In Exercises 7–10, graph the solution set of each inequality or system of inequalities.

7. $x - 2y < 8$

8. $x \geq 0, y \geq 0$
$3x + y \leq 9$
$2x + 3y \geq 6$

9. $x^2 + y^2 > 1$
$x^2 + y^2 < 4$

10. $y \leq 1 - x^2$
$x^2 + y^2 \leq 9$

11. Find the maximum value of the objective function $z = 3x + 5y$ subject to the following constraints: $x \geq 0, y \geq 0, x + y \leq 6, x \geq 2$.

12. Health experts agree that cholesterol intake should be limited to 300 mg or less each day. Three ounces of shrimp and 2 ounces of scallops contain 156 mg of cholesterol. Five ounces of shrimp and 3 ounces of scallops contain 45 mg of cholesterol less than the suggested maximum daily intake. Determine the cholesterol content in an ounce of each item.

13. A company is planning to produce and sell a new line of computers. The fixed cost will be \$360,000 and it will cost \$850 to produce each computer. Each computer will be sold for \$1150.

a. Write the cost function, C, of producing x computers.

b. Write the revenue function, R, from the sale of x computers.

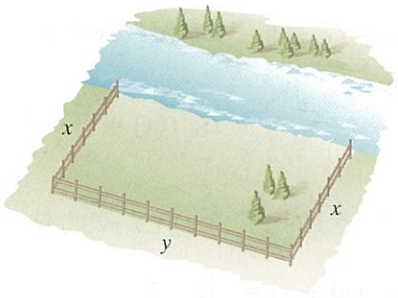
c. Determine the break-even point. Describe what this means.

14. A chemist needs to mix a 20% acid solution with a 50% acid solution to obtain 60 ounces of a 30% acid solution. How many ounces of each of the solutions must be used?

15. When a plane flies with the wind, it can travel 1600 kilometers in 2 hours. When the plane flies in the opposite direction, against the wind, it takes 3 hours to travel 1950 kilometers. Find the average velocity of the plane in still air and the average velocity of the wind.

16. Find the quadratic function whose graph passes through the points $(-1, -2)$, $(2, 1)$, and $(-2, 1)$.

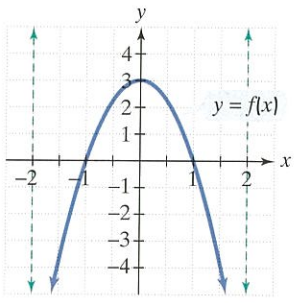
17. The rectangular plot of land shown in the figure is to be fenced along three sides using 39 feet of fencing. No fencing is to be placed along the river's edge. The area of the plot is 180 square feet. What are its dimensions?



18. A manufacturer makes two types of jet skis, regular and deluxe. The profit on a regular jet ski is \$200 and the profit on the deluxe model is \$250. To meet customer demand, the company must manufacture at least 50 regular jet skis per week and at least 75 deluxe models. To maintain high quality, the total number of both models of jet skis manufactured by the company should not exceed 150 per week. How many jet skis of each type should be manufactured per week to obtain maximum profit? What is the maximum weekly profit?

Cumulative Review Exercises (Chapters P–7)

The figure shows the graph of $y = f(x)$ and its two vertical asymptotes. Use the graph to solve Exercises 1–10.



1. Find the domain and the range of f.

2. Find the zeros and the least possible multiplicity of each zero.

3. What is the relative maximum and where does it occur?

4. Find the interval(s) on which f is decreasing.

5. Is $f(-0.7)$ positive or negative?

6. Find $(f \circ f)(-1)$.

7. Use arrow notation to complete this statement:

$f(x) \to -\infty$ as _____ or as _____.

8. Does f appear to be even, odd, or neither?

9. Graph $g(x) = f(x + 2) - 1$.

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

In Exercises 11–21, solve each equation, inequality, or system of equations.

11. $\sqrt{x^2 - 3x} = 2x - 6$

12. $4x^2 = 8x - 7$

13. $\left|\frac{x}{3} + 2\right| < 4$

14. $\frac{x + 5}{x - 1} > 2$

15. $2x^3 + x^2 - 13x + 6 = 0$

16. $6x - 3(5x + 2) = 4(1 - x)$

17. $\log(x + 3) + \log x = 1$

18. $3^{x+2} = 11$

19. $x^{\frac{1}{2}} - 2x^{\frac{1}{4}} - 15 = 0$

20.
$$\begin{aligned} 3x - y &= -2 \\ 2x^2 - y &= 0 \end{aligned}$$

21.
$$\begin{aligned} x + 2y + 3z &= -2 \\ 3x + 3y + 10z &= -2 \\ 2y - 5z &= 6 \end{aligned}$$

In Exercises 22–28, graph each equation, function, or inequality in a rectangular coordinate system. If two functions are indicated, graph both in the same system.

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

23. $2x - 3y \leq 6$

24. $y = 3^{x-2}$

25. $f(x) = \dfrac{x^2 - x - 6}{x + 1}$

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

27. $(x - 2)^2 + (y - 4)^2 > 9$

28. $f(x) = |x|$ and $g(x) = -|x - 2|$

In Exercises 29–30, let $f(x) = 2x^2 - x - 1$ *and* $g(x) = 1 - x$.

29. Find $(f \circ g)(x)$ and $(g \circ f)(x)$.

30. Find $\dfrac{f(x + h) - f(x)}{h}$ and simplify.

In Exercises 31–32, write the linear function in slope-intercept form satisfying the given conditions.

31. Graph of f passes through $(2, 4)$ and $(4, -2)$.

32. Graph of g passes through $(-1, 0)$ and is perpendicular to the line whose equation is $x + 3y - 6 = 0$.

33. You invested \$4000 in two stocks paying 12% and 14% annual interest, respectively. At the end of the year, the total interest from these investments was \$508. How much was invested at each rate?

34. The length of a rectangle is 1 meter more than twice the width. If the rectangle's area is 36 square meters, find its dimensions.

35. What interest rate is required for an investment of \$6000 subject to continuous compounding to grow to \$18,000 in 10 years?

In Exercises 36–37, verify each identity.

36. $\sec\theta - \cos\theta = \tan\theta \sin\theta$

37. $\tan x + \tan y = \dfrac{\sin(x + y)}{\cos x \cos y}$

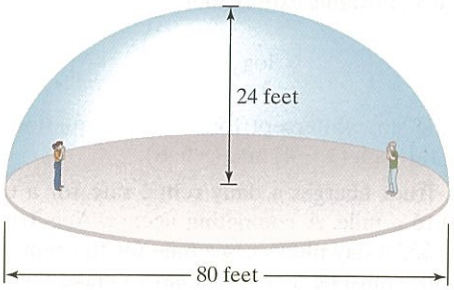
In Exercises 38–39, solve each equation.

38. $\sin\theta = \tan\theta, \quad 0 \leq \theta < 2\pi$

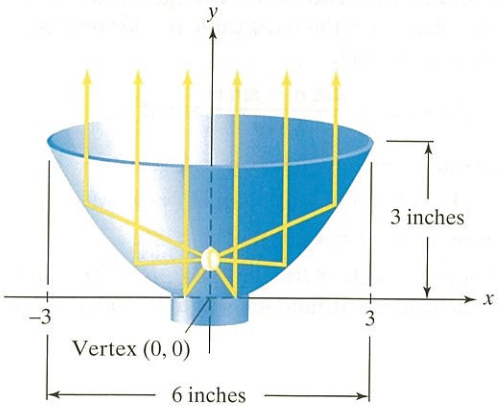
39. $2 + \cos 2\theta = 3\cos\theta, \quad 0 \leq \theta < 2\pi$

40. In oblique triangle ABC, $A = 12°$, $B = 75°$, and $a = 20$. Find b to the nearest tenth.

feet. How far from the room's center should two people stand so that they can whisper back and forth and be heard?



10. An engineer is designing headlight units for cars. The unit shown in the figure below has a parabolic surface with a diameter of 6 inches and a depth of 3 inches.



a. Using the coordinate system that has been positioned on the unit, find the parabola's equation.

b. If the light source is located at the focus, describe its placement relative to the vertex.

In Exercises 11–12, identify each equation without completing the square or using a rotation of axes.

11. $x^2 + 9y^2 + 10x - 18y + 25 = 0$

12. $x^2 + y^2 + xy + 3x - y - 3 = 0$

13. For the equation

$$7x^2 - 6\sqrt{3}xy + 13y^2 - 16 = 0,$$

determine what angle of rotation would eliminate the $x'y'$-term in a rotated $x'y'$-system.

In Exercises 14–15, eliminate the parameter and graph the plane curve represented by the parametric equations. Use arrows to show the orientation of each plane curve.

14. $x = t^2, y = t - 1; -\infty < t < \infty$

15. $x = 1 + 3\sin t, y = 2\cos t; 0 \le t < 2\pi$

In Exercises 16–17, identify the conic section and graph the polar equation.

16. $r = \dfrac{2}{1 - \cos\theta}$ **17.** $r = \dfrac{4}{2 + \sin\theta}$

Cumulative Review Exercises (Chapters P–9)

Solve each equation or inequality in Exercises 1–7.

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

2. $-3(2x - 4) > 2(6x - 12)$

3. $x - 5 = \sqrt{x + 7}$ **4.** $(x - 2)^2 = 20$

5. $|2x - 1| \ge 7$ **6.** $3x^3 + 4x^2 - 7x + 2 = 0$

7. $\log_2(x + 1) + \log_2(x - 1) = 3$

Solve each system in Exercises 8–10.

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

9. $2x^2 - y^2 = -8$
$x - y = 6$

10. (Use matrices.)

$$\begin{aligned} x - y + z &= 17 \\ -4x + y + 5z &= -2 \\ 2x + 3y + z &= 8 \end{aligned}$$

In Exercises 11–13, graph each equation, function, or system in a rectangular coordinate system.

11. $f(x) = (x - 1)^2 - 4$ **12.** $\dfrac{x^2}{9} + \dfrac{y^2}{4} = 1$

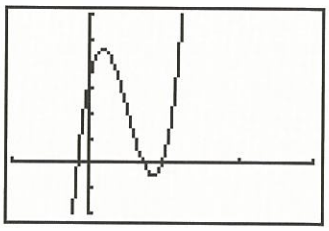
13. $5x + y \le 10$

$$y \ge \frac{1}{4}x + 2$$

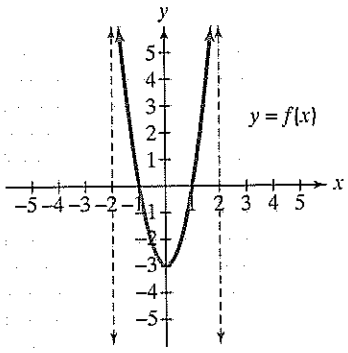
14. a. List all possible rational roots of

$$32x^3 - 52x^2 + 17x + 3 = 0.$$

b. The graph of $f(x) = 32x^3 - 52x^2 + 17x + 3$ is shown in a $[-1, 3, 1]$ by $[-2, 6, 1]$ viewing rectangle. Use the graph of f and synthetic division to solve the equation in part (a).



15. The figure shows the graph of $y = f(x)$ and its two vertical asymptotes.



a. Find the domain and the range of f.

b. What is the relative minimum and where does it occur?

c. Find the interval on which f is increasing.

d. Find $f(-1) - f(0)$.

e. Find $(f \circ f)(1)$.

f. Use arrow notation to complete this statement:

$$f(x) \to \infty \text{ as } \_\_\_\_\_ \text{ or as } \_\_\_\_\_.$$

g. Graph $g(x) = f(x - 2) + 1$.

h. Graph $h(x) = -f(2x)$.

16. If $f(x) = x^2 - 4$ and $g(x) = x + 2$, find $(g \circ f)(x)$.

17. Expand using logarithmic properties. Where possible, evaluate logarithmic expressions.

$$\log_5\left(\frac{x^3\sqrt{y}}{125}\right)$$

18. Write the slope-intercept form of the equation of the line passing through $(1, -4)$ and $(-5, 8)$.

19. Rent-a-Truck charges a daily rental rate for a truck of \$39 plus \$0.16 a mile. A competing agency, Ace Truck Rentals, charges \$25 a day plus \$0.24 a mile for the same truck. How many miles must be driven in a day to make the daily cost of both agencies the same? What will be the cost?

20. The local cable television company offers two deals. Basic cable service with one movie channel costs \$35 per month. Basic service with two movie channels cost \$45 per month. Find the charge for the basic cable service and the charge for each movie channel.

21. Verify the identity: $\dfrac{\csc\theta - \sin\theta}{\sin\theta} = \cot^2\theta$.

22. Graph one complete cycle of $y = 2\cos(2x + \pi)$.

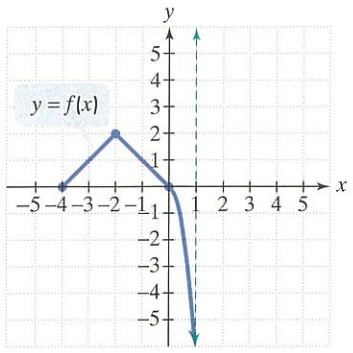
23. If $\mathbf{v} = 3\mathbf{i} - 6\mathbf{j}$ and $\mathbf{w} = \mathbf{i} + \mathbf{j}$, find $(\mathbf{v} \cdot \mathbf{w})\mathbf{w}$.

24. Solve for θ: $\sin 2\theta = \sin\theta, 0 \leq \theta < 2\pi$.

25. In oblique triangle ABC, $A = 64°$, $B = 72°$, and $a = 13.6$. Solve the triangle. Round lengths to the nearest tenth.

Cumulative Review Exercises (Chapters P–10)

The figure shows the graph of $y = f(x)$ and its vertical asymptote. Use the graph to solve Exercises 1–9.



1. Find the domain and the range of f.
2. Does f have a relative maximum or a relative minimum? What is this relative maximum or minimum and where does it occur?
3. Find the interval on which f is decreasing.
4. Is f even, odd, or neither?
5. For what value(s) of x is $f(x) = 1$?
6. Find $(f \circ f)(-4)$.
7. Use arrow notation to complete this statement:

$$f(x) \to -\infty \quad \text{as} \quad \_\_\_\_\_.$$

8. Graph $g(x) = f(x - 2) + 1$.
9. Graph $h(x) = -f(2x)$.

In Exercises 10–22, solve each equation, inequality, or system of equations.

10. $-2(x - 5) + 10 = 3(x + 2)$
11. $3x^2 - 6x + 2 = 0$
12. $\log_2 x + \log_2(2x - 3) = 1$
13. $x^{\frac{1}{2}} - 6x^{\frac{1}{4}} + 8 = 0$
14. $e^{2x} - 6e^x + 8 = 0$
15. $|2x + 1| \le 1$
16. $6x^2 - 6 < 5x$
17. $\dfrac{x - 1}{x + 3} \le 0$
18. $30e^{0.7x} = 240$
19. $2x^3 + 3x^2 - 8x + 3 = 0$
20. $4x^2 + 3y^2 = 48$
    $3x^2 + 2y^2 = 35$
21. (Use matrices.)

$$\begin{aligned} x - 2y + z &= 16 \\ 2x - y - z &= 14 \\ 3x + 5y - 4z &= -10 \end{aligned}$$

22. $x - y = 1$
    $x^2 - x - y = 1$

In Exercises 23–29, graph each equation, function, or system in a rectangular coordinate system. If two functions are indicated, graph both in the same system.

23. $100x^2 + y^2 = 25$
24. $4x^2 - 9y^2 - 16x + 54y - 29 = 0$
25. $f(x) = \dfrac{x^2 - 1}{x - 2}$
26. $2x - y \ge 4$
    $x \le 2$
27. $f(x) = x^2 - 4x - 5$
28. $f(x) = \sqrt[3]{x + 4}$ and f^{-1}
29. $f(x) = \log_2 x$ and $g(x) = -\log_2(x + 1)$

In Exercises 30–31, let $f(x) = -x^2 - 2x + 1$ and $g(x) = x - 1$.

30. Find $(f \circ g)(x)$ and $(g \circ f)(x)$.
31. Find $\dfrac{f(x + h) - f(x)}{h}$ and simplify.
32. If $A = \begin{bmatrix} 4 & 2 \\ 1 & -1 \\ 0 & 5 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 4 \\ 3 & 1 \end{bmatrix}$, find $AB - 4A$.
33. Find the partial fraction decomposition for

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

34. Expand and simplify: $(x^3 + 2y)^5$.
35. Use the formula for the sum of the first n terms of an arithmetic sequence to find $\sum_{i=1}^{50} (4i - 25)$.

In Exercises 36–37, write the linear function in slope-intercept form satisfying the given conditions.

36. Graph of f passes through $(6, 3)$ and $(-2, 1)$.
37. Graph of g passes through $(0, -2)$ and is perpendicular to the line whose equation is $x - 5y - 20 = 0$.
38. For a summer sales job, you are choosing between two pay arrangements: a weekly salary of \$200 plus 5% commission on sales, or a straight 15% commission. For how many dollars of sales will the earnings be the same regardless of the pay arrangement?
39. You have 900 feet of fencing to enclose a rectangular plot that borders on a river. If you do not fence the side along the river, find the length and width of the plot that will maximize the area. What is the largest area that can be enclosed?
40. If 10 pens and 12 pads cost \$42, and 5 of the same pens and 10 of the same pads cost \$29, find the cost of a pen and a pad.

41. A ball is thrown vertically upward from the top of a 96-foot tall building with an initial velocity of 80 feet per second. The height of the ball above ground, $s(t)$, in feet, after t seconds is modeled by the position function

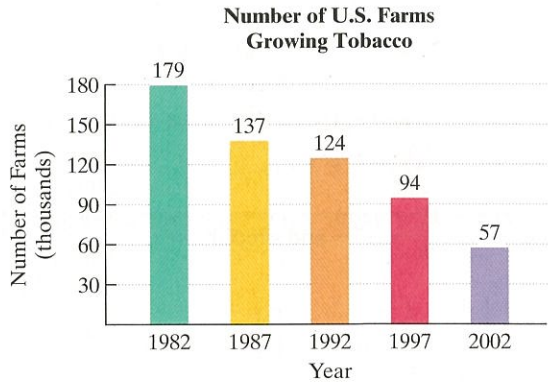
$$s(t) = -16t^2 + 80t + 96.$$

a. After how many seconds will the ball strike the ground?

b. When does the ball reach its maximum height? What is the maximum height?

42. The current, I, in amperes, flowing in an electrical circuit varies inversely as the resistance, R, in ohms, in the circuit. When the resistance of an electric percolator is 22 ohms, it draws 5 amperes of current. How much current is needed when the resistance is 10 ohms?

43. The bar graph shows the decline in the number of U.S. farms growing tobacco from 1982 through 2002. Develop a linear function that models the data and then use the function to make a prediction about what might occur in the future.



Source: U.S. Bureau of Agriculture

44. An object moves in simple harmonic motion described by $d = 10 \sin \frac{3\pi}{4} t$, where t is measured in seconds and d in inches. Find **a.** the maximum displacement; **b.** the frequency; and **c.** the time required for one oscillation.

Verify each identity in Exercises 45–46.

45. $\tan x + \dfrac{1}{\tan x} = \dfrac{1}{\sin x \cos x}$

46. $\dfrac{1 - \tan^2 x}{1 + \tan^2 x} = \cos 2x$

47. Graph one period: $y = -2 \cos(3x - \pi)$.

In Exercises 48–49, solve each equation on the interval $[0, 2\pi)$.

48. $4 \cos^2 x = 3$

49. $2 \sin^2 x + 3 \cos x - 3 = 0$

50. Find the exact value of $\cot\left[\cos^{-1}\left(-\frac{5}{6}\right)\right]$.

51. Graph the polar equation: $r = 1 + 2 \cos \theta$.

52. In oblique triangle ABC, $A = 34°$, $a = 22$, and $b = 32$. Solve the triangle(s). Round lengths to the nearest tenth and angle measures to the nearest degree.

53. Use the parametric equations

$$x = \sin t, \quad y = 1 + \cos^2 t, \quad -\frac{\pi}{2} < t < \frac{\pi}{2}$$

and eliminate the parameter. Graph the plane curve represented by the parametric equations. Use arrows to show the orientation of the curve.

58. The function $f(x) = 5x^2$ describes the volume of a rectangular box, $f(x)$, in cubic inches, whose square base has sides that each measure x inches and whose height is 5 inches. If x is changing,

a. Find the average rate of change of the volume with respect to x as x changes from 2 inches to 2.1 inches and from 2 inches to 2.01 inches.

b. Find the instantaneous rate of change of the volume with respect to x at the moment when $x = 2$ inches.

59. The function $f(x) = \frac{4}{3}\pi x^3$ describes the volume, $f(x)$, of a sphere of radius x inches. If the radius is changing, find the instantaneous rate of change of the volume with respect to the radius when the radius is 5 inches. Express the answer in terms of π.

60. A baseball is thrown straight upward from a height of 5 feet with an initial velocity of 80 feet per second. The function

$$s(t) = -16t^2 + 80t + 5$$

describes the ball's height above the ground, $s(t)$, in feet, t seconds after it is thrown.

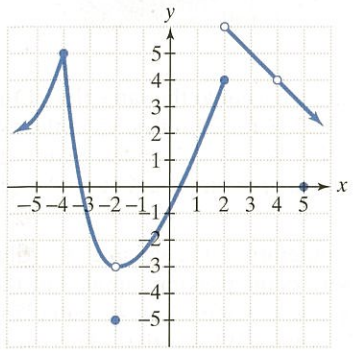
a. What is the instantaneous velocity of the ball 2 seconds after it is thrown? 4 seconds after it is thrown?

b. The ball reaches its maximum height above the ground when the instantaneous velocity is zero. After how many seconds does the ball reach its maximum height? What is the maximum height?

Chapter 11 Test

1. Construct a table to find $\lim_{x\to 9} \dfrac{9 - x}{3 - \sqrt{x}}$.

In Exercises 2–7, use the graph of function f to find the indicated limit or function value, or state that the limit or function value does not exist.



2. $\lim_{x\to -2} f(x)$ **3.** $f(-2)$

4. $\lim_{x\to 2^-} f(x)$ **5.** $\lim_{x\to 2^+} f(x)$

6. $\lim_{x\to 2} f(x)$ **7.** $\lim_{x\to 4} f(x)$

In Exercises 8–10, find the limit.

8. $\lim_{x\to -2} (x^2 + x + 1)^4$ **9.** $\lim_{x\to -1} \dfrac{x^2 - x - 2}{x + 1}$

10. $\lim_{x\to 9} \dfrac{\sqrt{x} - 3}{x - 9}$

In Exercises 11–12, determine whether f is continuous at a.

11. $f(x) = \begin{cases} \dfrac{x^2 - 1}{x + 1} & \text{if } x \neq -1 \\ 6 & \text{if } x = -1 \end{cases}$

$a = -1$

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

$a = 2$

In Exercises 13–14, find $f'(x)$.

13. $f(x) = x^2 - 5x + 1$ **14.** $f(x) = \dfrac{10}{x}$

15. Find the slope-intercept equation of the tangent line to the graph of $f(x) = x^2$ at $(-3, 9)$.

16. A ball is thrown straight upward. The function

$$s(t) = -16t^2 + 72t$$

describes the ball's height above the ground, $s(t)$, in feet, t seconds after it is thrown. What is the instantaneous velocity of the ball 3 seconds after it is thrown?

Cumulative Review Exercises (Chapters P–11)

Solve each equation or inequality in Exercises 1–5.

1. $\dfrac{1}{x + 2} > \dfrac{3}{x + 1}$ **2.** $2x^3 + 11x^2 - 7x - 6 = 0$

3. $|2x + 4| > 3$

4. $\cos^2 x + \sin x + 1 = 0, 0 \leq x < 2\pi$

5. $\log_4(x^2 - 9) - \log_4(x + 3) = 3$

In Exercises 6–15, graph each equation, function, or system in a rectangular coordinate system.

6. $f(x) = x^3 + x^2 - 12x$ **7.** $f(x) = \dfrac{2x^2 - 5x + 2}{x^2 - 4}$

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

9. $y = 2\sin\left(2x + \dfrac{\pi}{2}\right)$ (Graph one period.)

10. $y = \frac{1}{2}\sec 2\pi x, \quad 0 \leq x \leq 2$

11. $x - 2y \leq 4$

$x \geq 2$

12. $x^2 - 4y^2 - 4x - 24y - 48 = 0$

13. $f(x) = \sqrt{x}, g(x) = \sqrt{x - 2} + 1$ (Graph f and g in the same rectangular coordinate system.)

14. $x = 3\sin t,\ y = 4\cos t + 2;\ 0 \le t \le 2\pi$

15. $2x^2 + 5xy + 2y^2 - \frac{9}{2} = 0$

16. Find $f'(x)$ if $f(x) = -2x^2 + 7x - 1$.

17. Find $f^{-1}(x)$ if $f(x) = 7x - 1$.

18. Find the limit: $\lim_{x \to -3} \dfrac{x^2 + x - 6}{x^2 + 2x - 3}$.

19. Expand and simplify: $(x^2 - 3y)^4$.

20. Write the slope-intercept form of the equation of the line passing through the point $(2, -3)$ and parallel to the line whose equation is $2x + y - 6 = 0$.

21. Find the dot product $\mathbf{v} \cdot \mathbf{w}$ and the angle between $\mathbf{v}$ and $\mathbf{w}$:

$$\mathbf{v} = -2\mathbf{i} + \mathbf{j}, \quad \mathbf{w} = 4\mathbf{i} - 3\mathbf{j}$$

22. Find the partial fraction decomposition for

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

Verify each identity in Exercises 23–24.

23. $\tan\theta + \cot\theta = \sec\theta \csc\theta$

24. $\tan(\theta + \pi) = \tan\theta$

25. If $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 3 & 2 \\ 2 & 1 \end{bmatrix}$, find BA.

26. Graph the polar equation: $r = 4\sin\theta$.

27. Express $h(x) = (x^2 - 3x + 7)^9$ as a composition of two functions f and g such that $h(x) = (f \circ g)(x)$.

28. Solve using matrices:

$$\begin{aligned} 2x - y - 2z &= -1 \\ x - 2y - z &= 1 \\ x + y + z &= 4. \end{aligned}$$

29. Use the formula for the sum of the first n terms of a geometric sequence to find $\sum_{i=1}^{6} 4(-2)^i$.

30. Use DeMoivre's Theorem to find

$$\left[\sqrt{2}(\cos 15^\circ + i \sin 15^\circ)\right]^4.$$

Write the answer in rectangular form.

31. A bank loaned out \$120,000, part of it at 8% per year and the rest at 18% per year.

a. Express the interest, I, on the two loans as a function of the amount loaned at 8%, x.

b. If the interest received totaled \$10,000, how much was loaned at each rate?

32. A machine produces open boxes using square sheets of metal. The machine cuts equal-sized squares measuring 9 centimeters on a side from each corner. Then the machine shapes the metal into an open box by turning up the sides. If each box must have a volume of 225 cubic centimeters, what should be the dimensions of the piece of sheet metal?

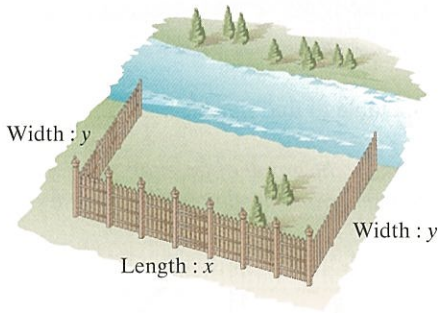
33. You have 200 feet of fencing to enclose a small rectangular garden with one side against a barn. If you do not fence the side along the barn, find the length and width of the garden that will maximize its area. What is the largest area that can be enclosed?

34. Use Newton's Law of Cooling, $T = C + (T_0 - C)e^{kt}$, to solve this exercise. You remove a pie that has a temperature of 375°F from the oven. You leave the pie in a room whose temperature is 72°F. After 60 minutes, the temperature of the pie is 75°F.

a. Write a model for the temperature of the pie, T, after t minutes.

b. When will the temperature of the pie be 250°F?

35. You just purchased a rectangular waterfront lot along a river's edge. The area of the lot is 60,000 square feet. To create a sense of privacy, you decide to fence along three sides, excluding the side that fronts the river. An expensive fencing along the lot's front length costs \$25 per foot. An inexpensive fencing along the two side widths costs only \$5 per foot. Express the total cost, C, of fencing along the three sides as a function of the lot's length, x.



36. Two ships leave a harbor at the same time. One ship travels at a bearing of N42°E for 23 miles. The other ship travels at a bearing of N38°W for 72 miles. After both ships are anchored, how far apart are they? Round to the nearest tenth of a mile.

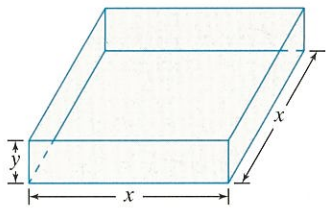
37. At a fixed temperature, the volume of a given mass of gas varies inversely as the pressure applied to the gas. A certain mass of gas has a volume of 40 cubic inches when the pressure is 22 pounds. What is the volume of the gas when the pressure is 30 pounds?

38. A ball is thrown straight upward. The function

$$s(t) = -16t^2 + 40t$$

describes the ball's height above the ground, $s(t)$, in feet, t seconds after it is thrown. What is the instantaneous velocity of the ball 2 seconds after it is thrown?

39. The figure shows an open box with a square base. The box is to have a volume of 4 cubic feet. Express the surface area of the box, A, as a function of the length of a side of its square base, x.



40. The function $f(x) = -2.32x^2 + 76.58x - 559.87$ models the percentage of U.S. students, $f(x)$, who are x years old who say their school is not drug free, where $12 \le x \le 17$. At what age do 70% of U.S. students say that their school is not drug free? Round to the nearest tenth of a year.