

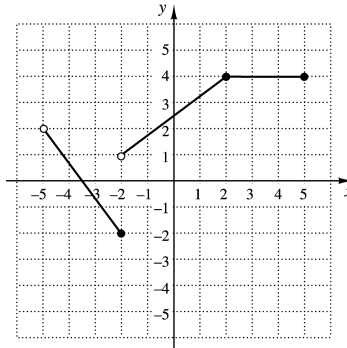
**TEST BANK**

**ALGEBRA and  
TRIGONOMETRY**

FOURTH EDITION

**BEECHER PENNA BITTINGER**

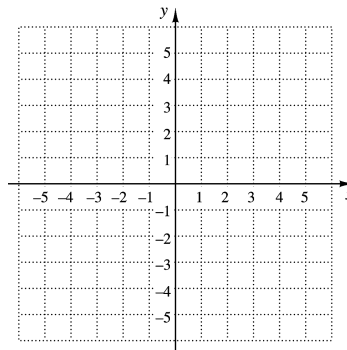
1. Determine the intervals on which the function is:
- increasing,
  - decreasing, and
  - constant.



**ANSWERS**

1. a) \_\_\_\_\_  
 b) \_\_\_\_\_  
 c) \_\_\_\_\_

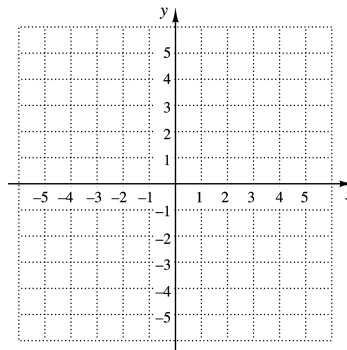
2. Graph the function  $f(x) = x^2 - 4$ . Estimate the intervals on which the function is increasing or decreasing and estimate any relative maxima or minima.



2. See graph.  
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3. The length of a rectangular parking lot is 40 ft more than the width. If the parking lot is  $w$  feet wide, express its area as a function of the width.

4. Graph
- $$f(x) = \begin{cases} -2x, & \text{for } x < -2, \\ -x^2, & \text{for } -2 \leq x \leq 2, \\ 5, & \text{for } x > 2. \end{cases}$$



3. \_\_\_\_\_

4. See graph. \_\_\_\_\_

5. For the function in Exercise 4, find  $f\left(-\frac{3}{4}\right)$ ,  $f(4)$ , and  $f(-5)$ .

5. \_\_\_\_\_

## TEST FORM A

## ANSWERS

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27. \_\_\_\_\_

Given that  $f(x) = x^2 - 3x + 2$  and  $g(x) = \sqrt{4-x}$ , find each of the following if it exists.

6.  $(f+g)(3)$

7.  $(f-g)(4)$

8.  $(fg)(-5)$

9.  $(f/g)(2)$

For  $f(x) = 2x + 1$  and  $g(x) = \sqrt{x-3}$ , find each of the following.

10. The domain of  $f$ 11. The domain of  $g$ 12. The domain of  $f+g$ 13. The domain of  $f-g$ 14. The domain of  $fg$ 15. The domain of  $f/g$ 

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

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

18.  $(fg)(x)$

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

For each function, construct and simplify the different quotient.

20.  $f(x) = \frac{2}{3}x - 8$

21.  $f(x) = 6 - x^2$

Given that  $f(x) = x^2 + 2$ ,  $g(x) = 2x - 5$ , and  $h(x) = 3x^2 + 4x - 2$ , find each of the following.

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

23.  $(g \circ h)(-3)$

24.  $(h \circ f)(2)$

25.  $(g \circ g)(x)$

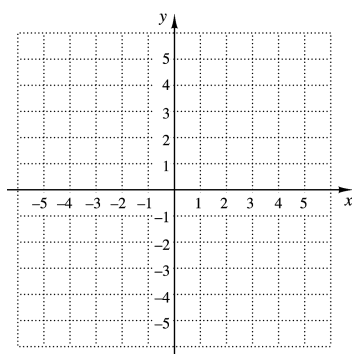
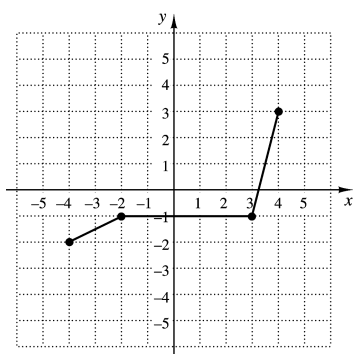
For  $f(x) = \sqrt{x+2}$  and  $g(x) = x - 8$ :

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

27. Find the domain of  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .

TEST FORM A

28. Find  $f(x)$  and  $g(x)$  such that  $h(x) = (f \circ g)(x) = \sqrt[3]{3x+1}$ .
29. Determine whether the graph of  $y = \frac{3x}{x^2 - 4}$  is symmetric with respect to the  $x$ -axis, the  $y$ -axis, and/or the origin.
30. Test whether the function  $f(x) = 5x - x^3$  is even, odd, or neither even nor odd. Show your work.
31. Write an equation for a function that has the shape of  $y = x^2$ , but shifted right 5 units and down 3 units.
32. Write an equation for a function that has the shape of  $y = x^2$ , but shifted left 2 units and up 4 units.
33. The graph of a function  $y = f(x)$  is shown below. No formula for  $f$  is given. Make a graph of  $y = f(-x)$ .



34. Find an equation of variation in which  $y$  varies inversely as  $x$ , and  $y = 18$  when  $x = 5$ .
35. Find an equation of variation in which  $y$  varies directly as  $x$ , and  $y = 0.8$  when  $x = 5$ .
36. Find an equation of variation where  $y$  varies jointly as  $x$  and  $z$  and inversely as the square of  $w$ , and  $y = 20$  when  $x = 0.5$ ,  $z = 4$ , and  $w = 5$ .
37. The volume of a 6-in. tall cone varies directly as the square of the radius. The volume is  $14.1 \text{ in}^3$  when the radius is 1.5 in. Find the volume when the radius is 3 in.

ANSWERS

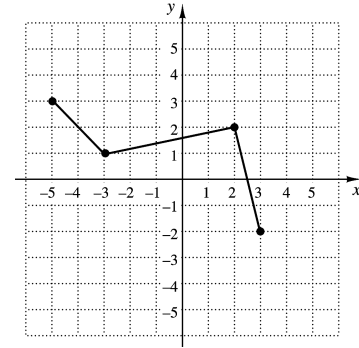
28. \_\_\_\_\_
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30. \_\_\_\_\_
31. \_\_\_\_\_
32. \_\_\_\_\_
33. See graph.
34. \_\_\_\_\_
35. \_\_\_\_\_
36. \_\_\_\_\_
37. \_\_\_\_\_

TEST FORM A

ANSWERS

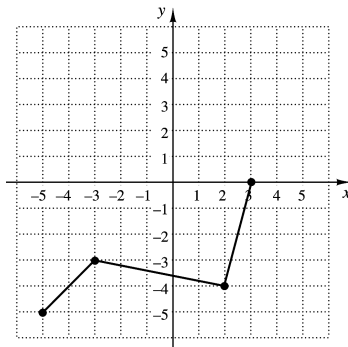
38. \_\_\_\_\_

38. The graph of the function  $f$  is shown to the right.

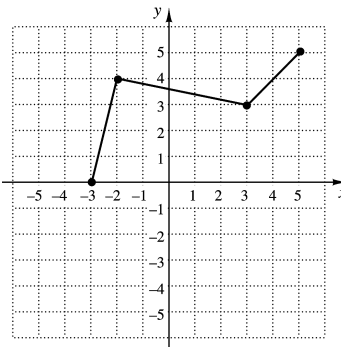


Which of the following represents the graph of  $g(x) = -f(x) + 2$ ?

A.

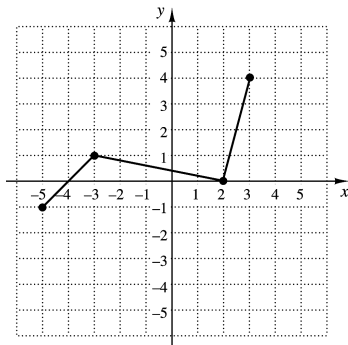


B.

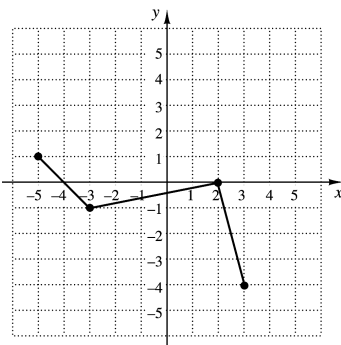


39. \_\_\_\_\_

C.

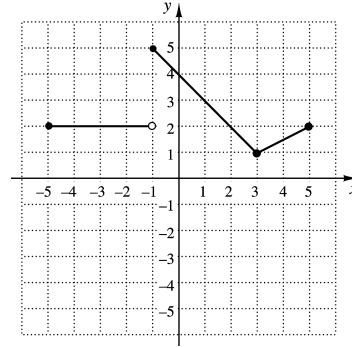


D.



39. If  $(-3, 6)$  is a point in the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = f(x + 3)$ ?

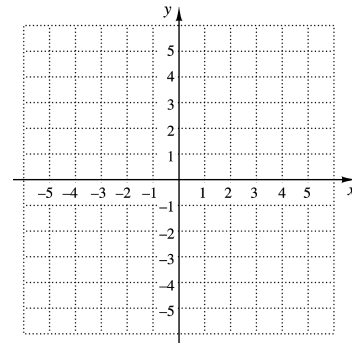
1. Determine the intervals on which the function is:
- increasing,
  - decreasing, and
  - constant.



**ANSWERS**

1. a) \_\_\_\_\_  
 b) \_\_\_\_\_  
 c) \_\_\_\_\_

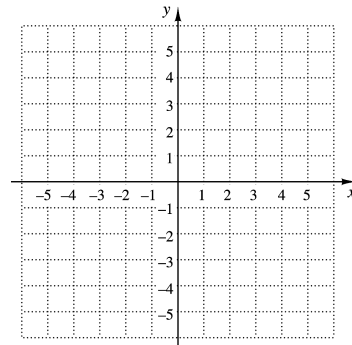
2. Graph the function  $f(x) = 5 - |x|$ . Estimate the intervals on which the function is increasing or decreasing and estimate any relative maxima or minima.



2. See graph.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. The length of a rectangular picture frame is 10.5 in. greater than the width. If the picture frame is  $w$  feet wide, express its area as a function of the width.

4. Graph
- $$f(x) = \begin{cases} \sqrt{x+5}, & \text{for } x < -1, \\ x^2, & \text{for } -1 \leq x \leq 2, \\ -|x|, & \text{for } x > 2. \end{cases}$$



3. \_\_\_\_\_

4. See graph. \_\_\_\_\_

5. For the function in Exercise 4, find  $f(-4)$ ,  $f\left(\frac{1}{2}\right)$ , and  $f(6)$ .

5. \_\_\_\_\_

## TEST FORM B

## ANSWERS

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26. \_\_\_\_\_

27. \_\_\_\_\_

Given that  $f(x) = x^2 + 2x + 4$  and  $g(x) = \sqrt{9-x}$ , find each of the following if it exists.

6.  $(f+g)(5)$

7.  $(f-g)(8)$

8.  $(fg)(-7)$

9.  $(f/g)(0)$

For  $f(x) = x^2$  and  $g(x) = \sqrt{2x}$ , find each of the following.

10. The domain of  $f$ 11. The domain of  $g$ 12. The domain of  $f+g$ 13. The domain of  $f-g$ 14. The domain of  $fg$ 15. The domain of  $f/g$ 

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

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

18.  $(fg)(x)$

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

For each function, construct and simplify the different quotient.

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

21.  $f(x) = 5x^2 + 2$

Given that  $f(x) = 4 - x^2$ ,  $g(x) = \frac{1}{2}x + 2$ , and  $h(x) = x^2 + 6x - 3$ , find each of the following.

22.  $(f \circ g)(2)$

23.  $(g \circ h)(4)$

24.  $(h \circ f)(-1)$

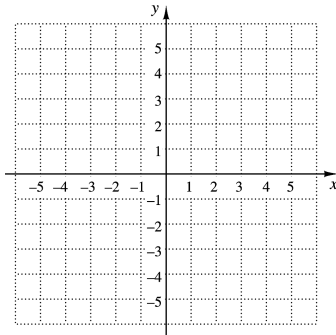
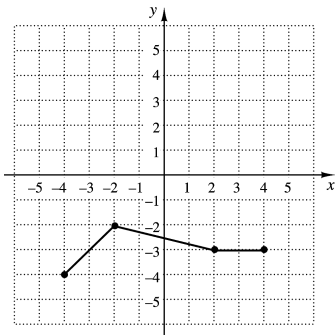
25.  $(g \circ g)(x)$

For  $f(x) = 3x - 2$  and  $g(x) = \sqrt{x}$ :

26. Find  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .27. Find the domain of  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .

TEST FORM B

28. Find  $f(x)$  and  $g(x)$  such that  $h(x) = (f \circ g)(x) = \frac{5}{2x+1}$ .
29. Determine whether the graph of  $y = x^4 - 2x^2$  is symmetric with respect to the  $x$ -axis, the  $y$ -axis, and/or the origin.
30. Test whether the function  $f(x) = \frac{x^2}{x-1}$  is even, odd, or neither even nor odd. Show your work.
31. Write an equation for a function that has the shape of  $y = |x|$ , but shifted right 4 units and up 2 units.
32. Write an equation for a function that has the shape of  $y = |x|$ , but shifted left 3 units and down 1 unit.
33. The graph of a function  $y = f(x)$  is shown below. No formula for  $f$  is given. Make a graph of  $y = f(x-1)$ .



34. Find an equation of variation in which  $y$  varies inversely as  $x$ , and  $y = 24$  when  $x = 3$ .
35. Find an equation of variation in which  $y$  varies directly as  $x$ , and  $y = 14$  when  $x = 6$ .
36. Find an equation of variation where  $y$  varies jointly as the square of  $x$  and the square of  $z$  and inversely as  $w$ , and  $y = 50$  when  $x = 2$ ,  $z = 3$ , and  $w = 10$ .
37. The current  $I$  in an electrical conductor varies inversely as the resistance  $R$  of the conductor. Suppose  $I$  is 0.2 ampere when the resistance is 200 ohms. Find the current when the resistance is 250 ohms.

ANSWERS

28. \_\_\_\_\_

29. \_\_\_\_\_

30. \_\_\_\_\_

31. \_\_\_\_\_

32. \_\_\_\_\_

33. See graph.

34. \_\_\_\_\_

35. \_\_\_\_\_

36. \_\_\_\_\_

37. \_\_\_\_\_

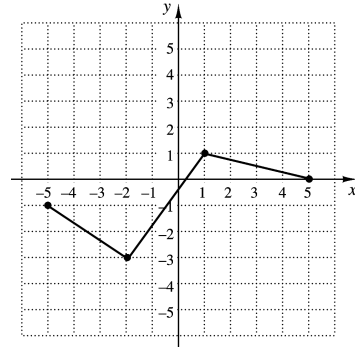


TEST FORM B

ANSWERS

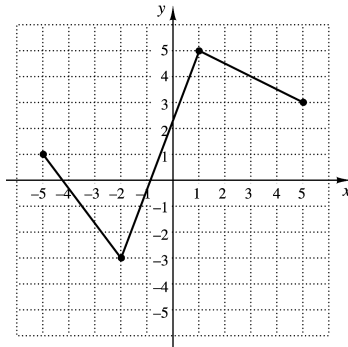
38. \_\_\_\_\_

38. The graph of the function  $f$  is shown to the right.

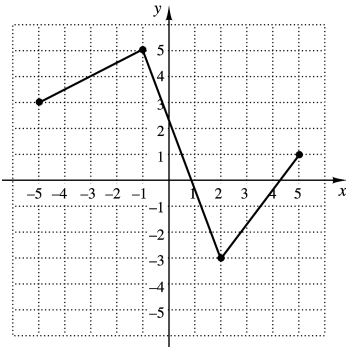


Which of the following represents the graph of  $g(x) = -2f(x) - 3$ ?

A.

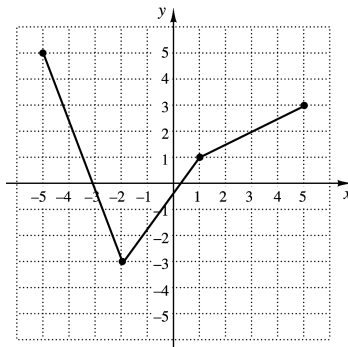


B.

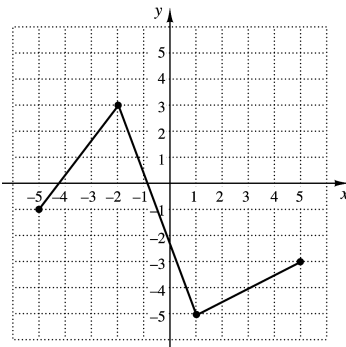


39. \_\_\_\_\_

C.

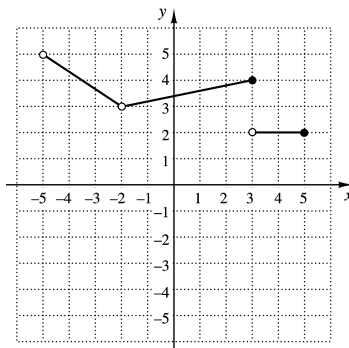


D.



39. If  $(4, -6)$  is a point in the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = f(-2x)$ ?

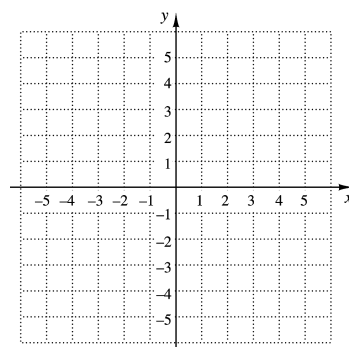
1. Determine the intervals on which the function is:
- increasing,
  - decreasing, and
  - constant.



**ANSWERS**

1. a) \_\_\_\_\_  
 b) \_\_\_\_\_  
 c) \_\_\_\_\_

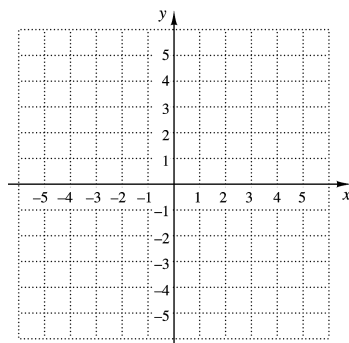
2. Graph the function  $f(x) = 3 - x^2$ . Estimate the intervals on which the function is increasing or decreasing and estimate any relative maxima or minima.



2. See graph.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. The length of a rectangular table cloth is 2 ft more than the width. If the table cloth is  $w$  feet wide, express the perimeter as a function of the width.

4. Graph
- $$f(x) = \begin{cases} |x|, & \text{for } x < -2, \\ x^2, & \text{for } -2 \leq x \leq 1, \\ -3x, & \text{for } x > 1. \end{cases}$$



3. \_\_\_\_\_

4. See graph. \_\_\_\_\_

5. For the function in Exercise 4, find  $f(-5)$ ,  $f\left(\frac{1}{2}\right)$ , and  $f(4)$ .

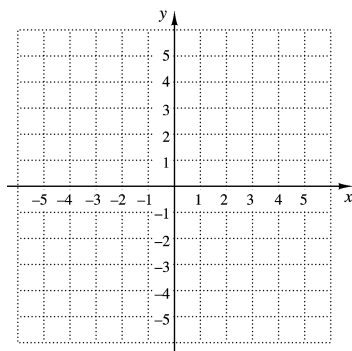
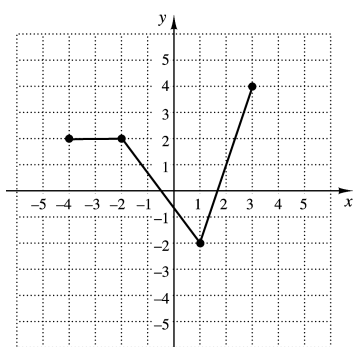
5. \_\_\_\_\_

TEST FORM C

ANSWERS		
6. _____	Given that $f(x) = x^2 + 2x - 8$ and $g(x) = \sqrt{x + 4}$ , find each of the following if it exists.	
7. _____		6. $(f + g)(-3)$ 7. $(f - g)(12)$
8. _____		8. $(fg)(-4)$ 9. $(f / g)(5)$
9. _____	For $f(x) = -2x + 4$ and $g(x) = \frac{1}{x}$ , find each of the following.	
10. _____		10. The domain of $f$ 11. The domain of $g$
11. _____		12. The domain of $f + g$ 13. The domain of $f - g$
12. _____		14. The domain of $fg$ 15. The domain of $g / f$
13. _____		16. $(f + g)(x)$ 17. $(f - g)(x)$
14. _____	18. $(fg)(x)$ 19. $(f / g)(x)$	
15. _____	For each function, construct and simplify the different quotient.	
16. _____		20. $f(x) = 4 - \frac{1}{2}x$ 21. $f(x) = x^3 - x$
17. _____		Given that $f(x) = x^2 - 2x + 1$ , $g(x) = 2x + 3$ , and $h(x) = x^2 - 4$ , find each of the following.
18. _____	22. $(f \circ g)(-1)$ 23. $(g \circ h)(4)$	
19. _____	24. $(h \circ f)(1)$ 25. $(g \circ g)(x)$	
20. _____	For $f(x) = x^2$ and $g(x) = x - 3$ :	
21. _____		
22. _____		27. Find the domain of $(f \circ g)(x)$ and $(g \circ f)(x)$ .
23. _____		
24. _____		
25. _____		
26. _____		
27. _____		

TEST FORM C

28. Find  $f(x)$  and  $g(x)$  such that  $h(x) = (f \circ g)(x) = \sqrt{x^2 + 5}$ .
29. Determine whether the graph of  $y = 3x^6 - 2x^4$  is symmetric with respect to the  $x$ -axis, the  $y$ -axis, and/or the origin.
30. Test whether the function  $f(x) = -3x + 1$  is even, odd, or neither even nor odd. Show your work.
31. Write an equation for a function that has the shape of  $y = x^3$ , but shifted left 4 units and up 6 units.
32. Write an equation for a function that has the shape of  $y = x^3$ , but shifted right 3 units and down 2 units.
33. The graph of a function  $y = f(x)$  is shown below. No formula for  $f$  is given. Make a graph of  $y = f(x - 2)$ .



34. Find an equation of variation in which  $y$  varies inversely as  $x$ , and  $y = 0.6$  when  $x = 2$ .
35. Find an equation of variation in which  $y$  varies directly as  $x$ , and  $y = 1.5$  when  $x = 0.3$ .
36. Find an equation of variation where  $y$  varies jointly as  $x$  and  $z$  and inversely as the square root of  $w$ , and  $y = 20$  when  $x = 5$ ,  $z = 2$ , and  $w = 25$ .
37. The intensity  $I$  of a light from a light bulb varies inversely as the square of the distance  $d$  from the bulb. Suppose  $I$  is  $60 \text{ W/m}^2$  (watts per square meter) when the distance is 5 m. Find the intensity at 20 m.

ANSWERS

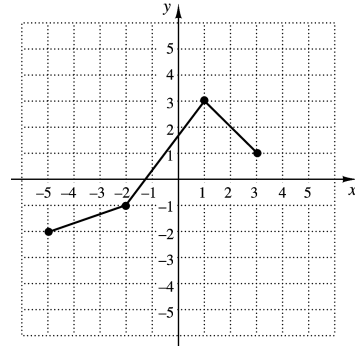
28. \_\_\_\_\_
29. \_\_\_\_\_
30. \_\_\_\_\_
31. \_\_\_\_\_
32. \_\_\_\_\_
33. See graph.
34. \_\_\_\_\_
35. \_\_\_\_\_
36. \_\_\_\_\_
37. \_\_\_\_\_

TEST FORM C

ANSWERS

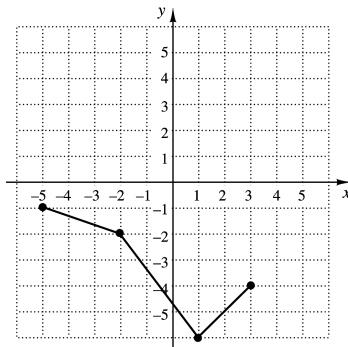
38. \_\_\_\_\_

38. The graph of the function  $f$  is shown to the right.

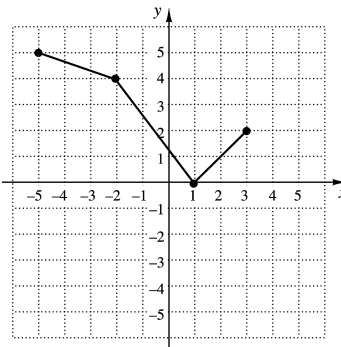


Which of the following represents the graph of  $g(x) = -f(x) - 3$ ?

A.

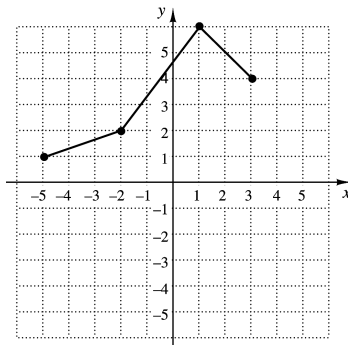


B.

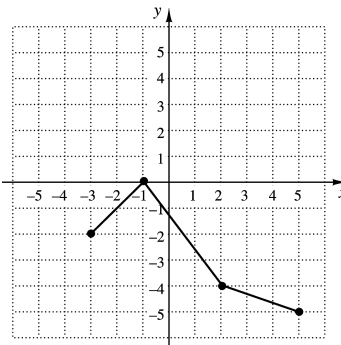


39. \_\_\_\_\_

C.

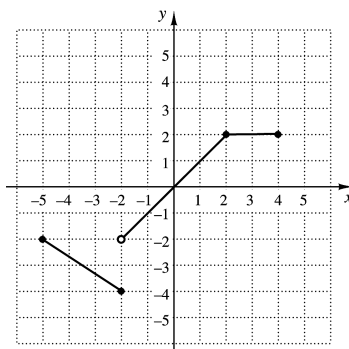


D.

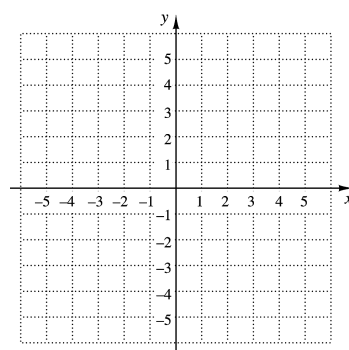


39. If  $(-6, 3)$  is a point in the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = f(-3x)$ ?

1. Determine the intervals on which the function is:
- increasing,
  - decreasing, and
  - constant.

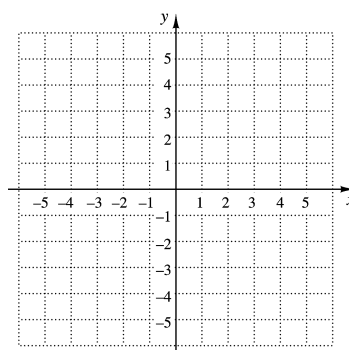


2. Graph the function  $f(x) = |x| + 2$ . Estimate the intervals on which the function is increasing or decreasing and estimate any relative maxima or minima.



3. The length of a rectangular board game is  $2\frac{1}{2}$  times the width. If the board game is  $w$  cm wide, express the perimeter as a function of the width.

4. Graph
- $$f(x) = \begin{cases} x + 2, & \text{for } x < -2, \\ x^2 - 3, & \text{for } -2 \leq x \leq 2, \\ \sqrt{x}, & \text{for } x > 2. \end{cases}$$



5. For the function in Exercise 4, find  $f(-3)$ ,  $f\left(\frac{2}{3}\right)$ , and  $f(4)$ .

**ANSWERS**

1. a) \_\_\_\_\_  
 b) \_\_\_\_\_  
 c) \_\_\_\_\_

2. See graph.  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

3. \_\_\_\_\_

4. See graph.

5. \_\_\_\_\_

## TEST FORM D

## ANSWERS

6. \_\_\_\_\_

7. \_\_\_\_\_

8. \_\_\_\_\_

9. \_\_\_\_\_

10. \_\_\_\_\_

11. \_\_\_\_\_

12. \_\_\_\_\_

13. \_\_\_\_\_

14. \_\_\_\_\_

15. \_\_\_\_\_

16. \_\_\_\_\_

17. \_\_\_\_\_

18. \_\_\_\_\_

19. \_\_\_\_\_

20. \_\_\_\_\_

21. \_\_\_\_\_

22. \_\_\_\_\_

23. \_\_\_\_\_

24. \_\_\_\_\_

25. \_\_\_\_\_

26. \_\_\_\_\_

27. \_\_\_\_\_

Given that  $f(x) = x^2 - 2x + 1$  and  $g(x) = \sqrt{x+6}$ , find each of the following if it exists.

6.  $(f + g)(-1)$

7.  $(f - g)(-2)$

8.  $(fg)(10)$

9.  $(g/f)(3)$

For  $f(x) = \frac{1}{x^2}$  and  $g(x) = x + 4$ , find each of the following.

10. The domain of  $f$ 11. The domain of  $g$ 12. The domain of  $f + g$ 13. The domain of  $f - g$ 14. The domain of  $fg$ 15. The domain of  $f/g$ 

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

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

18.  $(fg)(x)$

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

For each function, construct and simplify the different quotient.

20.  $f(x) = -6x + 2$

21.  $f(x) = 2x^2 + 6$

Given that  $f(x) = 2x + 1$ ,  $g(x) = \sqrt{x+3}$ , and  $h(x) = x^2 - 3x + 4$ , find each of the following.

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

23.  $(g \circ h)(6)$

24.  $(h \circ f)(3)$

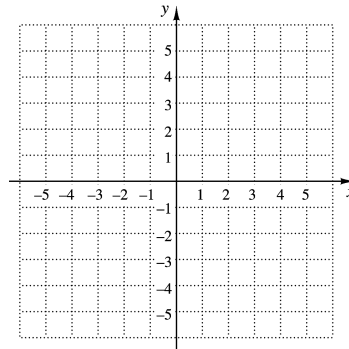
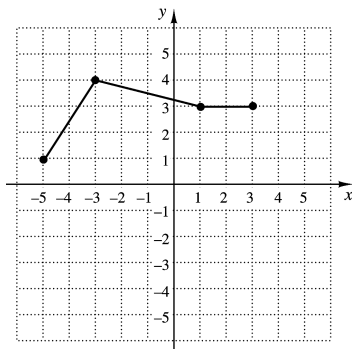
25.  $(f \circ f)(x)$

For  $f(x) = \sqrt{x-5}$  and  $g(x) = x + 2$ :

26. Find  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .27. Find the domain of  $(f \circ g)(x)$  and  $(g \circ f)(x)$ .

TEST FORM D

28. Find  $f(x)$  and  $g(x)$  such that  $h(x) = (f \circ g)(x) = \frac{4}{x-6}$ .
29. Determine whether the graph of  $y = x^3 - 2x$  is symmetric with respect to the  $x$ -axis, the  $y$ -axis, and/or the origin.
30. Test whether the function  $f(x) = 8x - |x|$  is even, odd, or neither even nor odd. Show your work.
31. Write an equation for a function that has the shape of  $y = \sqrt{x}$ , but shifted left 5 units and down 3 units.
32. Write an equation for a function that has the shape of  $y = \sqrt{x}$ , but shifted right 2 units and up 1 unit.
33. The graph of a function  $y = f(x)$  is shown below. No formula for  $f$  is given. Make a graph of  $y = -f(x)$ .



34. Find an equation of variation in which  $y$  varies inversely as  $x$ , and  $y = 15$  when  $x = 6$ .
35. Find an equation of variation in which  $y$  varies directly as  $x$ , and  $y = 0.5$  when  $x = 1.5$ .
36. Find an equation of variation where  $y$  varies jointly as  $x$  and the square of  $z$  and inversely as  $w$ , and  $y = 40$  when  $x = 100$ ,  $z = 0.1$ , and  $w = 2$ .
37. The surface area of a balloon varies directly as the square of its radius. The area is  $78.5 \text{ cm}^2$  when the radius is 2.5 cm. Find the area when the radius is 3 cm.

ANSWERS

28. \_\_\_\_\_

29. \_\_\_\_\_

30. \_\_\_\_\_

31. \_\_\_\_\_

32. \_\_\_\_\_

33. See graph.

34. \_\_\_\_\_

35. \_\_\_\_\_

36. \_\_\_\_\_

37. \_\_\_\_\_

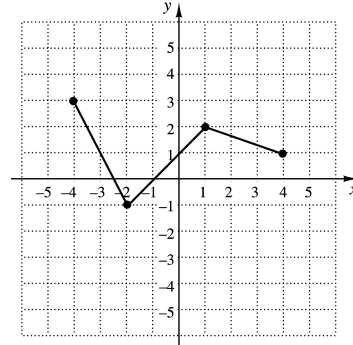


TEST FORM D

ANSWERS

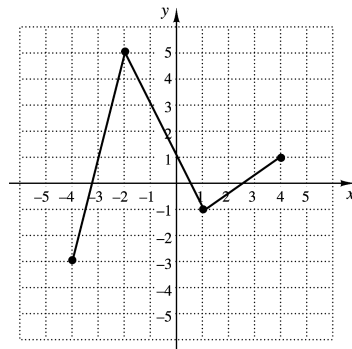
38. \_\_\_\_\_

38. The graph of the function  $f$  is shown to the right.

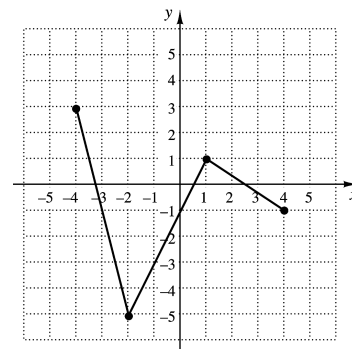


Which of the following represents the graph of  $g(x) = -2f(x) + 3$ ?

A.

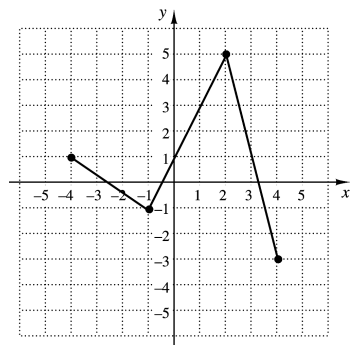


B.

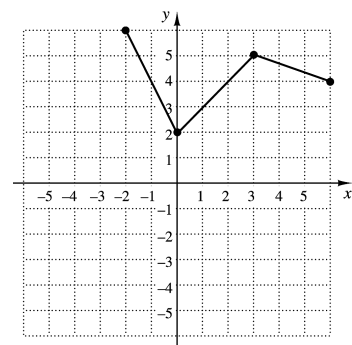


39. \_\_\_\_\_

C.

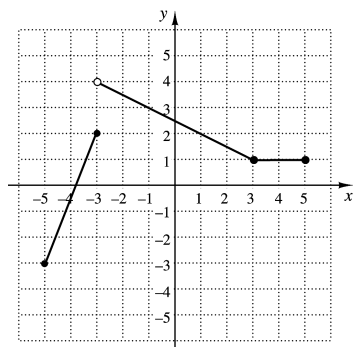


D.



39. If  $(-10, 10)$  is a point in the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = f\left(\frac{1}{2}x\right)$ ?

1. Determine on which interval the function is decreasing.



- a)  $(-5, -3)$     b)  $(-3, 4)$     c)  $(4, 1)$     d)  $(-3, 3)$

2. The width of a rectangular blanket is  $\frac{2}{3}$  of the length  $l$ . Express the area of the blanket as a function of  $l$ .

- a)  $A(l) = \frac{2}{3}l^2$     b)  $A(l) = \frac{3}{2}l^2$     c)  $A(l) = \frac{10}{3}l$     d)  $A(l) = \frac{5}{3}l^2$

Use the following function for Exercises 3 and 4.

$$f(x) = \begin{cases} 2x^2, & \text{for } x \leq -1, \\ \sqrt{x+3}, & \text{for } -1 < x \leq 6, \\ |x-4|, & \text{for } x > 6. \end{cases}$$

3. Find  $f(-1)$ .

- a)  $-2$     b)  $\sqrt{2}$     c)  $2$     d)  $4$

4. Find  $f(5)$ .

- a)  $1$     b)  $50$     c)  $\sqrt{5}$     d)  $\sqrt{8}$

5. For  $f(x) = x^2 - 3x - 2$  and  $g(x) = 4x + 1$ , find  $(f + g)(2)$ .

- a)  $-36$     b)  $5$     c)  $17$     d)  $4$

6. For  $f(x) = x^2 - 5$  and  $g(x) = \sqrt{x}$ , find  $h(x) = (fg)(x)$ .

- a)  $h(x) = x^2 - 5 + \sqrt{x}$     b)  $h(x) = x - 5$   
 c)  $h(x) = x^2\sqrt{x} - 5\sqrt{x}$     d)  $h(x) = \sqrt{x^2 - 5}$

ANSWERS

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

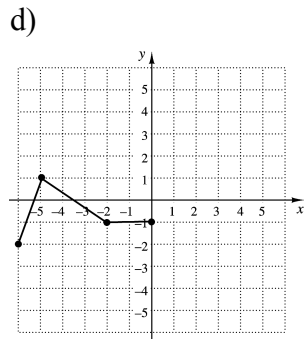
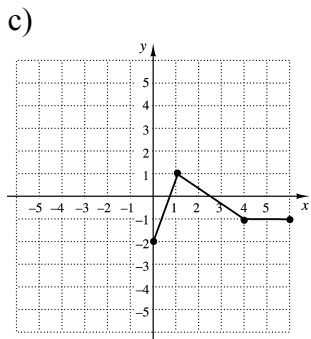
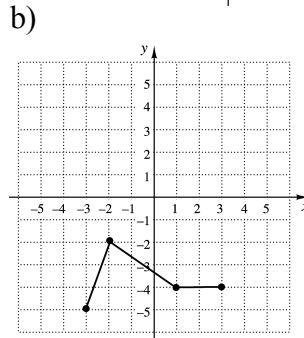
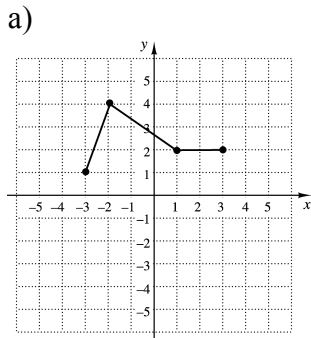
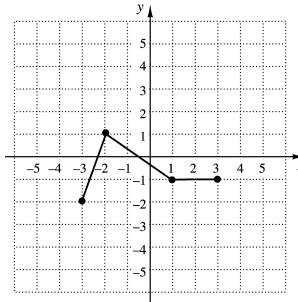
## TEST FORM E

ANSWERS	
7. _____	7. For $f(x) = x^2 - 5$ and $g(x) = \sqrt{x}$ , find the domain of $f/g$ . a) $(-\infty, 0) \cup (0, \infty)$ b) $[0, \infty)$ c) $(-\infty, -\sqrt{5}) \cup (-\sqrt{5}, \sqrt{5}) \cup (\sqrt{5}, \infty)$ d) $(0, \infty)$
8. _____	8. Construct and simplify the difference quotient for $f(x) = 3 + 5x$ . a) $5h$ b) $5$ c) $3 + 5x - 5h$ d) $3$
9. _____	9. Construct and simplify the difference quotient for $f(x) = 2x^2 - 3x + 1$ . a) $4x + 2h - 3$ b) $4h^2 - 3h$ c) $2x + h$ d) $4xh + 2h^2 - 3h$
10. _____	10. For $f(x) = x + 4$ and $g(x) = 2x^2$ , find $h(x) = (g \circ f)(x)$ . a) $h(x) = 2x^2 + 4$ b) $h(x) = 2x^3 + 8x^2$ c) $h(x) = 2x^2 + 16x + 32$ d) $h(x) = 2x^2 + x + 4$
11. _____	11. For $g(x) = 2x - 5$ , find $h(x) = (g \circ g)(x)$ . a) $h(x) = 4x - 10$ b) $h(x) = 4x^2 - 20x + 25$ c) $h(x) = 4x - 5$ d) $h(x) = 4x - 15$
12. _____	12. For $f(x) = \sqrt{x+4}$ and $g(x) = 2x^2$ , find the domain of $(f \circ g)(x)$ . a) $[0, \infty)$ b) $[-4, \infty)$ c) $(-\infty, \infty)$ d) $[-4, 4]$
13. _____	13. Which of the following functions is symmetric with respect to the $y$ -axis? a) $f(x) = 5 - x^2$ b) $f(x) = x$ c) $f(x) = 5x^3$ d) $f(x) = \sqrt{x}$
14. _____	14. Which of the following functions is even? a) $y = 16 - x^2$ b) $y = 2x^3$ c) $y = 4x - 6$ d) $y = \sqrt{x}$

TEST FORM E

15. Write an equation for a function that has the shape of  $y = |x|$ , but is shifted right 2 units and down 6 units.
- a)  $f(x) = |x + 2| - 6$       b)  $f(x) = |x - 2| + 6$   
 c)  $f(x) = |x + 2| + 6$       d)  $f(x) = |x - 2| - 6$

16. The graph of  $y = f(x)$  is given. Which graph below represents the graph of  $y = f(x) + 3$ ?



17. Find an equation of variation in which  $y$  varies directly as  $x$  and  $y = 15$  and  $x = 10$ .
- a)  $y = \frac{2}{3}x$       b)  $y = \frac{3}{2}x$       c)  $y = \frac{150}{x}$       d)  $y = 6x$
18. If  $y$  varies inversely as  $x$  and  $y = 1.5$  when  $x = 8$ , find  $y$  when  $x = 20$ .
- a)  $\frac{5}{3}$       b)  $\frac{15}{4}$       c)  $\frac{320}{3}$       d)  $\frac{3}{5}$

ANSWERS

15. \_\_\_\_\_

16. \_\_\_\_\_

17. \_\_\_\_\_

18. \_\_\_\_\_

TEST FORM E

ANSWERS

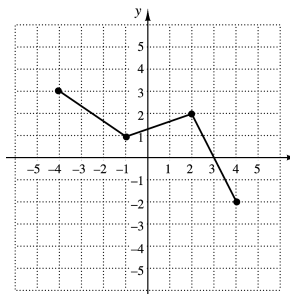
19. \_\_\_\_\_

19.  $d$  varies inversely as  $w$  and directly as the square of  $v$ . If  $d = 40$  when  $w = 6$  and  $v = 2$ , find  $d$  when  $w = 9$  and  $v = 4$ .

- a) 240      b)  $\frac{320}{3}$       c) 15      d)  $\frac{40}{3}$

20. \_\_\_\_\_

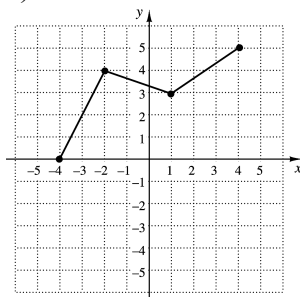
20. The graph of the function  $f$  is shown to the right.



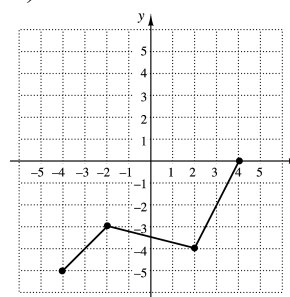
Which of the following represents the graph of  $g(x) = -f(x) + 2$ ?

21. \_\_\_\_\_

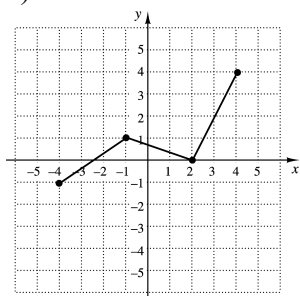
a)



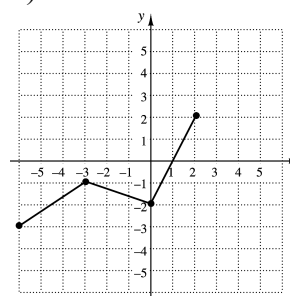
b)



c)



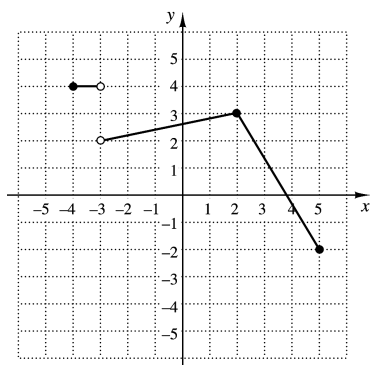
d)



21. If  $(-1, -4)$  is a point on the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = f\left(\frac{1}{2}x\right)$ ?

- a)  $(-1, -2)$       b)  $\left(-\frac{1}{2}, -4\right)$       c)  $(-2, -4)$       d)  $\left(-\frac{1}{2}, -2\right)$

1. Determine on which interval the function is increasing.



- a)  $(-2, 4)$     b)  $(2, 3)$     c)  $(-3, 2)$     d)  $(2, 5)$

2. The width of a rectangular blanket is 4 less than twice the length  $l$ . Express the area of the blanket as a function of  $l$ .

- a)  $A(l) = 4l - 2l^2$     b)  $A(l) = 2l^2 - 4$   
 c)  $A(l) = 3l - 4$     d)  $A(l) = 2l^2 - 4l$

Use the following function for Exercises 3 and 4.

$$f(x) = \begin{cases} x^2 + 1, & \text{for } x \leq -3, \\ |x - 6|, & \text{for } -3 < x \leq 1, \\ \sqrt{3x}, & \text{for } x > 1. \end{cases}$$

3. Find  $f(-1)$ .

- a) 2    b) 0    c) 7    d) 5

4. Find  $f(2)$ .

- a) 5    b)  $\sqrt{6}$     c) 1    d) 4

5. For  $f(x) = x^2 + 4x - 5$  and  $g(x) = -3x + 2$ , find  $(f + g)(-1)$ .

- a) -3    b) -5    c) -9    d) -40

6. For  $f(x) = 3x - 4$  and  $g(x) = \sqrt{x}$ , find  $h(x) = (fg)(x)$ .

- a)  $h(x) = 3x - 4 + \sqrt{x}$     b)  $h(x) = \sqrt{x}(3x - 4)$   
 c)  $h(x) = 3\sqrt{x} - 4$     d)  $h(x) = \sqrt{3x - 4}$

ANSWERS

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

## TEST FORM F

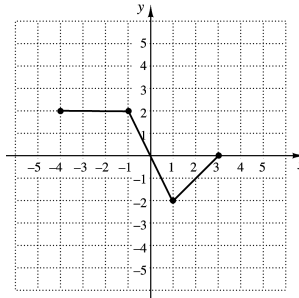
ANSWERS	
7. _____	7. For $f(x) = x^2 - 4$ and $g(x) = \sqrt{3-x}$ , find the domain of $g/f$ . a) $(-\infty, 3)$ b) $(-\infty, 3]$ c) $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ d) $(-\infty, -2) \cup (-2, 2) \cup (2, 3]$
8. _____	8. Construct and simplify the difference quotient for $f(x) = -7x + 3$ . a) 3                      b) $-7$ c) $-7h$ d) $3 - 7x - 7h$
9. _____	9. Construct and simplify the difference quotient for $f(x) = 2x^2 - x$ . a) $2h^2 + h - 4xh$ b) $-4x + 2h + 1$ c) $4x + 2h - 1$ d) $4x + 2h - 1 - \frac{2x}{h}$
10. _____	10. For $f(x) = 2x$ and $g(x) = x^2$ , find $h(x) = (g \circ f)(x)$ . a) $h(x) = 2x^2$ b) $h(x) = x^2 + 2x$ c) $h(x) = 2x^3$ d) $h(x) = 4x^2$
11. _____	11. For $g(x) = 8 - 3x$ , find $h(x) = (g \circ g)(x)$ . a) $h(x) = 9x - 16$ b) $h(x) = 9x^2 - 48x + 64$ c) $h(x) = 16 - 6x$ d) $h(x) = 9x - 24$
12. _____	12. For $f(x) = \frac{1}{4-x}$ and $g(x) = x^2$ , find the domain of $(f \circ g)(x)$ . a) $(-\infty, 4) \cup (4, \infty)$ b) $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$ c) $(-\infty, 2) \cup (2, \infty)$ d) $(-\infty, 16) \cup (16, \infty)$
13. _____	13. Which of the following is symmetric with respect to the origin? a) $y = (x - 4)^2$ b) $x = y^2$ c) $y = - x  - 2$ d) $y = x - x^3$
14. _____	14. Which of the following functions is even? a) $f(x) = 2x + 8$ b) $f(x) = \sqrt{4 - x^2}$ c) $f(x) = x^2 + x$ d) $f(x) = \sqrt[4]{x}$

TEST FORM F

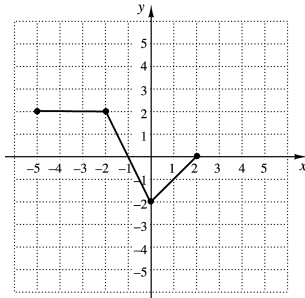
15. Write an equation for a function that has the shape of  $y = x^2$ , but is shifted left 3 units and up 4 units.

- a)  $f(x) = (x + 3)^2 + 4$       b)  $f(x) = (x - 3)^2 + 4$   
 c)  $f(x) = (x - 3)^2 - 4$       d)  $f(x) = (x + 3)^2 - 4$

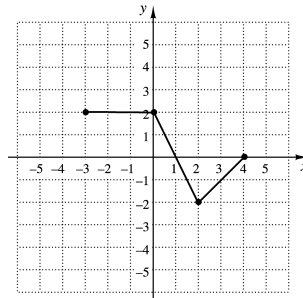
16. The graph of  $y = f(x)$  is given. Which graph below represents the graph of  $y = f(x) - 1$ ?



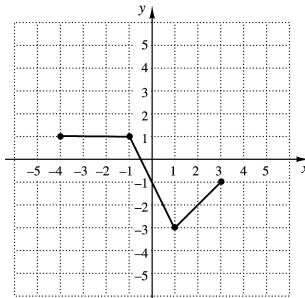
a)



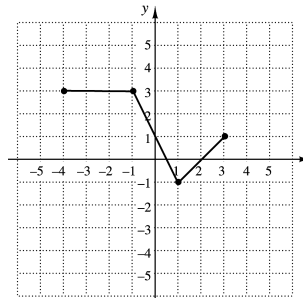
b)



c)



d)



17. Find an equation of variation in which  $y$  varies directly as  $x$  and  $y = 0.5$  and  $x = 4$ .

- a)  $y = \frac{1}{8}x$       b)  $y = 2x$       c)  $y = 8x$       d)  $y = \frac{2}{x}$

18. If  $y$  varies inversely as  $x$  and  $y = 4$  when  $x = 0.2$ , find  $y$  when  $x = 8$ .

- a) 160      b) 10      c) 0.1      d) 0.4

ANSWERS

15. \_\_\_\_\_

16. \_\_\_\_\_

17. \_\_\_\_\_

18. \_\_\_\_\_



TEST FORM F

ANSWERS

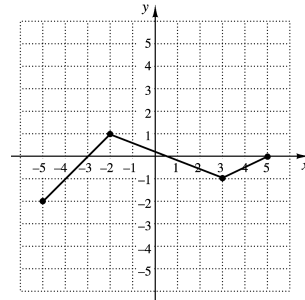
19. \_\_\_\_\_

19.  $p$  varies directly as the square of  $m$  and inversely as  $n$ . If  $p = 120$  when  $m = 4$  and  $n = 5$ , find  $p$  when  $m = 2$  and  $n = 10$ .

- a)  $\frac{3}{4}$                       b) 120                      c) 960                      d) 15

20. \_\_\_\_\_

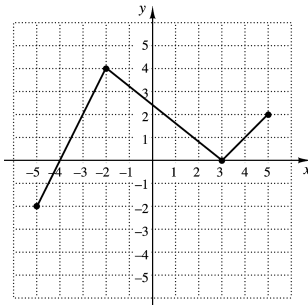
20. The graph of the function  $f$  is shown to the right.



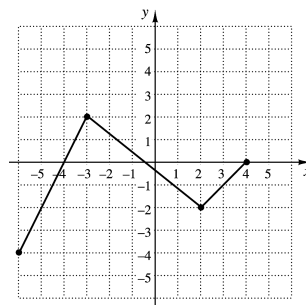
21. \_\_\_\_\_

Which of the following represents the graph of  $g(x) = 2f(x) + 1$ ?

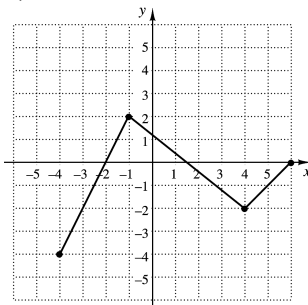
a)



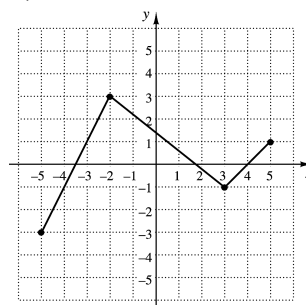
b)



c)



d)



21. If  $(-4, 2)$  is a point on the graph of  $y = f(x)$ , what point do you know is on the graph of  $y = 3f(x)$ ?

- a)  $(-4, 6)$                       b)  $(-12, 2)$                       c)  $(-12, 6)$                       d)  $(-4, 5)$