

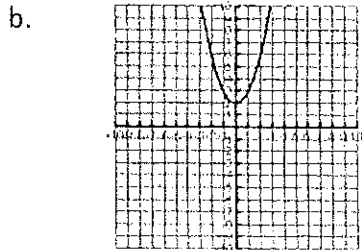
Unit 2 Test Review

Name: _____

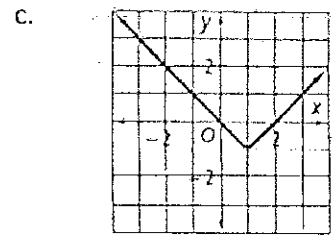
1. Determine if the following relations are functions.

- a. $\{(-2, 4), (-4, -1), (2, 5), (4, 6)\}$

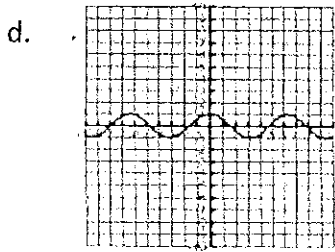
yes function



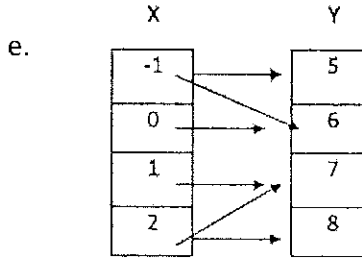
yes function



yes function



Yes

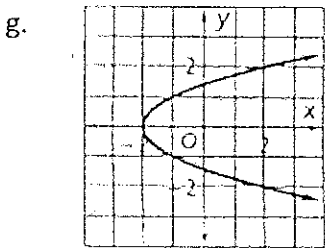


No

f.

X	Y
5	2
4	-1
5	3
2	-2

No



No

h.

X	Y
-1	2
0	-1
1	3
2	-2

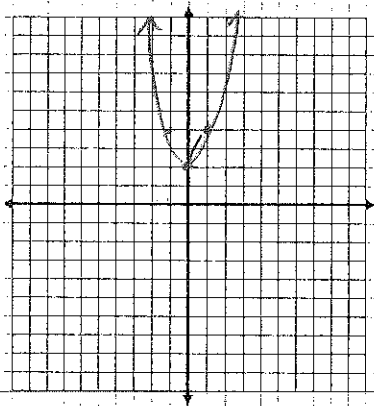
Yes

- i. $\{(-1, 4), (-1, -1), (2, 5), (4, 6)\}$

No

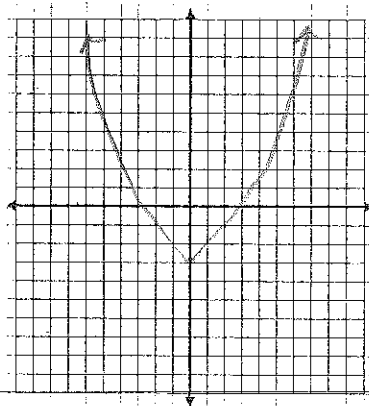
Graph the following functions.

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



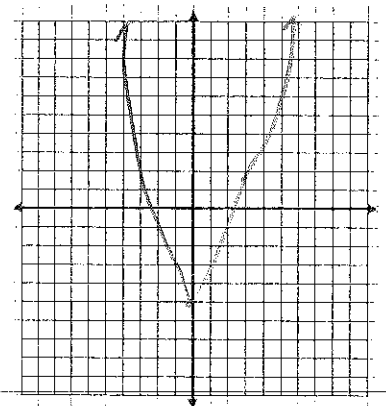
X	Y
-1	4
0	2
1	4

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



X	Y
-1	-2
0	-3
1	-2

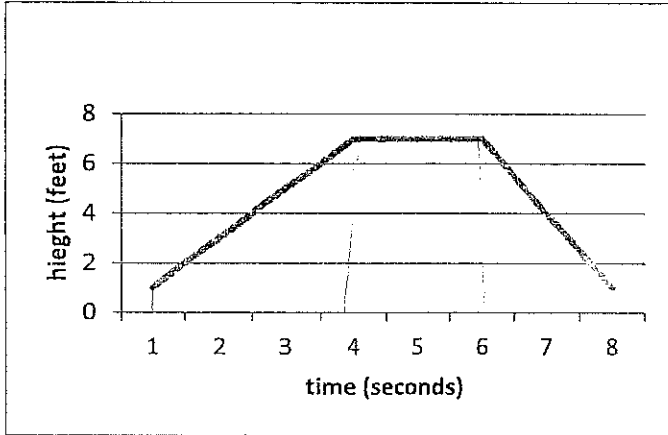
4. $f(x) = 2x^2 - 5$



X	Y
-1	-3
0	-5
1	-3

Identify any intervals of the domain in which the graph is increasing, decreasing, and constant.

5.

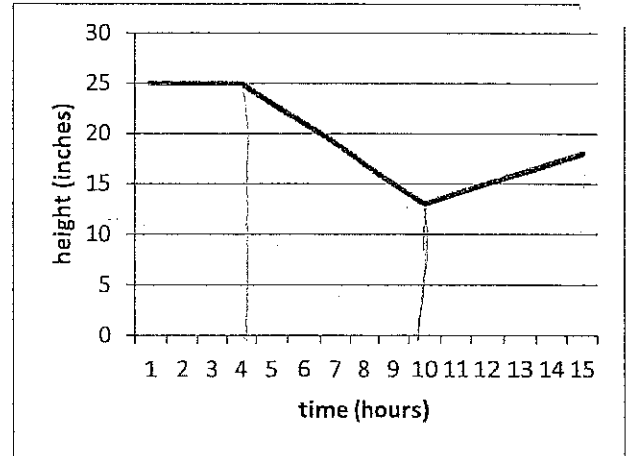


Increasing: [1, 4]

Decreasing: [6, 8]

Constant: [4, 6]

6.

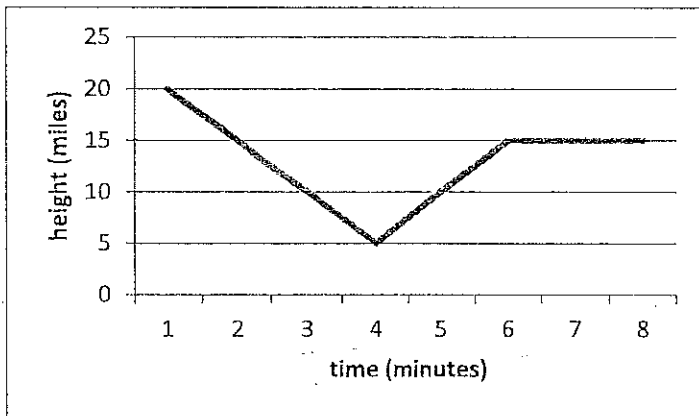


Increasing: [10, 15]

Decreasing: [4, 10]

Constant: [1, 4]

7.

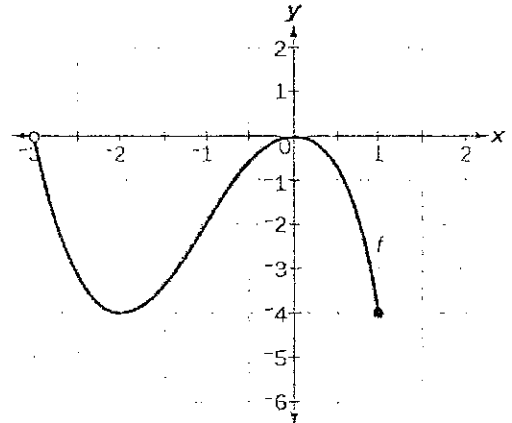


Increasing: [4, 6]

Decreasing: [1, 4]

Constant: [6, 8]

8. State the domain and range of the relation.

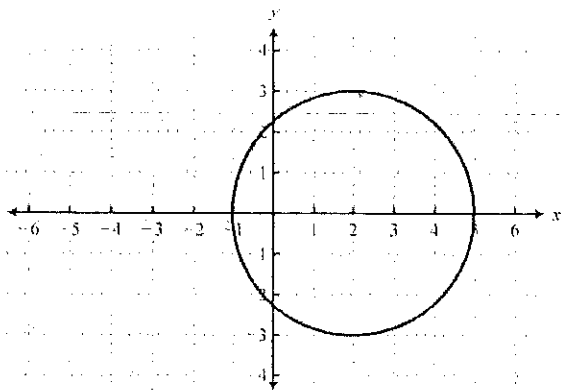


Domain: $(-3, 1]$

Range: $[-4, 0]$

State the domain and range of the relation.

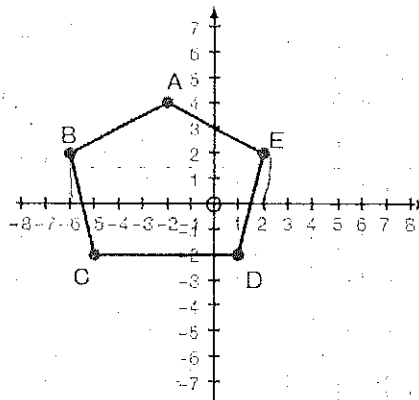
9.



Domain: $[-1, 5]$

Range: $[-3, 3]$

10.



Domain: $[-6, 2]$

Range: $[-2, 4]$

11. Use the graph to interpret the following questions.

a. What is the maximum speed from 0 to 10 seconds?

200

b. During what interval(s) is the speed increasing?

$[0, 2]$ $[4, 5]$ $[6, 7]$

c. What does the point (8, 200) mean in the context of the graph?

At 8 seconds, the speed is 200

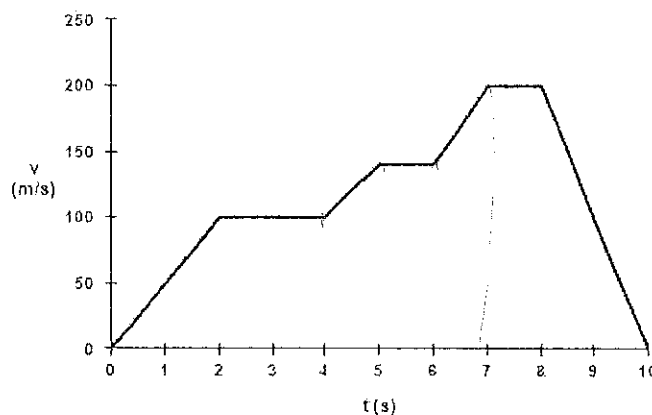
d. During what interval(s) is the speed constant?

$(2, 4)$ $(5, 6)$ $(7, 8)$

e. What does the point (4, 100) mean in the context of the graph?

At 4 seconds the speed is 100

Speed vs Time



Find the slope of the line through the given points.

13. (8, 10) and (-7, 14)

$$\frac{14-10}{-7-8} = \frac{4}{-15}$$

14. (-3, 1) and (-17, 2)

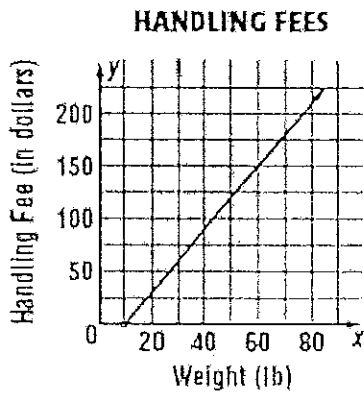
$$\frac{2-1}{-17-3} = \frac{1}{-20}$$

15. (-20, -4) and (-12, -10)

$$\frac{-10-4}{-12-20} = \frac{-14}{-32} = \frac{-7}{16}$$

Calculate the slope and interpret the meaning of the slope in context of the problem.

16. The graph below shows the weight of a bucket as it is filled with sand.



$(10, 0) (60, 150)$

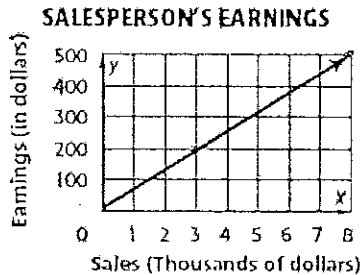
$$\frac{150 - 0}{60 - 10} = \frac{150}{50} = 3$$

$$y - 0 = 3(x - 10)$$

$$y = 3x - 30$$

Increases by \$3 per pound

17. The graph below shows the handling fee a company charges based on the weight of a package.



$(3, 200) (8, 500)$

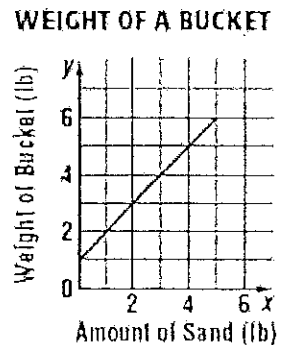
$$\frac{500 - 200}{8 - 3} = \frac{300}{5} = 60$$

$$y - 200 = 60(x - 3)$$

$$y = 60x + 20$$

increases by \$60 per 1000 sales

18. The graph below shows a salesperson's earnings, which are based on the amount of sales.



$(0, 1) (5, 6)$

$$\frac{6 - 1}{5 - 0} = \frac{5}{5} = 1$$

$$y = x + 1$$

1 lb of sand increases the weight of the bucket by 1 lb

19. A clothing brand, K&N Inc., has a fixed production cost of \$1000 per day, and a marginal cost of \$20 per item made. K&N Inc. sells their clothing for \$40 per item. Write the profit function, and use it to determine how many items should be sold to break even?

Cost Function: $C = 1000 + 20x$

Revenue Function: $R = 40x$

Profit Function: $P = R - C = 20x - 1000$

Answer: $R = C \quad x = 50$

$$40x - (1000 + 20x)$$

$$40x - 1000 - 20x$$

$$R - C$$

$$40x = 1000 + 20x$$

$$-20x \quad -20x$$

$$\frac{20x = 1000}{20 \quad 20}$$

20. A donut shop has a fixed production cost of \$80 per day, and a marginal cost of \$0.50 per donut. The donuts sell for \$0.75 each. Write the profit function, and use it to determine how many donuts should be sold to break even?

Cost Function: $C = 80 + .50x$

Revenue Function: $R = .75x$

Profit Function: $P = .25x - 80$

Answer: $320 \quad C = R$

$$P = R - C$$

$$P = .75x - (80 + .50x)$$

$$.75x - 80$$

$$.75x = 80 + .50x$$

$$-.50x \quad -.50x$$

$$\frac{.25x = 80}{.25 \quad .25}$$

21. Write the equation in point slope form of a line that goes through the point (2,4) and is parallel to $y = \frac{1}{2}x - 2$

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

22. Write the equation in point slope form of a line that goes through the point (-2,3) and is parallel to $y = -2x - 3$

$$y - 3 = -2(x + 2)$$

23. Write the equation in point slope form of a line that goes through the point (-1, -5) and is perpendicular to

$$y = -\frac{1}{3}x + 3$$

$$y + 5 = 3(x + 1)$$

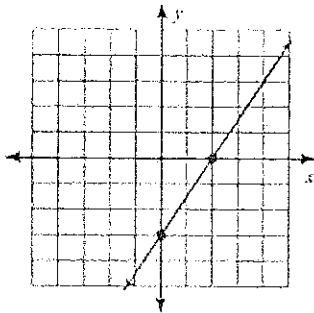
24. Write the equation in point slope form of a line that goes through the point (2, -4) and is perpendicular to

$$y = 3x + 3$$

$$y - 4 = -\frac{1}{3}(x - 2)$$

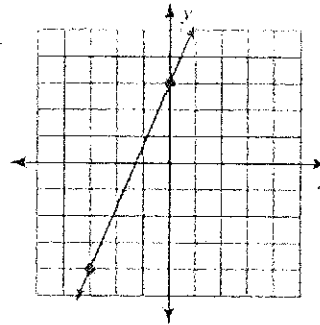
Write the equation of the line in slope intercept form.

25.



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

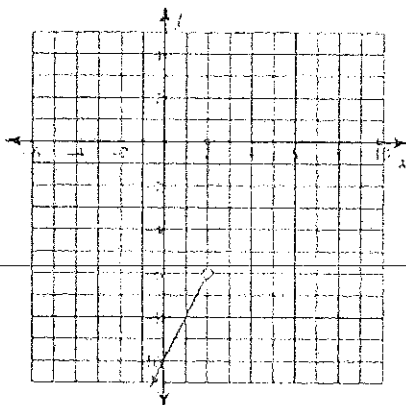
26.



$$y = \frac{1}{3}x + 3$$

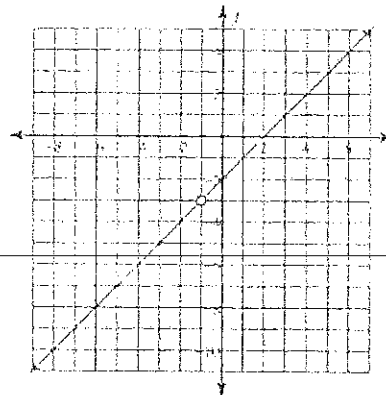
Determine the intervals of the domain over which the function is continuous.

27.



$$(-\infty, 2)$$

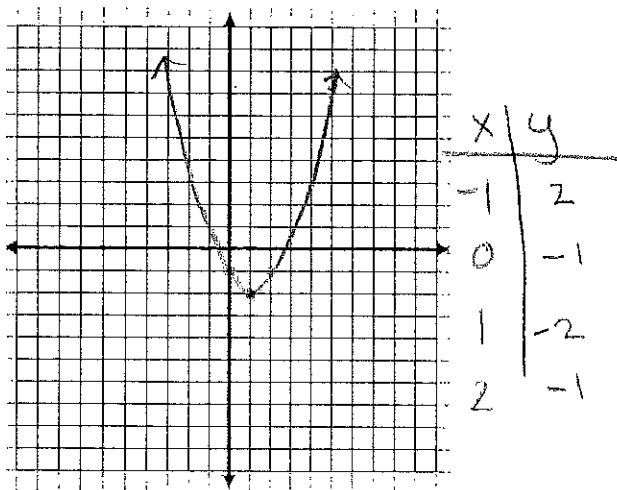
28.



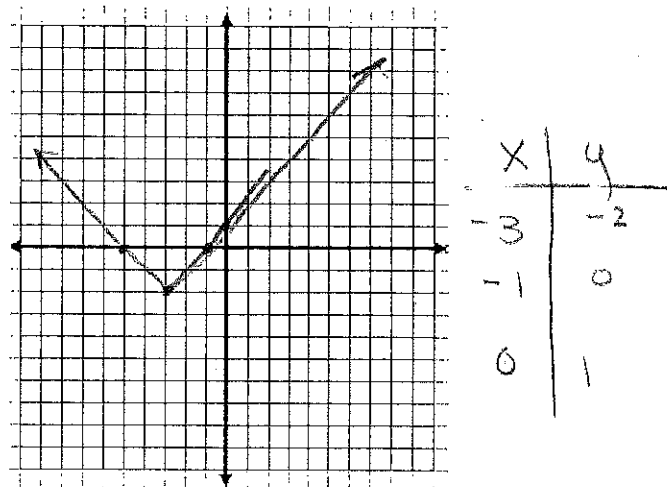
$$(-\infty, -1) \cup (-1, \infty)$$

Graph the following functions.

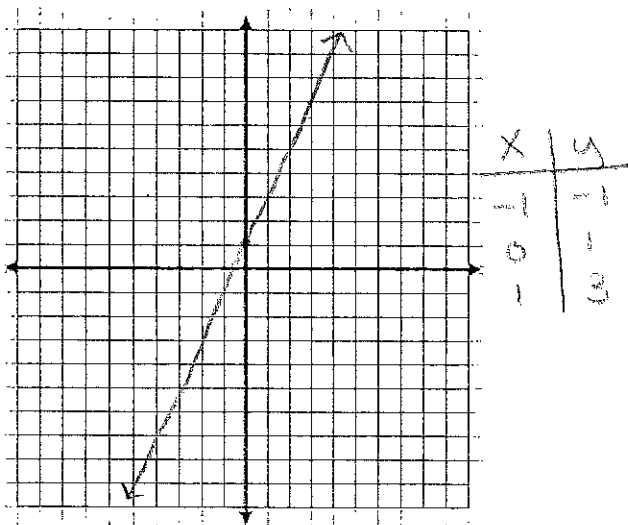
29. $f(x) = (x - 1)^2 - 2$



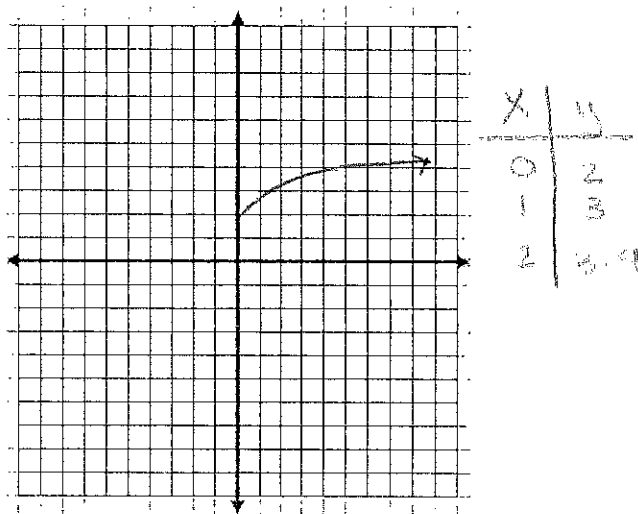
30. $f(x) = |x + 3| - 2$



31. $f(x) = 2x + 1$



32. $f(x) = \sqrt{x} + 2$



Which of the following represents the following transformation from the parent function?

33. A vertical stretch by a factor of 2, a translation 3 units to the right, and a translation 2 units down

- A. $f(x) = 2(x - 3)^3 - 2$
- B. $f(x) = -2(x + 3)^2 + 2$
- C. $f(x) = 2|x + 3| - 2$
- D. $f(x) = -2\sqrt{x - 3} - 2$

34. A vertical shrink by a factor of $\frac{1}{2}$, a translation 2 units to the left, and a translation 2 units up

- A. $f(x) = \frac{1}{2}(x - 2)^3 - 3$
- B. $f(x) = -\frac{1}{2}(x + 2)^2 + 2$
- C. $f(x) = \frac{1}{2}|x + 2| + 2$
- D. $f(x) = -\frac{1}{2}\sqrt{x - 2} - 2$

35. A vertical shrink by a factor of $\frac{1}{3}$, a translation 5 units to the right, and a translation 4 units up

A. $f(x) = \frac{1}{3}(x - 5)^3 - 4$

B. $f(x) = \frac{1}{3}(x - 5)^2 + 4$

C. $f(x) = \frac{1}{3}|x + 5| - 4$

D. $f(x) = -\frac{1}{3}\sqrt{x - 5} - 4$

Graph the piecewise functions.

$$37. f(x) = \begin{cases} x - 2 & x \leq -1 \\ 2x + 2 & -1 < x \leq 3 \\ 3x - 5 & x > 3 \end{cases}$$

Is it a function? *yes*

Evaluate the piecewise function at:

$$f(-1) = -1 - 2 = -3$$

$$f(0) = 2(0) + 2 = 2$$

$$f(5) = 3(5) - 5 = 10$$

$$38. f(x) = \begin{cases} x + 1 & x \leq -3 \\ 3x + 5 & -3 < x \leq 1 \\ 2x + 1 & x > 1 \end{cases}$$

Is it a function? *yes*

Evaluate the piecewise function at:

$$f(-3) = -3 + 1 = -2$$

$$f(1) = 3(1) + 5 = 8$$

$$f(3) = 2(3) + 1 = 7$$

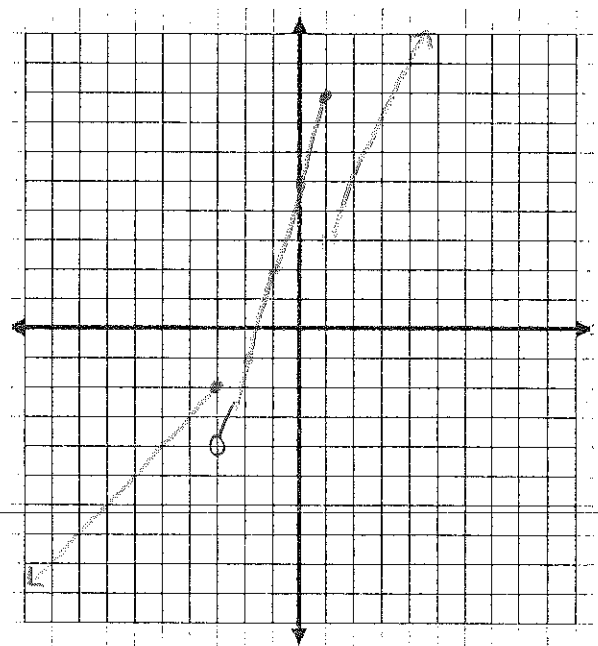
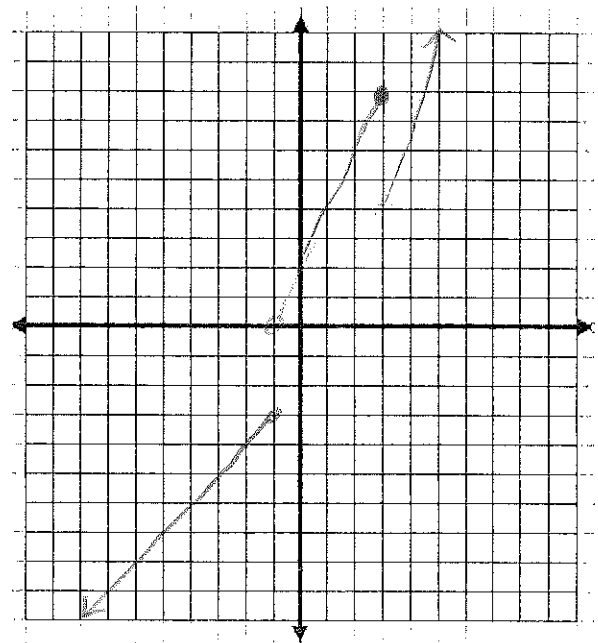
36. A vertical stretch by a factor of 3, a translation 3 units to the left, and a translation 1 unit down

A. $f(x) = 3(x - 3)^3 - 1$

B. $f(x) = -3(x + 3)^2 + 1$

C. $f(x) = 3|x - 3| - 1$

D. $f(x) = 3\sqrt{x + 3} - 1$



Determine if the functions are even, odd, or neither.

39. $f(x) = 5x^4 + 7x^2 + 1$

even

40. $f(x) = x^2 - 3x$

Neither

41. $f(x) = x^3 - 2x$

odd

Determine if the functions are symmetric to the x-axis, y-axis, origin, or none of these.

42. $x^2 + y^2 = 25$

$y = \sqrt{x^2 + 25}$

y-axis

43. $y = 2x + 1$

origin

44. $y = 2x^2 + 1$

y-axis

For #45-46, use the following functions.

$f(x) = 2x + 2$

$g(x) = \sqrt{2x + 4}$

$h(x) = 2x^2 - 2x + 3$

45. What is $(f + g)(x)$ and its domain?

$(2x + 2) + (\sqrt{2x + 4})$

$\sqrt{2x + 4} + 2x + 2$

46. What is $(f - h)(-1)$?

$f(-1) = 2(-1) + 2$

$f(-1) = -2 + 2$

$f(-1) = 0$

$h(-1) = 2(-1)^2 - 2(-1) + 3$

$h(-1) = 2(1) - 2(-1) + 3$

$h(-1) = 2 + 2 + 3$

$h(-1) = 7$

$0 - 7 = -7$

For #47-49, use the following functions.

$$f(x) = 2x + 2$$

$$g(x) = \sqrt{2x + 4}$$

$$h(x) = 2x^2 - 2x + 3$$

47. What is $(f \circ h)(x)$ and its domain?

$$2(2x^2 - 2x + 3) + 2$$

$$4x^2 - 4x + 6 + 2$$

$$\frac{4x^2 - 4x + 8}{4}$$

$$x^2 - x + 2$$

$$d: (\mathbb{R})$$

48. What is $(h \circ f)(2)$?

$$h(f(2))$$

$$f(2) = 2(2) + 2$$

$$f(2) = 4 + 2$$

$$f(2) = 6$$

$$h(6) = 2(6)^2 - 2(6) + 3$$

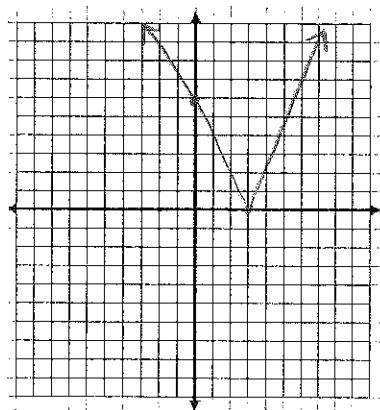
$$h(6) = 72 - 12 + 3$$

$$h(6) = 63$$

$$h(6) = 63$$

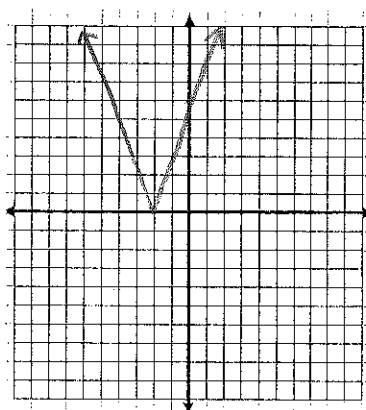
Graph the following functions.

49. $f(x) = 2|x - 3|$



$$\begin{array}{r|l} x & y \\ \hline 0 & 6 \\ 1 & 4 \\ 2 & 2 \\ 3 & 0 \\ 4 & 2 \\ 5 & 4 \\ 6 & 6 \end{array}$$

50. $f(x) = 3|x + 2|$



$$\begin{array}{r|l} x & y \\ \hline -2 & 0 \\ -1 & 3 \\ 0 & 6 \end{array}$$