



9. If the slope  $m$  of the graph of a linear function is \_\_\_\_\_, the function is increasing over its domain.

12. **True or False** The average rate of change of  $f(x) = 2x + 8$  is 8.

### Skill Building 3.1

In Problems 13–20, a linear function is given.

- (a) Determine the slope and  $y$ -intercept of each function.  
 (b) Use the slope and  $y$ -intercept to graph the linear function.  
 (c) Determine the average rate of change of each function.  
 (d) Determine whether the linear function is increasing, decreasing, or constant.

13.  $f(x) = 2x + 3$

14.  $g(x) = 5x - 4$

15.  $h(x) = -3x + 4$

16.  $p(x) = -x + 6$

17.  $f(x) = \frac{1}{4}x - 3$

18.  $h(x) = -\frac{2}{3}x + 4$

19.  $F(x) = 4$

20.  $G(x) = -2$

In Problems 21–28, determine whether the given function is linear or nonlinear. If it is linear, determine the slope.

21.

$x$	$y = f(x)$
-2	4
-1	1
0	-2
1	-5
2	-8

22.

$x$	$y = f(x)$
-2	1/4
-1	1/2
0	1
1	2
2	4

23.

$x$	$y = f(x)$
-2	-8
-1	-3
0	0
1	1
2	0

24.

$x$	$y = f(x)$
-2	-4
-1	0
0	4
1	8
2	12

### SECTION 3.1 Linear Functions and Their Properties 125

25.

$x$	$y = f(x)$
-2	-26
-1	-4
0	2
1	-2
2	-10

26.

$x$	$y = f(x)$
-2	-4
-1	-3.5
0	-3
1	-2.5
2	-2

27.

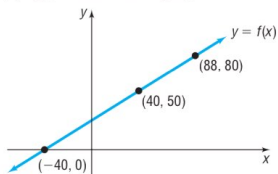
$x$	$y = f(x)$
-2	8
-1	8
0	8
1	8
2	8

28.

$x$	$y = f(x)$
-2	0
-1	1
0	4
1	9
2	16

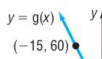
### Applications and Extensions

29. Suppose that  $f(x) = 4x - 1$  and  $g(x) = -2x + 5$ .  
 (a) Solve  $f(x) = 0$ . (b) Solve  $f(x) > 0$ .  
 (c) Solve  $f(x) = g(x)$ . (d) Solve  $f(x) \leq g(x)$ .  
 (e) Graph  $y = f(x)$  and  $y = g(x)$  and label the point that represents the solution to the equation  $f(x) = g(x)$ .
30. Suppose that  $f(x) = 3x + 5$  and  $g(x) = -2x + 15$ .  
 (a) Solve  $f(x) = 0$ . (b) Solve  $f(x) < 0$ .  
 (c) Solve  $f(x) = g(x)$ . (d) Solve  $f(x) \geq g(x)$ .  
 (e) Graph  $y = f(x)$  and  $y = g(x)$  and label the point that represents the solution to the equation  $f(x) = g(x)$ .
31. In parts (a)–(f), use the following figure.

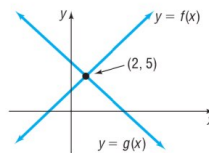


- (a) Solve  $f(x) = 50$ . (b) Solve  $f(x) = 80$ .  
 (c) Solve  $f(x) = 0$ . (d) Solve  $f(x) > 50$ .  
 (e) Solve  $0 < f(x) \leq 80$ . (f) Solve  $0 < f(x) < 80$ .

32. In parts (a)–(f), use the following figure.

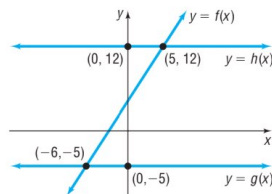


34. In parts (a) and (b), use the following figure.



- (a) Solve the equation:  $f(x) = g(x)$ .  
 (b) Solve the inequality:  $f(x) \leq g(x)$ .

35. In parts (a) and (b), use the following figure.



- (a) Solve the equation:  $f(x) = g(x)$ .  
 (b) Solve the inequality:  $g(x) \leq f(x) < h(x)$ .

36. In parts (a) and (b), use the following figure.

