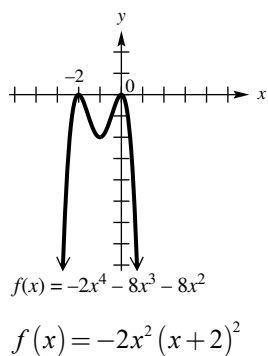
12.



13.



14.

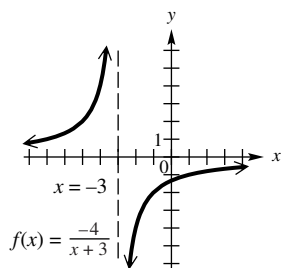


15. $f(x) = -2(x+1)^2(x-1)$

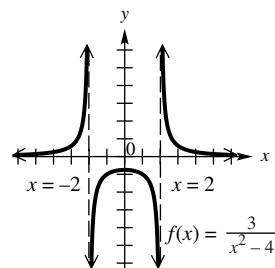
16. $[3, \infty)$

17. $(1, 3) \cup (5, \infty)$

18.



19.



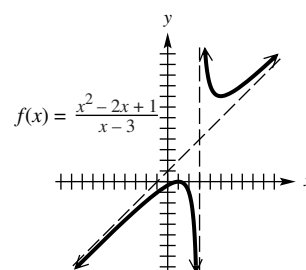
20. a. $y = x + 1$

b. 1

c. $-\frac{1}{3}$

d. $x = 3$

e.



21. 2/9 foot-candle

22. 15.2 ft

CHAPTER 3, FORM E

1. b
2. a
3. b
4. c
5. c
6. a
7. d
8. b
9. d
10. b
11. c
12. a
13. b
14. b
15. c
16. a
17. a
18. d
19. c
20. b
21. b
22. a

CHAPTER 3, FORM F

1. a
2. b
3. c
4. d
5. a
6. c
7. a
8. c
9. a
10. a
11. d
12. b
13. d
14. c
15. a
16. c
17. a
18. d
19. c
20. b
21. a
22. b

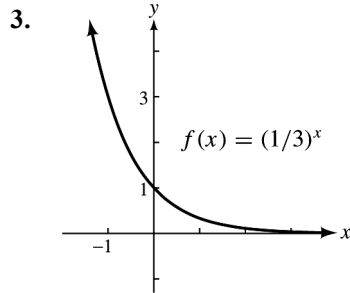
CHAPTER 4, FORM A

1a. $[-9, \infty); [0, \infty)$

1b. $f^{-1}(x) = x^2 - 9$

1c. $[0, \infty); [-9, \infty)$

2. b



4. $\{9\}$

5a. $\log_6 216 = 3$

5b. $4^5 = 1024$

6. $\frac{7}{4} \ln x - \frac{5}{4} \ln y - \frac{1}{4} \ln z$

7. 6.477

8. $q = e^{3.5} \approx 33.116$

9. 2.322

10. a. 1

b. $\frac{1}{25}$

11. $\left(-\infty, -\frac{1}{3}\right]$

12. $\{9\}$

13. $\{1\}$

14. $\{8\}$

15. $\{4\}$

16. 2 and 3, since $4^2 = 16$ and $4^3 = 64$

17. 20 min

18. \$1537.85

19. a. 813.1 g

b. 46.2 days

20. 23.8 yrs

CHAPTER 4, FORM B

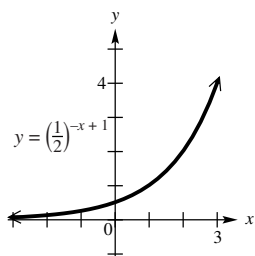
1a. $(-\infty, 4]; [0, \infty)$

1b. $f^{-1}(x) = 4 - x^2$

1c. $(-\infty, \infty); (-\infty, 4]$

2. d

3.



4. $\left\{\frac{3}{5}\right\}$

5a. $\log_3 a = 4.1$

5b. $8^b = \frac{1}{2}$

6. $2\log_3 y + \frac{1}{2}\log_3 z - \log_3 x$

7. 5.513

8. $q = e^{3.5} \approx 33.115$

9. 2.807

10. a. 243

b. $\frac{1}{3}$

11. $\left[\frac{1}{4}, \infty\right)$

12. $\{625\}$

13. $\{5\sqrt{5}\}$

14. $\{72\}$

15. $\{8\}$

16. 2 and 3, since $6^2 = 36$ and $6^3 = 216$

17. a. 3,306,953

b. 13.9 hr

18. 13 min

19. 14.7 yr

20. 16.7 yr

CHAPTER 4, FORM C

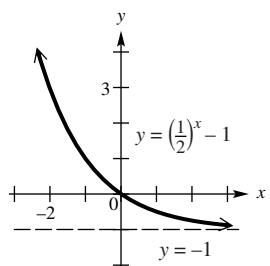
1a. $[4, \infty); [0, \infty)$

1b. $f^{-1}(x) = x^2 + 4$

1c. $[0, \infty); (-\infty, \infty)$

2. a

3.



4. $\left\{\frac{8}{3}\right\}$

5a. $\log_5 0.04 = -2$

5b. $10^{5y} = x$

6. $\log_3 x + \log_3 z - \log_3 y$

7. 3.560

8. $y = e^{-0.28} = 0.756$

9. 10.754

10. a. 16

b. $\frac{1}{8}$

11. $\left(-\infty, \frac{5}{3}\right]$

12. -7

13. $\{5\}$

14. $\{8.485\}$ or $6\sqrt{2}$

15. $\{4\}$

16. 3 and 4, since $3^3 = 27$ and $3^4 = 81$

17. a. 2130.4 g

b. 23.1 sec

18. 19 min

19. 45.1 yr

20. 13.7 yr

CHAPTER 4, FORM D

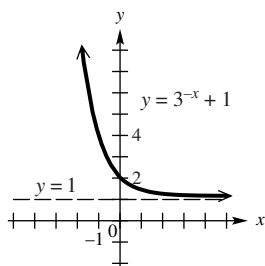
1a. $(-\infty, \infty); (-\infty, \infty)$

1b. $f^{-1}(x) = \frac{x^3 + 1}{2}$

1c. $(-\infty, \infty); (-\infty, \infty)$

2. b

3.



4. $\left\{-\frac{1}{4}\right\}$

5a. $\log_7 \sqrt{7} = \frac{1}{2}$

5b. $49^{1/6} = \sqrt[3]{7}$

6. $\frac{1}{2} \log_2 x - \frac{2}{3} \log_2 y + \frac{1}{2} \log_2 z$

7. 6.799

8. $a = e^{-2.9} \approx 0.055$

9. 5.052

10. a. 100

b. 1

11. $\left(-\infty, \frac{3}{2}\right]$

12. {19}

13. {9}

14. {2}

15. $\left\{\frac{1}{2}\right\}$

16. 2 and 3, since $5^2 = 25$ and $5^3 = 125$

17. a. 7994

b. 2005

18. 19 in

19. 15.7 yr

20. 16.3 yr

CHAPTER 4, FORM E

1. c
2. a
3. c
4. c
5. c
6. a
7. b
8. b
9. c
10. c
11. c
12. b
13. b
14. d
15. c
16. d
17. d
18. a
19. c
20. a

CHAPTER 4, FORM F

1. c
2. d
3. b
4. a
5. b
6. b
7. d
8. c
9. b
10. a
11. d
12. c
13. b
14. b
15. c
16. b
17. d
18. d
19. b
20. d

CHAPTER 5, FORM A

1. $\{(3, -2)\}$

2. $\emptyset$; inconsistent

3. $\{(3, -1, 2)\}$

4. $\left\{\left(-\frac{2}{5}, -3\right)\right\}$

5. $\left\{\left(\frac{8}{3}, -3, \frac{4}{3}\right)\right\}$

6. $y = \frac{x^2}{4} - \frac{x}{2} + 1$

7. -37

8. -125

9. $\{(1, -3)\}$

10. $\{(-2, -1, 3)\}$

11. $\frac{3}{x} + \frac{2}{x-5} - \frac{1}{x+1}$

12. $\{(3, 3), (9, 1)\}$

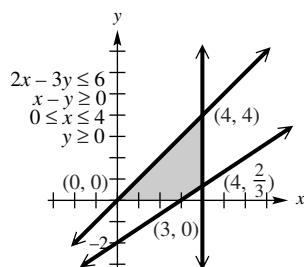
13. $\{(\sqrt{5}, 1), (\sqrt{5}, -1), (-\sqrt{5}, 1), (-\sqrt{5}, -1)\}$

14. Yes

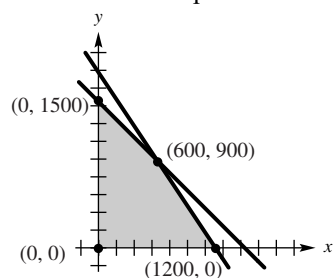


15. 55 and 17

16.



17. 600 model A lamps and 900 model B lamps



18. $x = -1$; $y = -3$; $z = -1$

19. $\begin{bmatrix} 4 & 2 & 10 \\ 5 & -2 & 4 \\ 2 & -2 & 1 \end{bmatrix}$

20. $\begin{bmatrix} 0 & 3 & 21 \\ 18 & 14 & 7 \\ -14 & 15 & 7 \end{bmatrix}$

21. $\begin{bmatrix} 18 & -1 & -4 \\ -35 & 0 & -1 \end{bmatrix}$

22. AB is 4×4 ; BA is 1×1 .

23. $\begin{bmatrix} -\frac{7}{2} & 2 \\ -2 & 1 \end{bmatrix}$

24. $\begin{bmatrix} 1 & \frac{1}{6} & -\frac{1}{2} \\ 0 & -\frac{1}{6} & \frac{1}{2} \\ 0 & \frac{1}{3} & 0 \end{bmatrix}$

25. $\left\{\left(-\frac{1}{2}, 4\right)\right\}$

CHAPTER 5, FORM B

1. No solution

 2. $\{(6, 2)\}$

 3. $\left\{\left(\frac{6}{11}, -\frac{7}{11}, 1\right)\right\}$

 4. $\{(-5, 7)\}$

 5. $\{(-2, 3, 1)\}$

 6. $y = 0.5x^2 - 2x + 4$

7. 16

8. -84

 9. $\left\{\left(-\frac{1}{2}, 1\right)\right\}$

 10. $\{(1, 1, 3)\}$

 11. $2 + \frac{3}{x+1} + \frac{4}{(x+1)^2}$

 12. $\left\{\left(\frac{\sqrt{6}}{2}, \frac{\sqrt{2}}{2}\right), \left(\frac{\sqrt{6}}{2}, -\frac{\sqrt{2}}{2}\right), \left(-\frac{\sqrt{6}}{2}, \frac{\sqrt{2}}{2}\right), \left(-\frac{\sqrt{6}}{2}, -\frac{\sqrt{2}}{2}\right)\right\}$

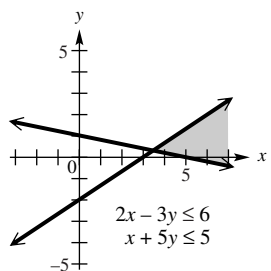
 13. $\{(0, 1), (-1, 2)\}$

14. Yes

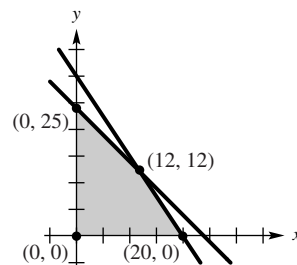


15. 8 and 7

16.



17. 12 VIP rinds and 12 SST rings


 18. $x = 17$; $y = 2$; $z = 2$

 19. $\begin{bmatrix} 26 \\ 10 \\ 12 \end{bmatrix}$

 20. $\begin{bmatrix} -29 & 9 \\ 21 & -13 \end{bmatrix}$

21. not possible

 22. AB cannot be found; BA is 5×4 .

23. does not exist

 24. $\begin{bmatrix} 3 & -2 & -2 \\ -1 & 1 & 1 \\ 2 & -\frac{3}{2} & -2 \end{bmatrix}$

 25. $\{(2, 1)\}$

CHAPTER 5, FORM C

1. $\{(4, -2)\}$

2. $\left\{\left(-\frac{10}{11}, \frac{10}{27}\right)\right\}$

3. $\{(1, -1, 2)\}$

4. $\left\{\left(-\frac{2}{3}, 3\right)\right\}$

5. $\emptyset$; inconsistent

6. $y = 3x^2 - 4x - 1$

7. 25

8. 0

9. $\left\{\left(\frac{4}{3}, \frac{1}{3}\right)\right\}$

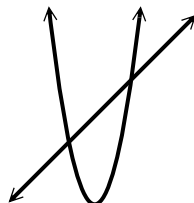
10. $\{(0, 2, -3)\}$

11. $-\frac{7}{x} + \frac{5}{x^2} + \frac{40}{3x-5}$

12. $\{(2, 1), (-2, -1), (i\sqrt{2}, -i\sqrt{2}), (-i\sqrt{2}, i\sqrt{2})\}$

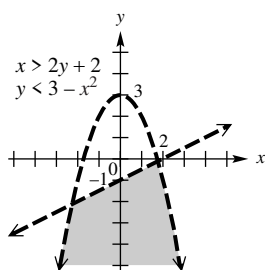
13. $\{(-2, 1), (1, 4)\}$

14. Yes

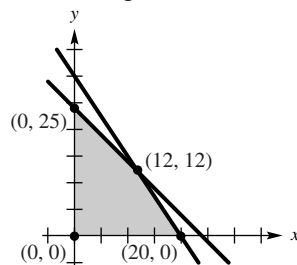


15. $\frac{2}{5}$ and 5

16.



17. 12 VIP rings and 12 SST rings



18. $x = -1$; $y = 1$; $z = 3$

19. $\begin{bmatrix} 15 & 11 & 0 \\ -5 & 15 & 14 \\ 25 & 5 & -10 \end{bmatrix}$

20. not possible

21. $\begin{bmatrix} 4 & 2 \\ -18 & 14 \\ -13 & -16 \end{bmatrix}$

22. AB is 2×2 ; BA is 5×5 .

23. $\begin{bmatrix} -1 & -2 \\ -\frac{3}{2} & -\frac{5}{2} \end{bmatrix}$

24. $\begin{bmatrix} 5 & 0 & -4 \\ -3 & -1 & 3 \\ -1 & 0 & 1 \end{bmatrix}$

25. 20 dimes and 5 quarters

CHAPTER 5, FORM D

 1. $\emptyset$; inconsistent

2. $\left\{\left(\frac{1}{9}, \frac{1}{3}\right)\right\}$

3. $\{(4, -2, 2)\}$

4. $\{(1, -2)\}$

5. $\{(1, 2, 0)\}$

6. $y = 0.5x^2 - 0.5x + 3$

7. 65

8. -86

9. $\left\{\left(-\frac{21}{13}, -\frac{1}{26}\right)\right\}$

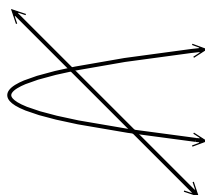
10. $\{(2, 3, -1)\}$

11. $\frac{4}{x} + \frac{5x-3}{x^2+2}$

12. $\left\{\left(\frac{\sqrt{2}}{2}, \sqrt{2}\right), \left(-\frac{\sqrt{2}}{2}, -\sqrt{2}\right)\right\}$

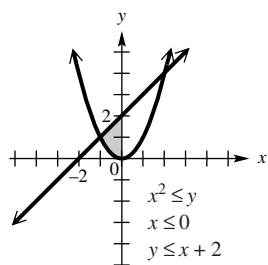
13. $\{(3, 2), (-3, 2), (3, -2), (-3, -2)\}$

14. Yes

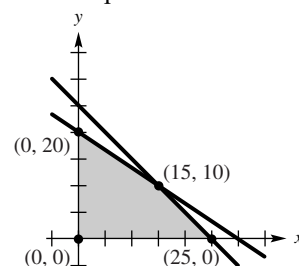


15. 6 and -4

16.



17. 15 kneehole desks and 10 rolltop desks


 18. $a = 1$; $b = -4$; $c = 0$; $d = 1$

19. $\begin{bmatrix} 13 & 13 & -15 \\ 37 & 28 & 9 \\ -28 & -21 & -2 \end{bmatrix}$

20. $\begin{bmatrix} 3 & 2 & -6 \\ -31 & -10 & -2 \end{bmatrix}$

21. $\begin{bmatrix} 7 & 6 \\ -1 & 14 \\ -3 & 13 \\ 7 & 14 \end{bmatrix}$

 22. AB is 3×4 ; BA cannot be found

23. does not exist

24. $\begin{bmatrix} 2 & 3 & -2 \\ -1 & -1 & 1 \\ -2 & -4 & 3 \end{bmatrix}$

25. $\left\{\left(\frac{13}{10}, -\frac{1}{10}\right)\right\}$

CHAPTER 5, FORM E

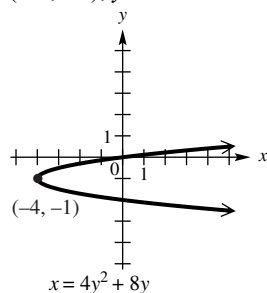
1. b
2. d
3. c
4. a
5. d
6. c
7. b
8. b
9. d
10. a
11. a
12. b
13. b
14. c
15. a
16. c
17. c
18. d
19. c
20. d
21. c
22. d
23. d
24. a
25. a
26. c
27. d

CHAPTER 5, FORM F

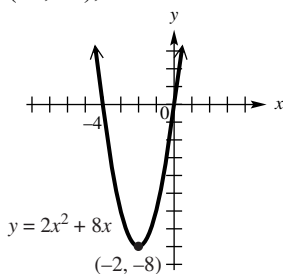
1. b
2. c
3. b
4. a
5. d
6. c
7. b
8. a
9. c
10. a
11. d
12. c
13. b
14. b
15. a
16. c
17. a
18. c
19. d
20. b
21. c
22. d
23. a
24. c
25. d
26. c
27. c

CHAPTER 6, FORM A

1. domain: $[-4, \infty)$; range: $(-\infty, \infty)$;
 $(-4, -1)$; $y = -1$



2. domain: $(-\infty, \infty)$; range: $[-8, \infty)$;
 $(-2, -8)$; $x = -2$

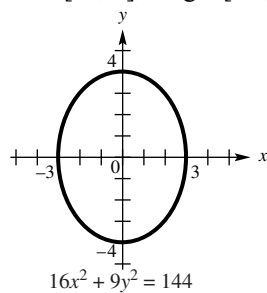


3. $(3, 0)$; $x = -3$

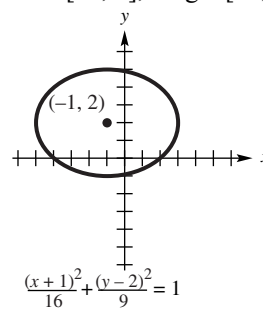
4. $(y - 2) = -\frac{2}{9}(x + 3)^2$ or
 $(x + 3)^2 = -\frac{9}{2}(y - 2)$

5. $y = \frac{1}{180}x^2$

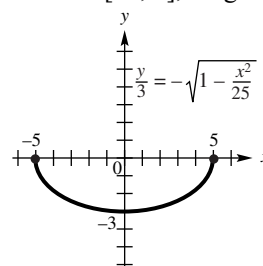
6. domain: $[-3, 3]$; range: $[-4, 4]$



7. domain: $[-5, 3]$; range: $[-1, 5]$



8. a. domain: $[-5, 5]$; range: $[-3, 0]$



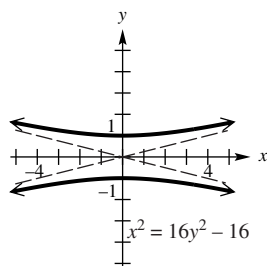
- b. It is the graph of a function.

9. $\frac{x^2}{36} + \frac{y^2}{25} = 1$

10. 12.12 ft

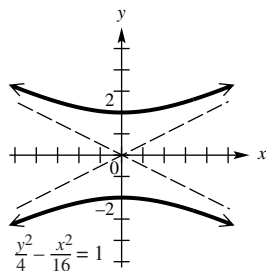
11. domain: $(-\infty, \infty)$; range: $(-\infty, -1] \cup [1, \infty)$;

$$y = \pm \frac{1}{4}x$$



12. domain: $(-\infty, \infty)$; range: $(-\infty, -2] \cup [2, \infty)$;

$$y = \pm \frac{1}{2}x$$



13. $\frac{y^2}{49} - \frac{x^2}{4} = 1$

14. circle

15. ellipse

16. parabola

17. ellipse

18. parabola

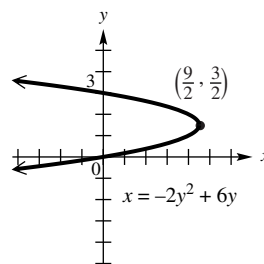
19. hyperbola

20. $y_1 = 5 + \sqrt{9 - (x + 4)^2}$
 $y_2 = 5 - \sqrt{9 - (x + 4)^2}$

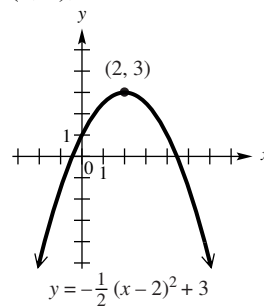
CHAPTER 6, FORM B

1. domain: $\left[-\infty, \frac{9}{2}\right]$; range: $(-\infty, \infty)$;

$$\left(\frac{9}{2}, \frac{3}{2}\right); y = \frac{3}{2}$$



2. domain: $(-\infty, \infty)$; range: $(-\infty, 3]$;
 $(2, 3); x = 2$

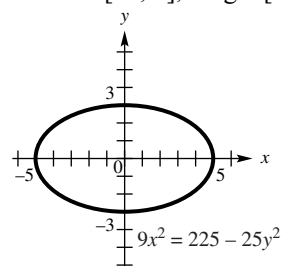


3. $(0, -6); y = 6$

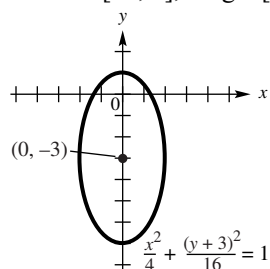
4. $y - 5 = \frac{1}{8}(x - 4)^2$ or
 $(x - 4)^2 = 8(y - 5)$

5. $y = \frac{1}{200}x^2$

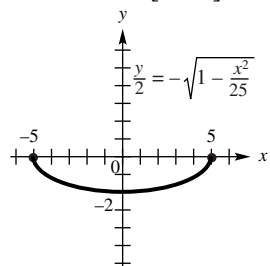
6. domain: $[-5, 5]$; range: $[-3, 3]$



7. domain: $[-2, 2]$; range: $[-7, 1]$



8. a. domain: $[-5, 5]$; range: $[-2, 0]$

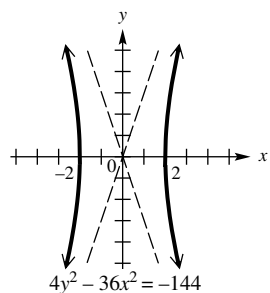


- b. It is the graph of a function.

9. $\frac{(x+4)^2}{16} + \frac{(y-5)^2}{4} = 1$

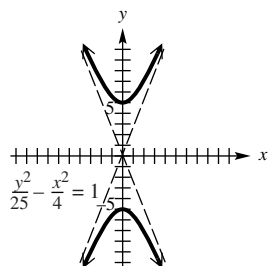
10. 8.66 m

11. domain: $(-\infty, -2] \cup [2, \infty)$; range: $(-\infty, \infty)$;
 $y = \pm 3x$



12. domain: $(-\infty, \infty)$; range: $(-\infty, -5] \cup [5, \infty)$;

$y = \pm \frac{5}{2}x$



13. $\frac{x^2}{16} - \frac{y^2}{9} = 1$

14. circle

15. point

16. ellipse

17. parabola

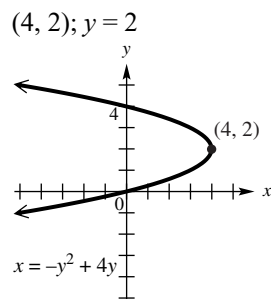
18. hyperbola

19. parabola

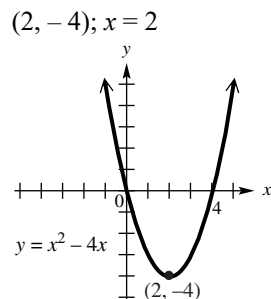
20. $y_1 = 5 + \sqrt{36 - 9(x+3)^2}$
 $y_2 = 5 - \sqrt{36 - 9(x+3)^2}$

CHAPTER 6, FORM C

1. domain:
- $(-\infty, 4]$
- ; range:
- $(-\infty, \infty)$
- ;



2. domain:
- $(-\infty, \infty)$
- ; range:
- $[-4, \infty)$
- ;

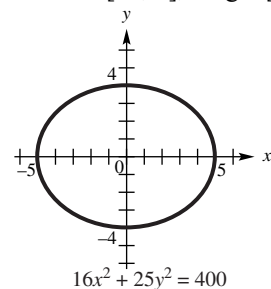


- 3.
- $(0, 4); y = -4$

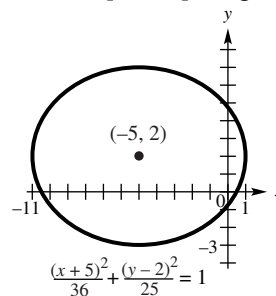
- 4.
- $(y - 6) = -\frac{3}{4}(x + 2)^2$
- or
-
- $(x + 2)^2 = -\frac{4}{3}(y - 6)$

- 5.
- $y = \frac{1}{320}x^2$

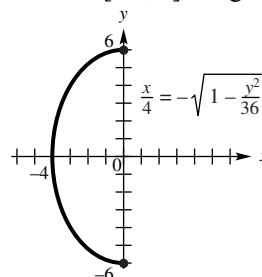
6. domain:
- $[-5, 5]$
- ; range:
- $[-4, 4]$



7. domain:
- $[-11, 1]$
- ; range:
- $[-3, 7]$



8. a. domain:
- $[-4, 0]$
- ; range:
- $[-6, 6]$



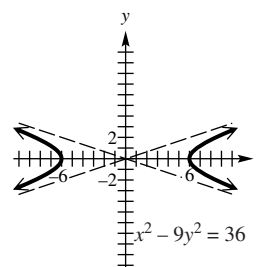
- b. It is not the graph of a function.

- 9.
- $\frac{(x-3)^2}{64} + \frac{(y+4)^2}{49} = 1$

10. 2.98 m

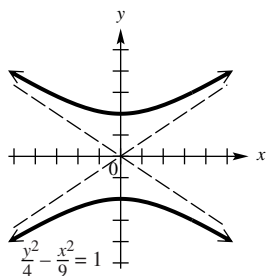
11. domain:
- $(\infty, -6] \cup [6, \infty)$
- ; range:
- $(-\infty, \infty)$
- ;

$$y = \pm \frac{1}{3}x$$



12. domain: $(-\infty, \infty)$; range: $(-\infty, -2] \cup [2, \infty)$;

$$y = \pm \frac{2}{3}x$$



13. $\frac{y^2}{25} - \frac{x^2}{4} = 1$

14. circle

15. hyperbola

16. hyperbola

17. ellipse

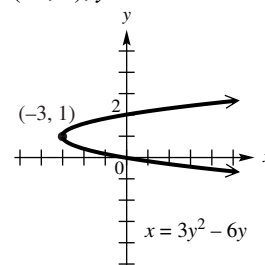
18. hyperbola

19. parabola

20. $y_1 = -1 + \sqrt{18 - (x+3)^2}$
 $y_2 = -1 - \sqrt{18 - (x+3)^2}$

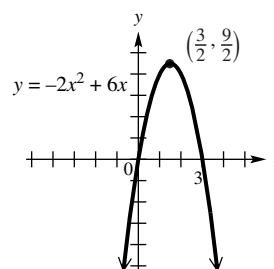
CHAPTER 6, FORM D

1. domain: $[-3, \infty)$; range: $(-\infty, \infty)$;
 $(-3, 1)$; $y = 1$



2. domain: $(-\infty, \infty)$; range: $\left[-\infty, \frac{9}{2}\right]$;

$\left(\frac{3}{2}, \frac{9}{2}\right)$; $x = \frac{3}{2}$

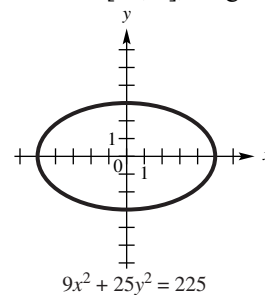


3. $\left(\frac{1}{16}, 0\right)$; $x = -\frac{1}{16}$

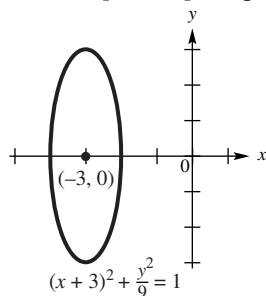
4. $x + 4 = 5(y - 2)^2$ or
 $(y - 2)^2 = \left(\frac{1}{5}\right)(x + 4)$

5. $y = \frac{3}{200}x^2$

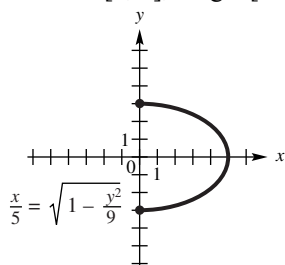
6. domain: $[-5, 5]$; range: $[-3, 3]$



7. domain: $[-4, -2]$; range: $[-3, 3]$



8. a. domain: $[0, 5]$; range: $[-3, 3]$



b. It is not the graph of a function.

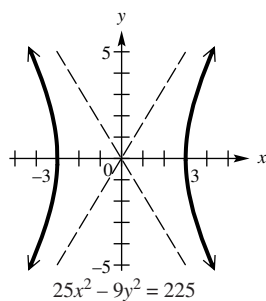
9. $\frac{(x+8)^2}{64} + \frac{(y-5)^2}{36} = 1$

10. 2.12 ft

11. domain: $(-\infty, -3] \cup [3, \infty)$;

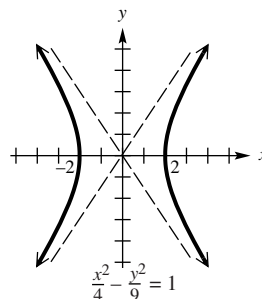
range: $(-\infty, \infty)$;

$$y = \pm \frac{5}{3}x$$



12. domain: $(-\infty, -2) \cup [2, \infty)$;

range: $(-\infty, \infty)$; $y = \pm \frac{3}{2}x$



13. $\frac{(y-3)^2}{9} - \frac{(x-5)^2}{9} = 1$

14. parabola

15. parabola

16. circle

17. hyperbola

18. ellipse

19. ellipse

20. $y_1 = 5\sqrt{16-x^2}$
 $y_2 = -5\sqrt{16-x^2}$

CHAPTER 6, FORM E

1. b
2. a
3. d
4. c
5. b
6. d
7. c
8. c
9. d
10. b
11. d
12. c
13. a
14. a
15. a
16. d
17. b
18. c
19. c
20. c

CHAPTER 6, FORM F

1. c
2. a
3. d
4. c
5. b
6. b
7. b
8. b
9. a
10. d
11. c
12. d
13. b
14. c
15. a
16. d
17. d
18. b
19. c
20. c

CHAPTER 7, FORM A

1. 1, 5, 14, 30, 55; neither
2. $\frac{3}{2}, 2, \frac{5}{2}, 3, \frac{7}{2}$; arithmetic
3. -2, 4, -8, 16, -32; neither
4. 5
5. 90
6. 620
7. $\frac{1023}{4}$
8. 75
9. does not exist
10. 120
11. $\frac{144}{5}$
12. $81x^4 - 108x^3 + 54x^2 - 12x + 1$
13. $x^4 - 8x^3y + 24x^2y^2 - 32xy^3 + 16y^4$
14. $37,500x^2y^4$
15. 55
16. 15
17. 604,800
18. 40,320

19. Let S_n represent the statement

$$6 + 8 + 10 + \cdots + (4 + 2n) = n(n + 5).$$

If $n = 1$, S_n becomes $6 = 1(1 + 5)$, which is true.

The statement S_k is

$$6 + 8 + 10 + \cdots + (4 + 2k) = k(k + 5).$$

The statement S_{k+1} is

$$\begin{aligned} 6 + 8 + 10 + \cdots + (4 + 2k) + [4 + 2(k + 1)] \\ = (k + 1)[(k + 1) + 5]. \end{aligned}$$

Assume S_k is true:

$$6 + 8 + 10 + \cdots + (4 + 2k) = k(k + 5).$$

Add the $(k + 1)^{\text{st}}$ -term, $4 + 2(k + 1)$, to both sides of the equation.

$$6 + 8 + 10 + \cdots + (4 + 2k) + [4 + 2(k + 1)]$$

$$= k(k + 5) + [4 + 2(k + 1)]$$

$$= k^2 + 5k + 4 + 2k + 2$$

$$= k^2 + 7k + 6$$

$$= (k + 1)(k + 6)$$

$$= (k + 1)[(k + 1) + 5]$$

It has been shown that if S_k is true, then S_{k+1} is true. Hence S_n is true for every positive integer n .

20. 224

21. 95,040

22. 120

23. 0.25

24. $\frac{1}{13}$

25. $\frac{7}{13}$

26. 2 to 11

27. 0.234

28. 0.0156

CHAPTER 7, FORM B

1. 1, 2, 3, 5, 8; neither
2. $-1, \frac{1}{4}, -\frac{1}{9}, \frac{1}{16}, -\frac{1}{25}$; neither
3. 0, -3, 8, -15, 24; geometric
4. 44
5. -162
6. 100
7. $\frac{58,025}{576}$
8. -210
9. 180
10. 540
11. does not exist
12. $81x^4 - 216x^3y + 216x^2y^2 - 96xy^3 + 16y^4$
13. $x^4 - 8x^3 + 24x^2 - 32x + 16$
14. $280a^3b^4$
15. 167,960
16. 161,700
17. 259,459,200
18. 720
19. Let S_n represent the statement

$$2 + 8 + 14 + \cdots + (6n - 4) = n(3n - 1).$$

If $n = 1$, S_n becomes $2 = 1(3 \cdot 1 - 1)$, which is true.

The statement S_k is

$$2 + 8 + 14 + \cdots + (6k - 4) = k(3k - 1).$$

The statement S_{k+1} is

$$\begin{aligned} 2 + 8 + 14 + \cdots + (6k - 4) + [6(k + 1) - 4] \\ = (k + 1)[3(k + 1) - 1]. \end{aligned}$$

Assume S_k is true:

$$2 + 8 + 14 + \cdots + (6k - 4) = k(3k - 1).$$

Add the $(k + 1)^{\text{st}}$ -term, $6(k + 1) - 4$, to both sides of the equation.

$$2 + 8 + 14 + \cdots + (6k - 4) + [6(k + 1) - 4]$$

$$\begin{aligned} &= k(3k - 1) + 6(k + 1) - 4 \\ &= 3k^2 - k + 6k + 6 - 4 \\ &= 3k^2 + 5k + 2 \\ &= (k + 1)(3k + 2) \\ &= (k + 1)[3(k + 1) - 1] \end{aligned}$$

It has been shown that if S_k is true, then S_{k+1} is true. Hence S_n is true for every positive integer n .

20. 240
21. 6160
22. 720
23. 0.68
24. $\frac{1}{4}$
25. $\frac{1}{13}$
26. 11 to 2
27. 0.00781
28. 0.194

CHAPTER 7, FORM C

1. 1, 3, 6, 13, 26; neither
2. $-\frac{3}{2}, 3, -6, 12, -24$; geometric
3. $\frac{1}{2}, -\frac{4}{5}, \frac{9}{10}, -\frac{16}{17}, \frac{25}{26}$; neither
4. 25
5. $\frac{3}{16}$
6. 490
7. $\frac{8,717,049}{2048}$
8. -240
9. 34
10. 384
11. 90
12. $16x^4 - 160x^3 + 600x^2 - 1000x + 625$
13. $8x^3 - 36x^2y + 54xy^2 - 27y^3$
14. $210x^5y^5$
15. 125,970
16. 2278
17. 1
18. 40,320
19. Let S_n represent the statement

$$5 + 5^2 + 5^3 + \cdots + 5^n = \frac{5}{4}(5^n - 1).$$

If $n = 1$, S_n becomes $5 = \frac{5}{4}(5^1 - 1)$, which is true.

The statement S_k is

$$5 + 5^2 + 5^3 + \cdots + 5^k = \frac{5}{4}(5^k - 1).$$

The statement S_{k+1} is

$$5 + 5^2 + 5^3 + \cdots + 5^k + 5^{k+1} = \frac{5}{4}(5^{k+1} - 1).$$

Assume S_k is true:

$$5 + 5^2 + 5^3 + \cdots + 5^k = \frac{5}{4}(5^k - 1).$$

Add the $(k+1)^{\text{st}}$ -term, 5^{k+1} , to both sides of the equation.

$$\begin{aligned} 5 + 5^2 + 5^3 + \cdots + 5^k + 5^{k+1} &= \frac{5}{4}(5^k - 1) + 5^{k+1} \\ &= \frac{5}{4} \cdot 5^k - \frac{5}{4} + 5^{k+1} \\ &= \frac{5^{k+1}}{4} + 5^{k+1} - \frac{5}{4} \\ &= 5^{k+1} \left(\frac{1}{4} + 1 \right) - \frac{5}{4} \\ &= 5^{k+1} \cdot \frac{5}{4} - \frac{5}{4} \\ &= \frac{5}{4}(5^{k+1} - 1) \end{aligned}$$

It has been shown that if S_k is true, then S_{k+1} is true. Hence S_n is true for every positive integer n .

20. 2184

21. 3780

22. 5880

23. 0.55

24. $\frac{1}{2}$

25. $\frac{1}{2}$

26. 3 to 1

27. 0.273

28. 0.109

CHAPTER 7, FORM D

1. 1, 3, 5, 11, 21; neither
2. -4, 2, 8, 14, 20; arithmetic
3. $1, -\frac{1}{2}, \frac{1}{4}, -\frac{1}{8}, \frac{1}{16}$; geometric
4. 21
5. 27
6. 185
7. $\frac{989,527}{4,374}$
8. $\frac{15,551}{2,520}$
9. does not exist
10. 112,344
11. 72
12. $16x^4 + 96x^3y + 216x^2y^2 + 216xy^3 + 81y^4$
13. $x^5 - 15x^4 + 90x^3 - 270x^2 + 405x - 243$
14. $-80a^2b^6$
15. 120
16. 120
17. 32,760
18. 3,628,800
19. Let S_n represent the statement

$$5 + 8 + 11 + \dots + (2 + 3n) = \frac{n(3n + 7)}{2}.$$

If $n = 1$, S_n becomes $5 = \frac{1(3 \cdot 1 + 7)}{2}$, which is true.

The statement S_k is

$$5 + 8 + 11 + \dots + (2 + 3k) = \frac{k(3k + 7)}{2}.$$

The statement S_{k+1} is

$$\begin{aligned} &5 + 8 + 11 + \dots + (2 + 3k) + [2 + 3(k + 1)] \\ &= \frac{(k + 1)[3(k + 1) + 7]}{2}. \end{aligned}$$

Assume S_k is true:

$$5 + 8 + 11 + \dots + (2 + 3k) = \frac{k(3k + 7)}{2}.$$

Add the $(k + 1)^{\text{st}}$ -term, $2 + 3(k + 1)$, to both sides of the equation.

$$\begin{aligned} &5 + 8 + 11 + \dots + (2 + 3k) + [2 + 3(k + 1)] \\ &= \frac{k(3k + 7)}{2} + [2 + 3(k + 1)] \\ &= \frac{3k^2 + 7k}{2} + 2 + 3k + 3 \\ &= \frac{3k^2 + 7k}{2} + 3k + 5 \\ &= \frac{3k^2 + 7k}{2} + \frac{6k + 10}{2} \\ &= \frac{3k^2 + 13k + 10}{2} \\ &= \frac{(k + 1)(3k + 10)}{2} \\ &= \frac{(k + 1)[3(k + 1) + 7]}{2} \end{aligned}$$

It has been shown that if S_k is true, then S_{k+1} is true. Hence S_n is true for every positive integer n .

20. 77,520
21. 720
22. 270
23. 0.60
24. $\frac{1}{13}$
25. $\frac{4}{13}$
26. 25 to 1
27. 0.161
28. 0.00322

CHAPTER 7, FORM E

1. d
2. b
3. c
4. a
5. d
6. c
7. c
8. a
9. c
10. a
11. a
12. b
13. a
14. c
15. b
16. a
17. b
18. d
19. a
20. a
21. c
22. d
23. b
24. d
25. d
26. a
27. d
28. a
29. a
30. b

CHAPTER 7, FORM F

1. a
2. d
3. a
4. c
5. c
6. d
7. a
8. a
9. b
10. b
11. d
12. a
13. d
14. d
15. a
16. c
17. b
18. b
19. c
20. c
21. c
22. b
23. b
24. c
25. d
26. d
27. a
28. a
29. a
30. c