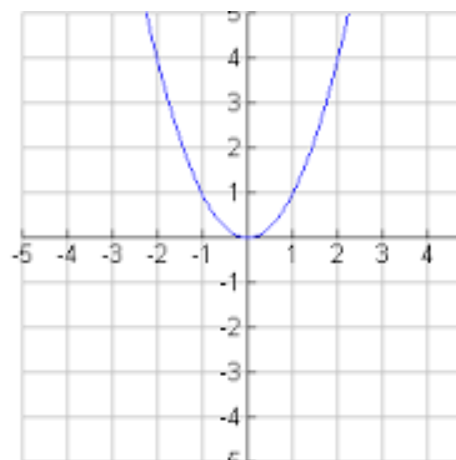
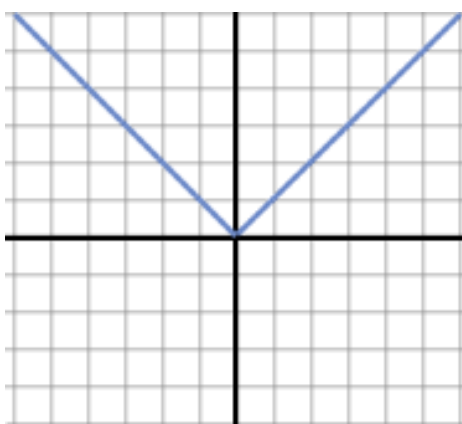
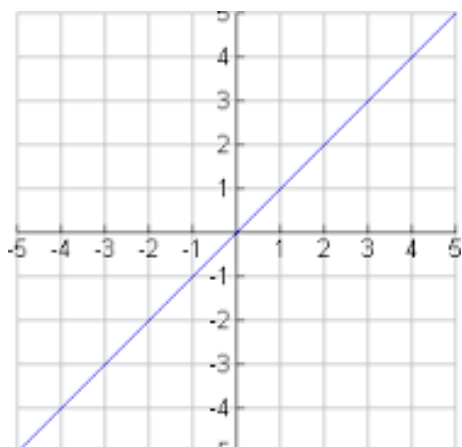


Horizontal and Vertical Translations

Recall: What are the functions below



Type of function: _____

Type of function: _____

Type of function: _____

Base Function: _____

Base Function: _____

Base Function: _____

Part 1: Investigate Vertical Translations

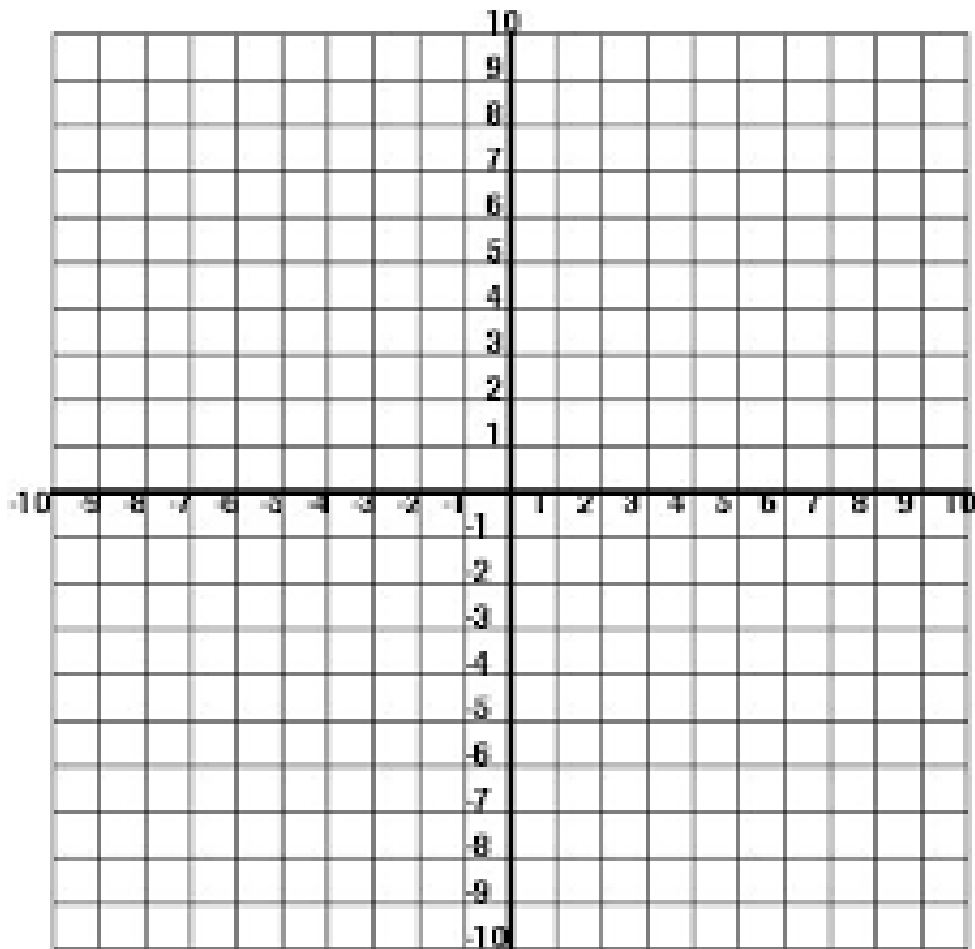
1. Consider the function $f(x) = |x|$, complete the table of values for the functions given and then graph all three functions on the graph paper provided.

$$y = f(x) + 3$$

| x-values | y-values |
|----------|----------|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |
| 3 | |

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

| x-values | y-values |
|----------|----------|
| -3 | |
| -2 | |
| -1 | |
| 0 | |
| 1 | |
| 2 | |
| 3 | |



2. Describe how the graphs of $y = f(x) + 3$ and $y = f(x) - 3$ compare to the graph of $y = f(x)$.

3. Relative to the graph of $y = f(x)$, what information about the graph of $y = f(x) + k$ does k provide?

4. Do the following equations produce the same graph? Explain.
 $y = f(x) + 3$ and $y - 3 = f(x)$

Part 2: Horizontal Translations

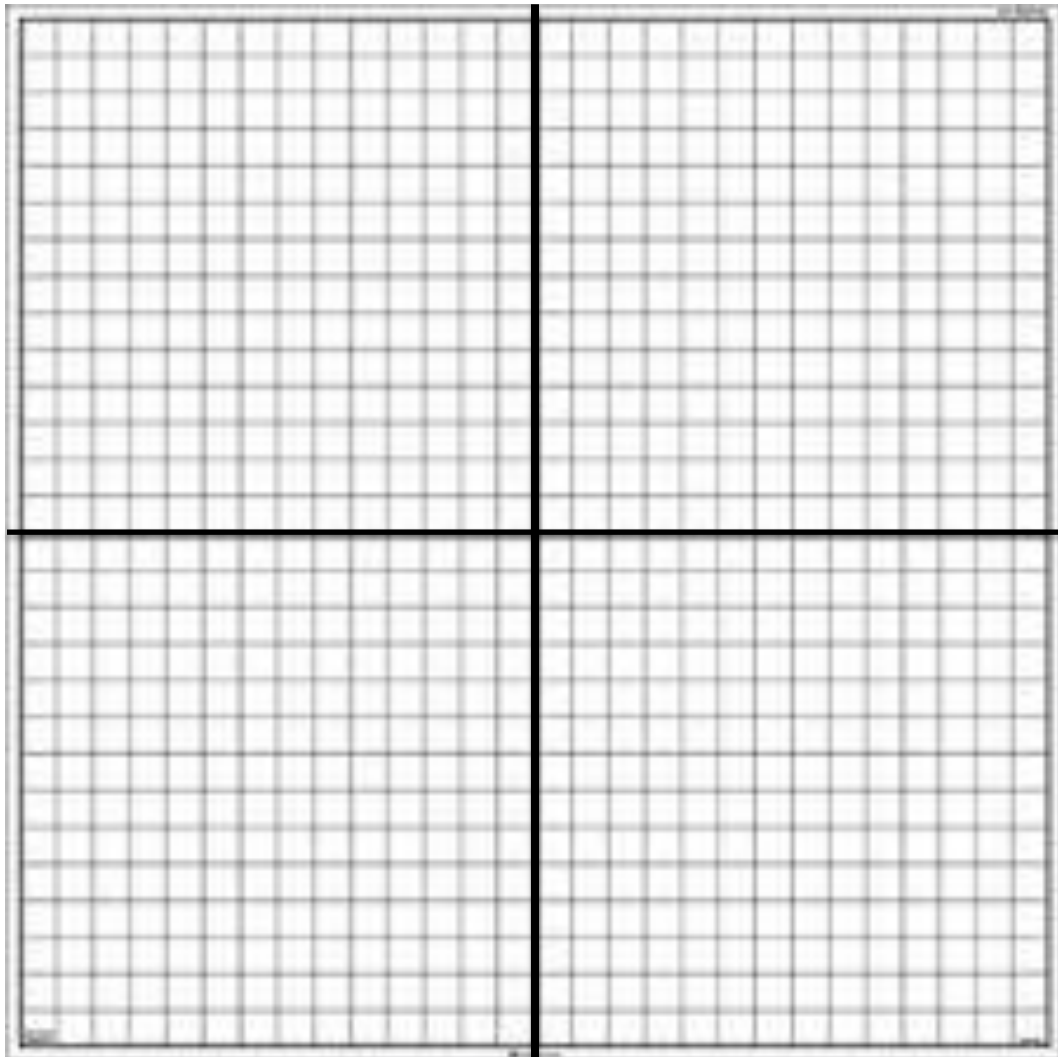
1. Consider the function $f(x) = |x|$, complete the table of values for the functions given and then graph all three functions on the graph paper provided.

$$y = f(x + 3)$$

| x-values | y-values |
|----------|----------|
| -9 | |
| -6 | |
| -3 | |
| 0 | |
| 3 | |
| 6 | |
| 9 | |

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

| x-values | y-values |
|----------|----------|
| -9 | |
| -6 | |
| -3 | |
| 0 | |
| 3 | |
| 6 | |
| 9 | |



2. Describe how the graphs of $y = f(x + 3)$ and $y = f(x - 3)$ compare to the graph of $y = f(x)$.

3. Relative to the graph of $y = f(x)$, what information about the graph of $y = f(x - h)$ does h provide?

Determine the mapping rule for the following:

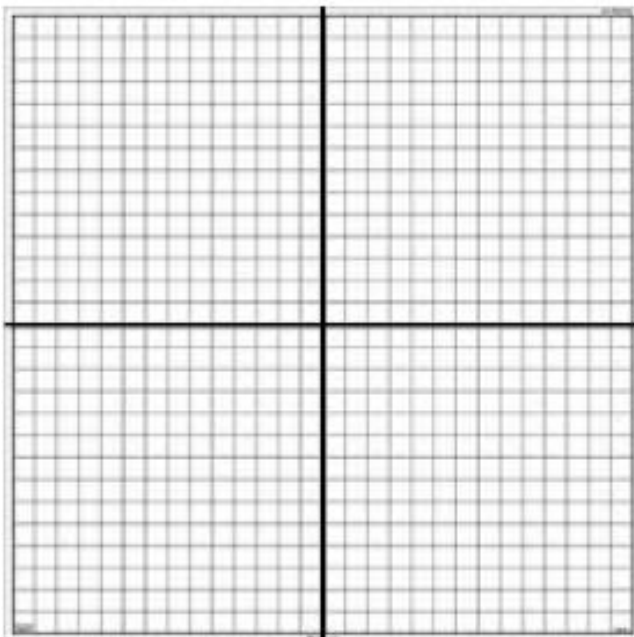
a. $y = f(x + 3)$

b. $y = f(x - 3)$

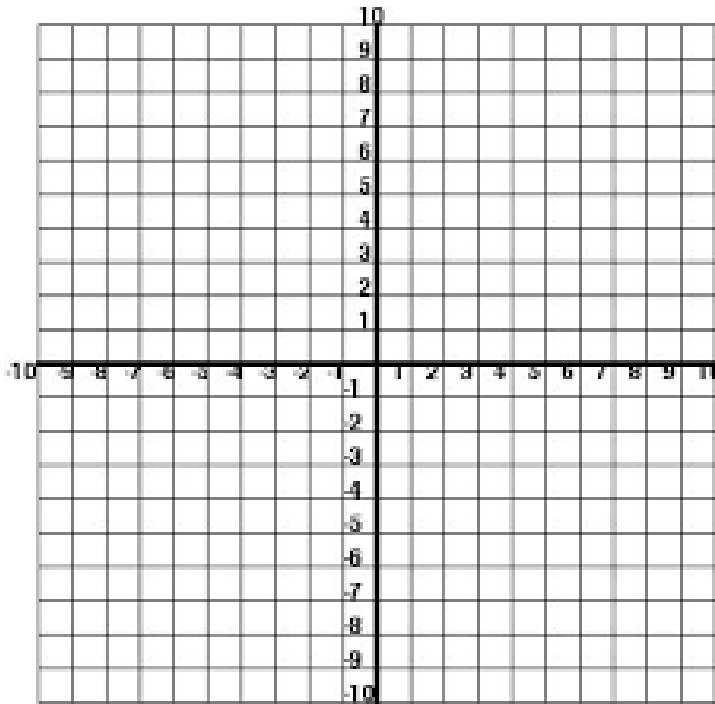
c. $y = f(x) + 3$

d. $y + 3 = f(x)$

Example 1: Graph the functions of $y = x^2$, $y - 2 = x^2$, and $y = (x - 5)^2$ on the same axis, and explain the transformations and state the mapping rules.



Example 2: Sketch the graph of $y = |x - 4| + 3$. State the mapping rule given a base function of $y = |x|$.



Homework: Page 12-15 #1-5, 8-12, 15, 17*