

In Exercises 1–14, write an equation for the specified line.

- through $(1, -6)$ with slope 3
- through $(-1, 2)$ with slope $-1/2$
- the vertical line through $(0, -3)$
- through $(-3, 6)$ and $(1, -2)$
- the horizontal line through $(0, 2)$
- through $(3, 3)$ and $(-2, 5)$
- with slope -3 and y -intercept 3
- through $(3, 1)$ and parallel to $2x - y = -2$
- through $(4, -12)$ and parallel to $4x + 3y = 12$
- through $(-2, -3)$ and perpendicular to $3x - 5y = 1$
- through $(-1, 2)$ and perpendicular to $\frac{1}{2}x + \frac{1}{3}y = 1$
- with x -intercept 3 and y -intercept -5
- the line $y = f(x)$, where f has the following values:

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

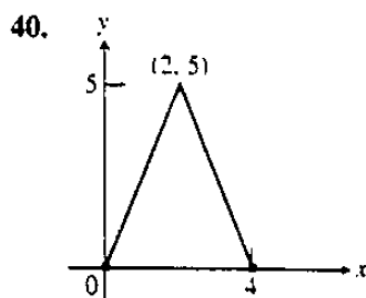
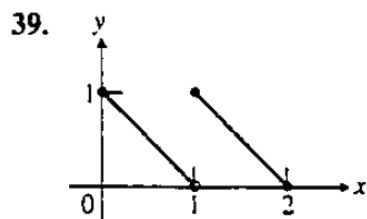
- through $(4, -2)$ with x -intercept -3

In Exercises 15–18, determine whether the graph of the function is symmetric about the y -axis, the origin, or neither.

- $y = x^{1/5}$
- $y = x^{2/5}$
- $y = x^2 - 2x - 1$
- $y = e^{-x^2}$

- Find the center and radius of the circle with equation $x^2 + y^2 - 8x - 6y = 0$.

In Exercises 39 and 40, write a piecewise formula for the function.



In Exercises 41 and 42, find

- $(f \circ g)(-1)$
- $(g \circ f)(2)$
- $(f \circ f)(x)$
- $(g \circ g)(x)$

41. $f(x) = \frac{1}{x}$, $g(x) = \frac{1}{\sqrt{x+2}}$

42. $f(x) = 2 - x$, $g(x) = \sqrt[3]{x+1}$

In Exercises 43 and 44, (a) write a formula for $f \circ g$ and $g \circ f$ and find the (b) domain and (c) range of each.

43. $f(x) = 2 - x^2$, $g(x) = \sqrt{x+2}$

44. $f(x) = \sqrt{x}$, $g(x) = \sqrt{1-x}$

In Exercises 53 and 54,

(a) find f^{-1} and show that $(f \circ f^{-1})(x) = (f^{-1} \circ f)(x) = x$.

(b) graph f and f^{-1} in the same viewing window.

53. $f(x) = 2 - 3x$

54. $f(x) = (x + 2)^2, x \geq -2$

57. Find the six trigonometric values of $\theta = \cos^{-1}(3/7)$. Give exact answers.

65. **Guppy Population** The number of guppies in Susan's aquarium doubles every day. There are four guppies initially.

(a) Write the number of guppies as a function of time t .

(b) How many guppies were present after 4 days? after 1 week?

(c) When will there be 2000 guppies?

(d) **Writing to Learn** Give reasons why this might not be a good model for the growth of Susan's guppy population.

21. Write the equation of the line through $(-2, 1)$ which:

(a) goes through $(7, 3)$;

(b) is parallel to $3x - 2y = 5$;

(c) is perpendicular to $3x - 4y = 9$;

(d) is perpendicular to $y = 4$;

(e) has y -intercept 3.

22. Show that $(2, -1)$, $(5, 3)$, and $(11, 11)$ are on the same line.

1. Convert the following to radians (leave π in your answer).

- | | | |
|-----------------|------------------|------------------|
| (a) 240° | (b) -60° | (c) -135° |
| (d) 540° | (e) 600° | (f) 720° |
| (g) 18° | (h) 22.5° | (i) 6° |

2. Convert the following radian measures to degrees.

- | | | |
|----------------------|----------------------|-------------------------|
| (a) $\frac{7\pi}{6}$ | (b) $\frac{-\pi}{3}$ | (c) 8π |
| (d) $\frac{5\pi}{4}$ | (e) $\frac{3\pi}{2}$ | (f) $\frac{-11\pi}{12}$ |
| (g) $\frac{\pi}{18}$ | (h) $\frac{7\pi}{4}$ | (i) $\frac{-\pi}{5}$ |

5. Calculate (be sure your calculator is in radian mode).

- | | |
|--------------------|--------------------|
| (a) $\sin(0.452)$ | (b) $\cos(0.452)$ |
| (c) $\tan(0.452)$ | (d) $\sin(-0.361)$ |
| (e) $\cos(-0.361)$ | (f) $\tan(-0.361)$ |

9. Evaluate without use of a calculator.

(a) $\tan\left(\frac{\pi}{6}\right)$ (b) $\sec(\pi)$ (c) $\sec\left(\frac{3\pi}{4}\right)$
(d) $\csc\left(\frac{\pi}{2}\right)$ (e) $\cot\left(\frac{\pi}{4}\right)$ (f) $\tan\left(-\frac{\pi}{4}\right)$

10. Evaluate without use of a calculator.

(a) $\tan\left(\frac{\pi}{3}\right)$ (b) $\sec\left(\frac{\pi}{3}\right)$ (c) $\cot\left(\frac{\pi}{3}\right)$
(d) $\csc\left(\frac{\pi}{4}\right)$ (e) $\tan\left(-\frac{\pi}{6}\right)$ (f) $\cos\left(-\frac{\pi}{3}\right)$

1)

approximate a solution of

$$x^3 + 9x - 3 = 0$$

to within two decimal places.

2)

approximate the solutions of

$$x^5 - 7x^4 - 2x^3 + 3x^2 + 7x - 4 = 0$$

to within two decimal places.

12)

Are there any asymptotes apparent from the graph? What are they?

Draw the graph of

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

13)

Draw the graph of

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

Determine any horizontal or vertical asymptotes.

14)

Draw the graph of

$$y = \frac{x - 3}{x^2 - 1}$$

Determine any asymptotes.

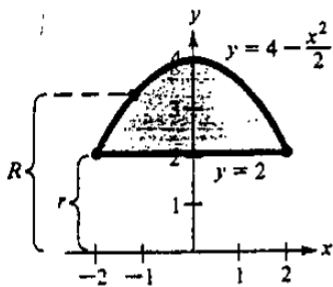
30. Find equations of the lines passing through (1, 3) and having the following characteristics:
- Slope of $-\frac{2}{3}$
 - Perpendicular to the line $x + y = 0$
 - Passing through the point (2, 4)
 - Parallel to the x -axis

In Exercises 11–14, determine the radius and center of the given circle and sketch its graph.

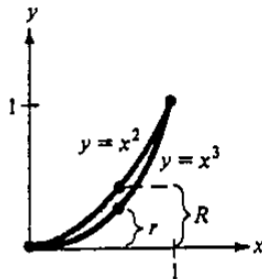
11. $x^2 + y^2 + 6x - 2y + 1 = 0$

In Exercises 41–44, express the indicated values as functions of x .

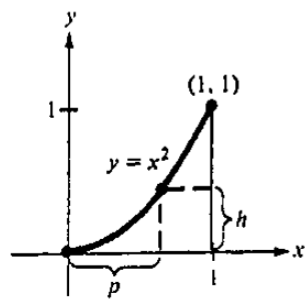
41. R and r



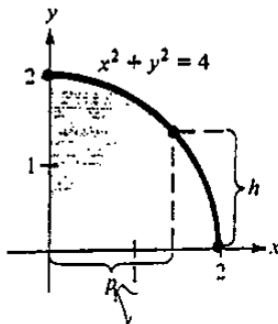
42. R and r



43. h and p



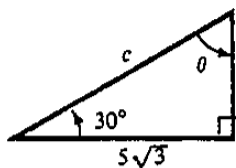
44. h and p



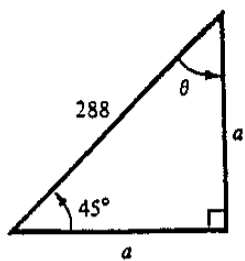
53. Given $f(x) = 1 - x^2$ and $g(x) = 2x + 1$, find
- $f(x) + g(x)$
 - $f(x) - g(x)$
 - $f(x)g(x)$
 - $\frac{f(x)}{g(x)}$
 - $f(g(x))$
 - $g(f(x))$

In Exercises 63–68, solve the given triangle for the indicated side and/or angle.

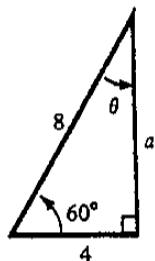
63.



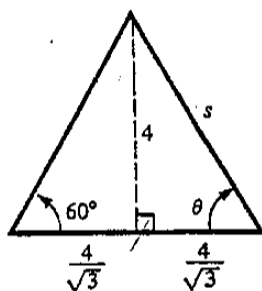
64.



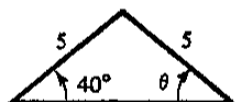
65.



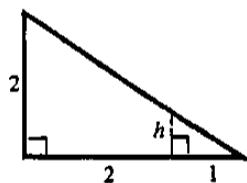
66.



67.



68.



69. A six-foot person standing 12 feet from a streetlight casts an 8-foot shadow as shown in Figure 1.87. What is the height of the streetlight?

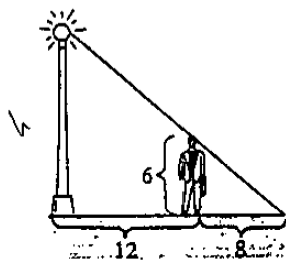


FIGURE 1.87