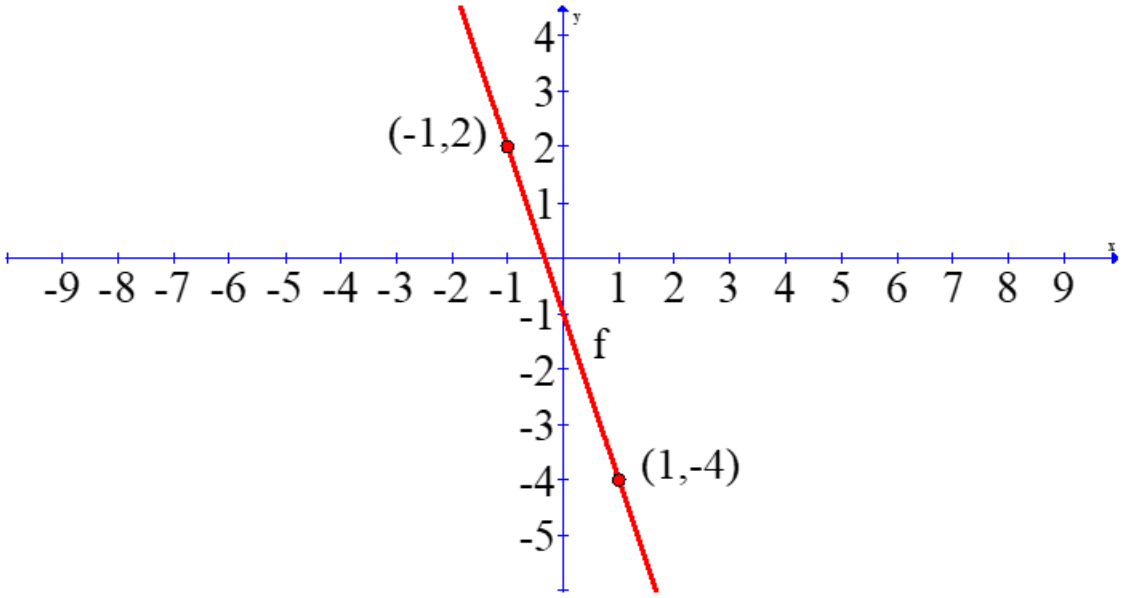
Name _____

Litmus Test For Transformations

Part A Place the correct answer on the sheet provided. Each question is worth 1 mark.

1. The graph of y = f(x) is shown below. Which of the following transformations of y = f(x) will produce an identical graph?



A) y – 3 = f(x – 1)
B) y – 3 = f(x + 1)
C) y + 1 = f(x – 3)
D) y – 1 = f(x + 3)

2. The function $f(x) = |x + 3| + 2$ is transformed into the function $g(x) = |x - 1| + 5$. The transformations that will transform $y = f(x)$ into $y = g(x)$ are a translation ____ units ____ and a translation ____ units ____. Using the chart below, what is a potential code to complete the sentence above?

Reference Number	Numerical Value		Reference Number	Translation Direction
1	1		5	up
2	2		6	down
3	3		7	left
4	4		8	right

A) 4835

B) 4735

C) 3826

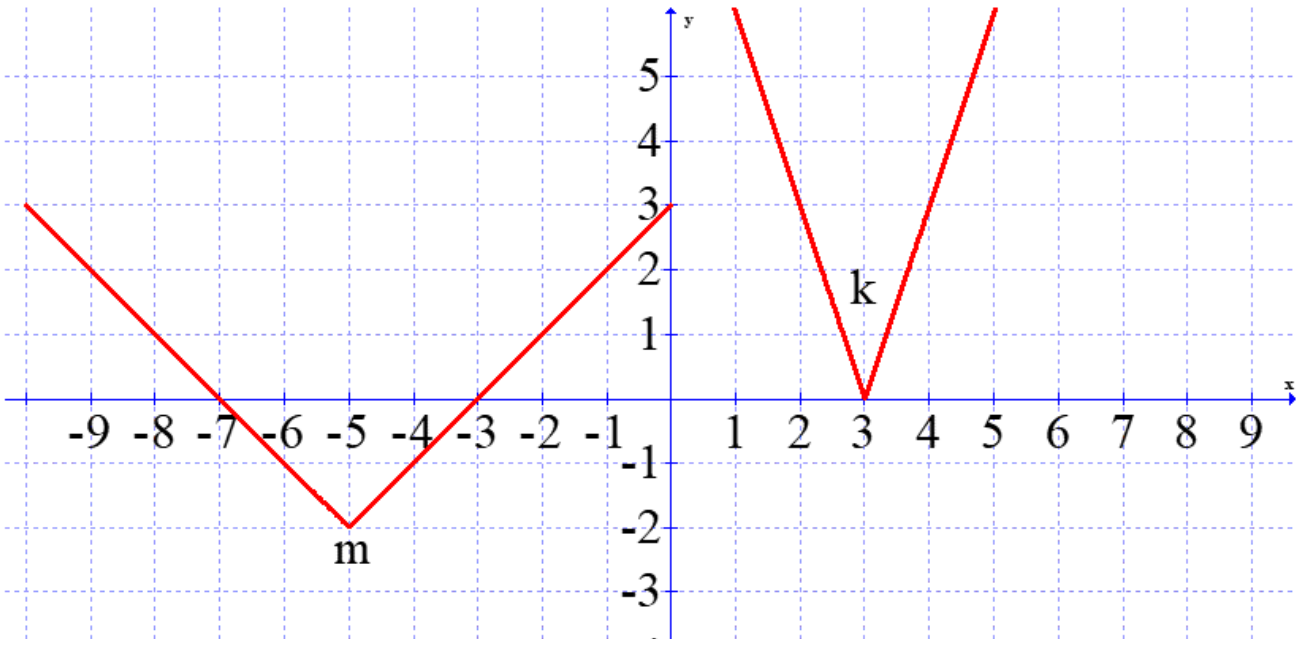
D) 3725

3. What transformations of the function $f(x) = x^2$ are described by the mapping notation $(x , y) \rightarrow (x + 3, y - 5)$?

A) 3 units left and 5 units up
B) 3 units right and 5 units down
C) 3 units left and 5 units down
D) 3 units right and 5 units u

Use the following information to answer the next question.

The graph of the function y = k(x) is transformed to produce the graph of the function y = m(x).



4. An equation for m(x) in terms of k(x) is

A) m(x) = 3k(x + 8) – 2

B) m(x) + 2= $\frac{1}{3}$k(x - 8)

C) m(x) - 2 = 3k(x - 8)

D) m(x) = $\frac{1}{3}$k(x + 8) - 2

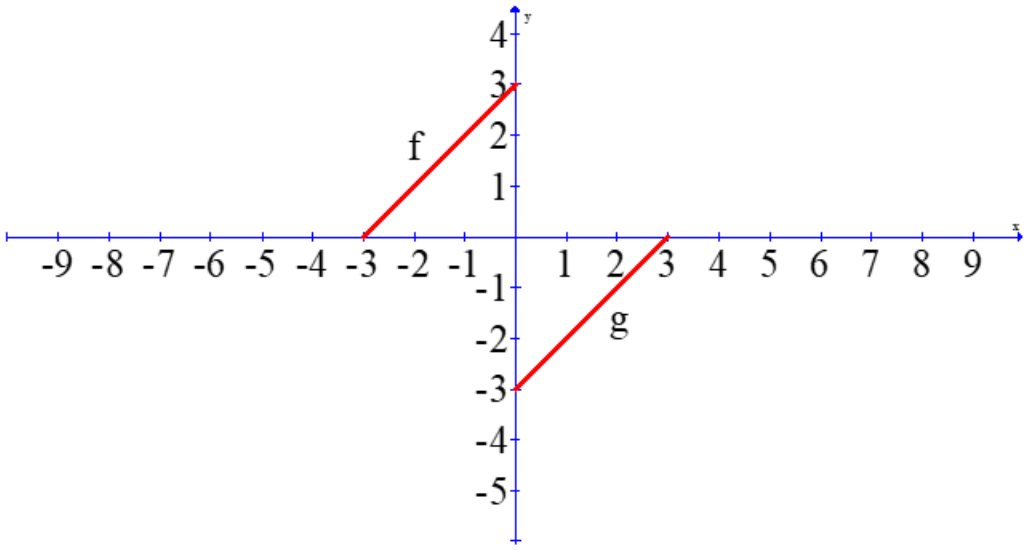
5. When Point M (-3,4) on y = f(x) is transformed by y = $\frac{1}{2}$ f(x + 9), Point M is now located at

   A) (-12,2)
   B) (6,2)
   C) (-6,8)
   D) ($\frac{-3}{2}$, 5)

6. If (m,n) is a point on the graph of y = f(x), which of the following points is on the graph of y + 3 = -f(x – 1)?

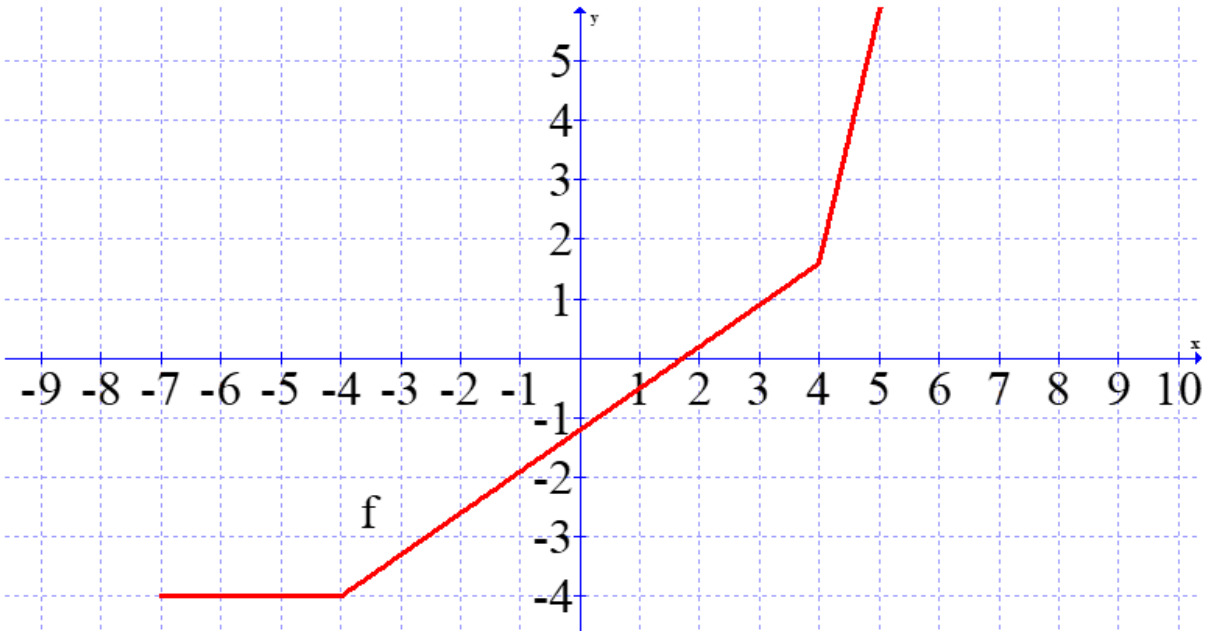
   A) (m – 1, -n + 3)
   B) (m – 3, n – 1)
   C) (m + 3, -n + 1)
   D) (m + 1, -n – 3)

7. The graph of the function y = f(x) is shown below in quadrant 2; what transformation will produce y = g(x) shown below in quadrant 4?



A) f(-x)
B) –f(x)
C) f(x) – 3
D) $f^{-1}(x)$

8. The graph of y = f(x) is shown below. When the total number of invariant points for the transformation y = f(-x) is added to the total number of invariant points for the transformation y = $f^{-1}(x)$, the sum is

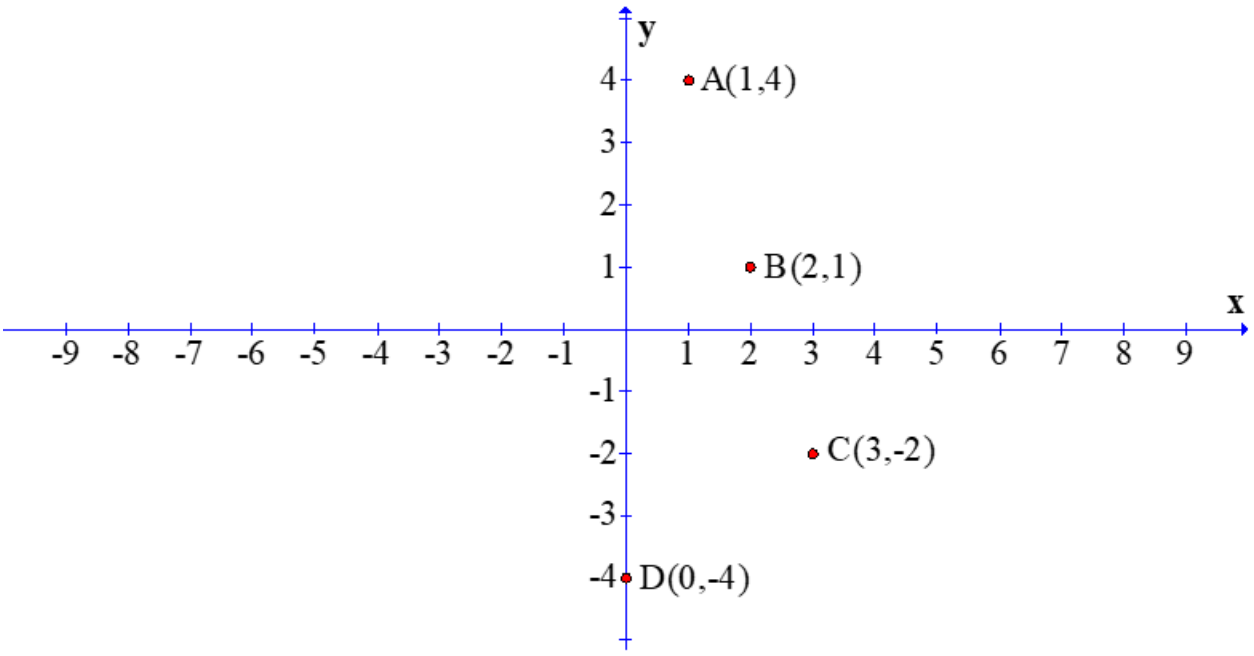


A) 1 B) 2 C) 3 D) 4

9. The zeros of a function y = f(x) are -4, 0 and 3. Determine the zeros of y = f(1 – x).

A) -2, 1, 5 B) -1, 2, 5 C) -5, -1, 2 D) -2, -1, 4

10. The following four points, A(1,4), B(2,1), C(3,-2) and D(0,-4) are on the graph of a function, f(x), shown below. When f(x) is stretched vertically by a factor of $\frac{1}{2}$ about the x-axis and stretched horizontally by a factor of 3 about the y-axis, which of the four points is now furthest from the origin?



A) A

B) B

C) C

D) D

11. The y-intercept of y = f(x) is **A**(0,6). Which of the following series of transformations will move point **A** so that it becomes an x-intercept of y = f(x)?

A) $y = -f(\frac{1}{3}x) + 5$

B) $y = \frac{1}{3}f(-x) - 1$

C) $y = f(x - 3) - 7$

D) $y = -2f(x + 1) + 12$

12. Given the equation, $f(x) = (x + 2)^2 + 3$, a restriction on the domain of f(x) such that its inverse is also a function could be:

A) $x \leq 3$

B) $x \geq -3$

C) $x \geq -2$

D) $x \leq 0$

13. The point (a,b) is on y = f(x). The corresponding point on $y = f^{-1}(x) + 7$ is:

A) (b + 7, a) B) (-a, b + 7) C) (b, a + 7) D) (a, b – 7)

14. The function $g(x) = x^2 - x - 12$ is graphed. The point where $x = 4$ is invariant for which of the following transformations?

A) $y = g(-x)$ B) $y = g^{-1}(x)$ C) $y = -g(x)$ D) $y = g(x) + 4$

Part B Place the correct answer in the space provided. Each correct answer is worth 1 mark.

Use the following information to answer the next question.

The ordered pairs below represent possible transformations of Point K (m,n) on the graph of the function $y = f(x)$.

Point 1	**Point 3**	**Point 5**
(m,6n)	(-m,n)	(6m,n)
Point 2	**Point 4**	**Point 6**
$(\frac{m}{6}, n)$	$(m, \frac{n}{6})$	(m,-n)

15. If $y = f(x)$ undergoes the following single transformations, identify the coordinates of the corresponding Point K on the new graph.

The corresponding point on the function $6y = f(x)$ is point ____

The corresponding point on the function $y = -f(x)$ is point ____

The corresponding point on the function $y = f(6x)$ is point ____

The corresponding point on the function $y = f(-x)$ is point ____

Use the following information to answer the next question.

When the math teacher asked his students to transform y = $\sqrt{x}$ to y - 8 = $\sqrt{\frac{-1}{3}x+2}$, he gave them the following statements to consider.

Statement 1	The graph is translated 8 units down.
Statement 2	There is a horizontal stretch by a factor of 3 about the y-axis.
Statement 3	The graph is translated 2 units left.
Statement 4	The graph is reflected in the y-axis.

16. The math teacher told his students that 2 of the statements are false. The false statements are ____ and ____.

17. The graph of y = f(x) is transformed into the graph of g(x) - 2 = [f(-3)(x + 1)]. The domain and range of each graph is shown below.

	Domain	Range
Graph of f(x)	[-15,-6]	[0,2]
Graph of g(x)	[a,b]	[c,d]

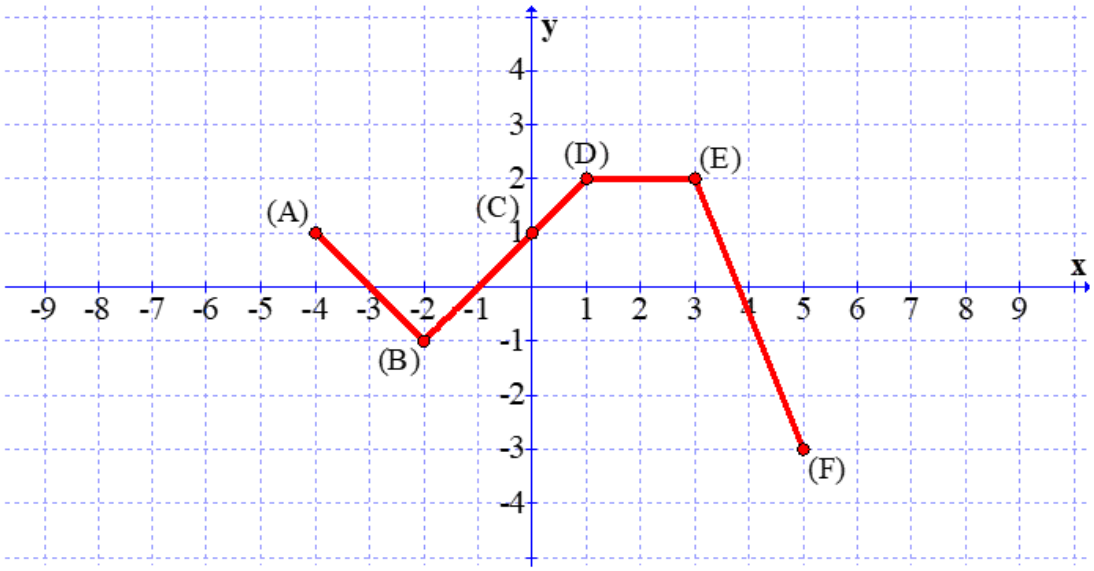
For the graph of g(x), the values a, b, c, and d respectively are:

____, ____, ____, and ____.

Use the following information to answer the next question.

The graph of y = f(x) is shown below. The following transformations are applied to y = f(x):

1. A reflection in the x-axis.
2. A horizontal stretch by a factor of 2 about the y-axis.
3. A horizontal translation 3 units left.



18. a) After the transformations are applied, how many of the points (A,B,C,D,E,F) will be positioned in quadrant three? Place answer in first box below.

b) After the transformations are applied, what are the coordinates of point F? Place answer in the second and third box below.

19. The point K(3,27) is on the exponential function $y = 3^x$. When this function undergoes the transformations described by, $y - m = 3^{nx}$, the point K now becomes (1.5, 31). The values of m and n respectively are _____ and _____.

Part C Show all work and provide all explanations to receive full marks in this section.

20. a) The domain of $y = f(x)$ is $\{x \mid -1 \leq x \leq 8, x \in R\}$. What is the domain of

$y = f(x - 3) + 2$? [Provide a picture to go with your explanation and answer]

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b) As a result of the transformations on the function, $y = f(x)$, will the range be any different? Explain.

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21. The point M(-3,5) is on the graph of $y = f(x)$. As a result of the transformations described by $y = \frac{-1}{5} f((bx) + 1)) + 7$, point M is now located at (-2,6).

a) What is the value of b?

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b) Describe how $\frac{-1}{5}$ and 7 affect the original function, y = f(x).

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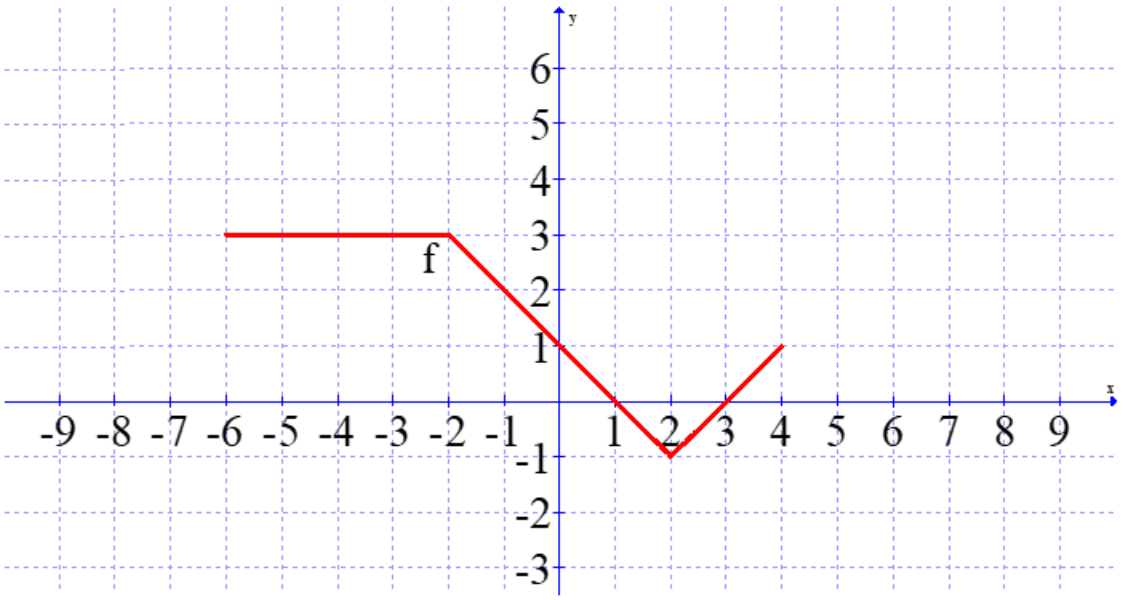
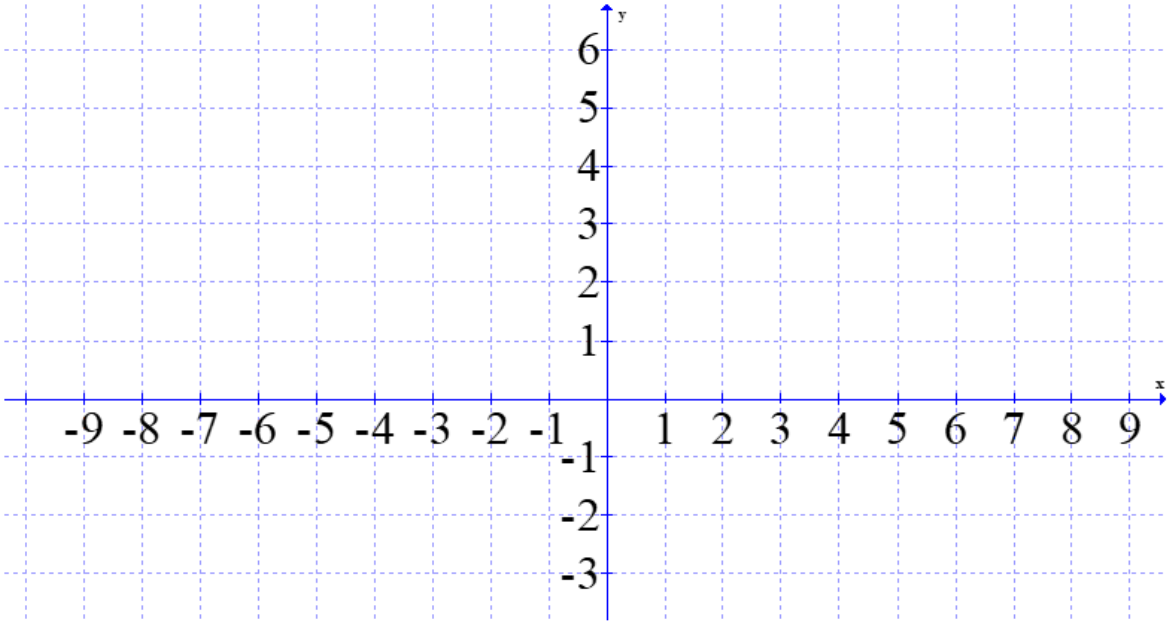
22. The graph of y = f(x) is shown below.



The graph of y = f(x) is reflected in the line x = 0, horizontally stretched by a factor of $\frac{1}{2}$ about the y-axis and translated 3 units up. Sketch the graph below.



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