

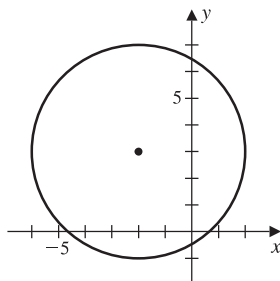
## Chapter 1 Form A: Test

1. Use interval notation to list the values of  $x$  that satisfy the inequality  $x^2 - 3x + 2 \leq 0$ .
2. Find all values of  $x$  that solve the equation  $|6x - 3| = 9$ .
3. Solve the inequality  $|x - 3| \geq 2$  and write the solution using interval notation.
4. Consider the points  $P_1(2, 4)$  and  $P_2(-1, 3)$ 
  - (a) Find the distance between  $P_1$  and  $P_2$ .
  - (b) Find the midpoint of the line segment joining  $P_1$  and  $P_2$ .
5. Indicate on the  $xy$ -plane the points  $(x, y)$  for which the statement

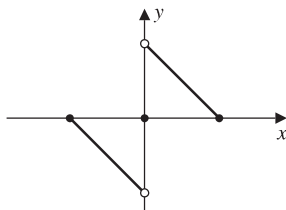
$$|x - 1| < 3 \quad \text{and} \quad |y + 1| < 2$$

holds.

6. Find the equation of the circle shown in the figure.



7. Consider the circle with equation  $x^2 + 2x + y^2 - 4y = -4$ .
  - (a) Find the center of the circle.
  - (b) Find the radius of the circle.
8. Specify any axis or origin symmetry of the graph.

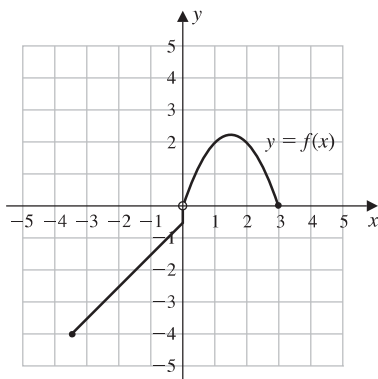


9. Consider the equation  $y = x^3 + 8$ .
  - (a) Determine any axis intercepts of the equation.
  - (b) Describe any axis or origin symmetry of the equation.
10. Find the distance between the points of intersection of the graphs  $y = x^2 + 2$  and  $y = 6$ .

11. Suppose  $f(x) = 4x^2 + 1$ . Find the following values.

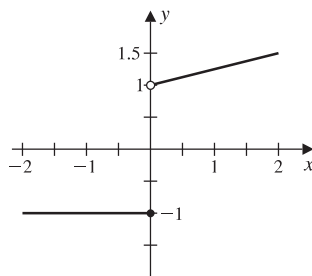
- (a)  $f(2)$                       (c)  $f(2 + \sqrt{3})$                       (e)  $f(2x)$                       (g)  $f(x + h)$   
 (b)  $f(\sqrt{3})$                       (d)  $f(2) + f(\sqrt{3})$                       (f)  $f(1 - x)$                       (h)  $f(x + h) - f(x)$

12. The graph of the function  $f$  is given in the figure.



- (a) Determine the value of  $f(-2)$ .                      (d) Determine the value of  $f(3)$ .  
 (b) Determine the value of  $f(0)$ .                      (e) Determine the domain of the function  $f$ .  
 (c) Determine the value of  $f(2)$ .                      (f) Determine the range of the function  $f$ .

13. Consider the following graph.

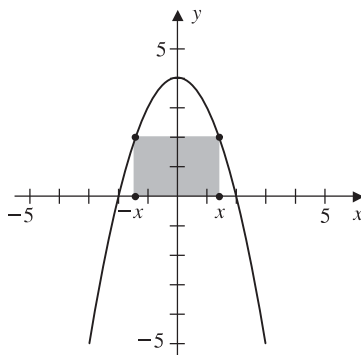


- (a) Use the graph to determine the domain of the function.  
 (b) Use the graph to determine the range of the function.

14. Find the domain of each function.

- (a)  $f(x) = 3x + 1$                       (c)  $f(x) = \sqrt{3x + 1}$   
 (b)  $f(x) = \frac{1}{3x + 1}$                       (d)  $f(x) = \frac{1}{\sqrt{3x + 1}}$

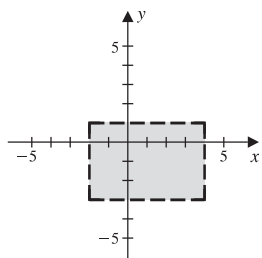
15. Suppose that  $f(x) = 2x - 4$ .
- (a) Find  $f(x + h)$ . (b) Find  $f(x + h) - f(x)$ .
- (c) Find  $\frac{f(x+h)-f(x)}{h}$  when  $h \neq 0$ .
- (d) Find the value that  $\frac{f(x+h)-f(x)}{h}$  approaches as  $h \rightarrow 0$ .
16. Express the area  $A$  of an equilateral triangle as a function of  $x$  if the side length is  $3x$ .
17. Find the equation of the line that passes through the point  $(2, 3)$  and has slope  $-2$ .
18. Find the slope-intercept form of the equation of the line that passes  $(0, 0)$  through and is parallel to  $y = 2x + 1$ .
19. Find the slope-intercept equation of the line that has  $x$ -intercept  $-2$  and  $y$ -intercept  $-3$ .
20. A new computer workstation costs \$10,000. Its useful lifetime is 4 years, at which time it will be worth an estimated \$2000. The company calculates its depreciation using the linear decline method that is an option in the tax laws. Find the linear equation that expresses the value  $V$  of the equipment as a function of time  $t$ , for  $0 \leq t \leq 4$ .
21. Consider the parabola with equation  $y = x^2 - 4x + 3$ .
- (a) Determine the vertex of the parabola.
- (b) Sketch the graph of the parabola.
22. Suppose that  $f(x) = -x^2 + 6x - 8$ .
- (a) Express the quadratic in standard form. (c) Find the maximum value of the function.
- (b) Find any axis intercepts. (d) Find the minimum value of the function.
23. Find the domain of the function described by  $f(x) = \sqrt{x^2 - 3}$ .
24. A rectangle is inscribed beneath the parabola with equation  $y = 4 - x^2$ . Express the area of the rectangle as a function of  $x$ .



25. Consider the parabola with equation  $y = (x - 3)^2$ .
- (a) Determine the vertex of the parabola.
- (b) Sketch the graph of the parabola.

## Chapter 1 Form A: Answers

1.  $[1, 2]$
2.  $x = -1, x = 2$
3.  $(-\infty, 1] \cup [5, \infty)$
4.  $d = \sqrt{10}$ , midpoint =  $\left(\frac{1}{2}, \frac{7}{2}\right)$
- 5.



6.  $(x + 2)^2 + (y - 3)^2 = 16$
7. center:  $(-1, 2)$ ; radius: 1
8. origin
9. (a)  $(-1, 0)$  and  $(0, 1)$   
(b) none
10. 4
11. (a) 17 (d) 30 (g)  $4x^2 + 8xh + 4h^2 + 1$   
(b) 13 (e)  $16x^2 + 1$  (h)  $8xh + 4h^2$   
(c)  $29 + 16\sqrt{3}$  (f)  $5 - 8x + 4x^2$
12. (a)  $-2.5$  (c) 2 (e)  $[-3.5, 3]$   
(b)  $-0.5$  (d) 0 (f)  $[-4, 0) \cup (0, 2.25]$
13. domain:  $(-\infty, \infty)$ ; range:  $(1, \infty) \cup \{-1\}$
14. (a)  $(-\infty, \infty)$  (c)  $\left[-\frac{1}{3}, \infty\right)$   
(b)  $\left(-\infty, -\frac{1}{3}\right) \cup \left(-\frac{1}{3}, \infty\right)$  (d)  $\left(-\frac{1}{3}, \infty\right)$
15. (a)  $2x + 2h - 4$  (b)  $2h$  (c) 2 (d) 2
16.  $A = \frac{9\sqrt{3}}{4}x$
17.  $y = -x + 5$
18.  $y = 2x$
19.  $y = -\frac{3}{2}x - 3$