

Transformations and Translations

Part 1: Basic Transformations

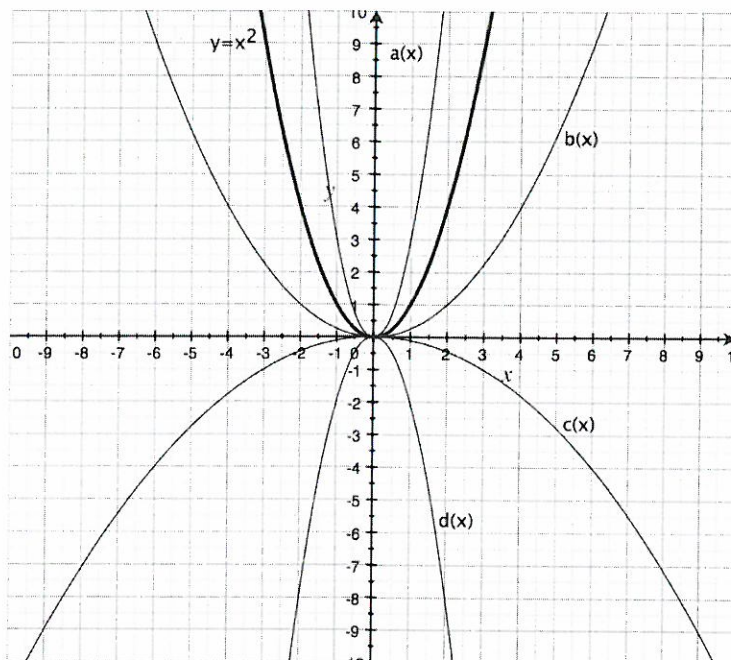
- 1) All of the graphs on the coordinate plane are transformations of $y = x^2$. Write the function of each graph. **Check your answers by graphing them on the calculator.**

$$a(x) =$$

$$b(x) =$$

$$c(x) =$$

$$d(x) =$$

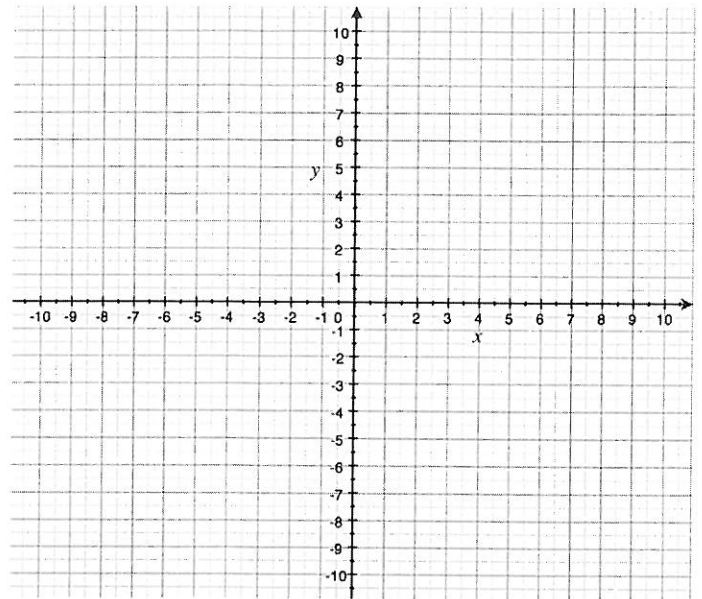


Part 2: Applying Translations and Transformations

1) Graph $y = x^2$ on the coordinate plane below.

2) Given that $f(x) = \frac{1}{2}(x - 3)^2 - 8$,

- a. Describe the **translation** (horizontal/vertical shift) of the graph compared to $y = x^2$.
- b. Describe the **transformation** (vertical stretch/compression) of the graph compared to $y = x^2$.



3) Use your answers to question 2 to graph $f(x) = \frac{1}{2}(x - 3)^2 - 8$. Follow the order of operations. To do this, start by looking at a point on the original graph. Then:

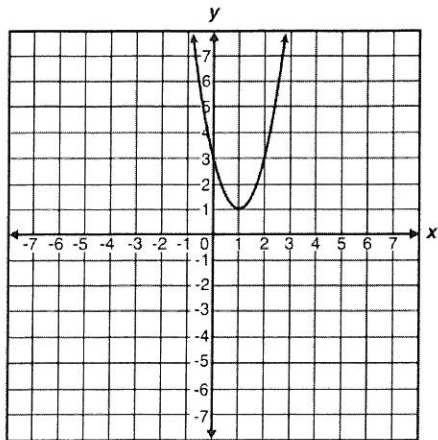
- a. Translate it horizontally (*move the point _____ by _____ spaces*).
- b. Transform it vertically (*multiply the current y-coordinate by _____, and move the point there*).
- c. Translate it vertically (*move the point _____ by _____ spaces*).
- d. Plot the new point in its final location.
- e. Repeat until you have enough points to make a good sketch of $f(x)$.

4) Fill in the table. Are the points in your table on the graph of $f(x)$ that you already made?

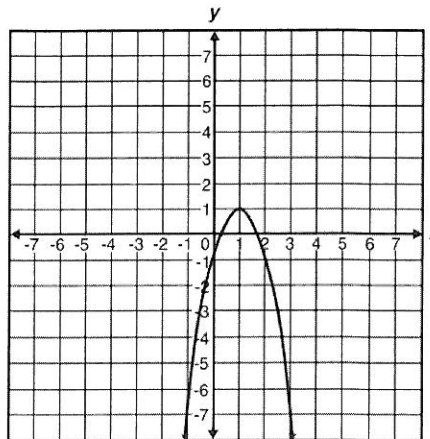
x	$f(x) = \frac{1}{2}(x - 3)^2 - 8$
-2	
-1	
0	
1	
2	
3	
4	
5	
6	
7	
8	

Part 3: Multiple Choice Practice

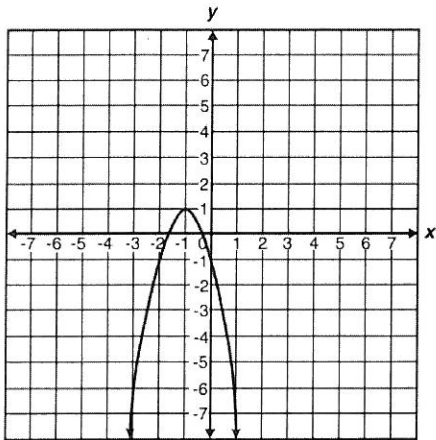
1) Which of the following is the graph of $f(x) = -2(x-1)^2 + 1$?



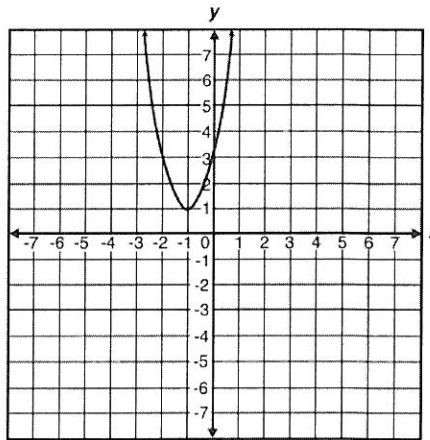
A



C



B



D

2) Explain how you can answer #1 without doing any calculations.

3) Which of the following most accurately describes the translation of the graph of

$$y = (x+3)^2 - 2 \text{ to the graph of } y = (x-2)^2 + 2?$$

- a. up 4 and 5 to the right
- b. down 2 and 2 to the right
- c. down 2 and 3 to the left
- d. up 4 and 2 to the left

- 4) Which of the following is true about the graphs of $f(x) = \frac{3}{4}(x-5)^2 + 1$ and $f(x) = 2(x-5)^2 + 1$?
- The graphs have the same shape and the same vertex.
 - The graphs have different shapes and the same vertex.
 - The graphs have the same shape and different vertices. (*“vertices” is the plural of “vertex”*)
 - The graphs have different shapes and different vertices.
- 5) Given that the point $(-2, 6)$ is on the graph of $y = f(x)$, what point **must** be on the graph of $y = 3f(x)$?
- $(-2, 18)$
 - $(-6, 6)$
 - $(-2, 2)$
 - $(-6, 18)$
- 6) Given that the point $(4, -8)$ is on the graph of $y = f(x)$, what point **must** be on the graph of $y = -\frac{1}{10}f(x)$?
- $(0.4, -8)$
 - $(4, -0.8)$
 - $(-0.4, -8)$
 - $(4, 0.8)$
- 7) Given that the point $(0, 12)$ is on the graph of $y = f(x)$, what point **must** be on the graph of $y = \frac{1}{2}f(x+5) - 6$?
- $(5, 0)$
 - $(-5, 6)$
 - $(-5, 0)$
 - $(5, -6)$