

3.7 Graphing Absolute Value Functions

Do Now: Transform the function $f(x) = 3x - 5$ with a horizontal shift right 6 and a vertical shift down 3.

$h =$ _____

$k =$ _____

Final: _____

Vertex Form:

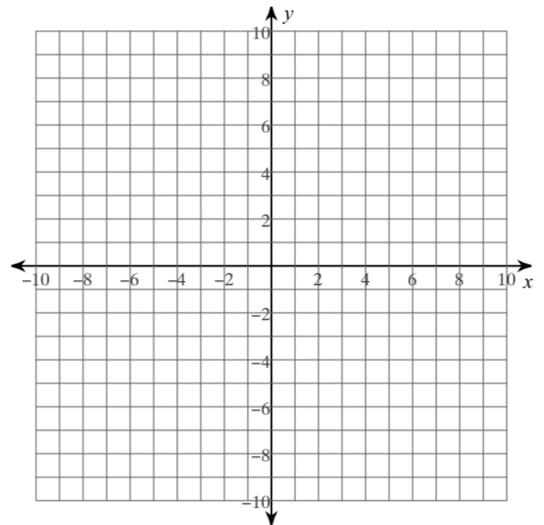
$$y = a|x - h| + k$$

h – Horizontal Shift
 $a > 1$ - Vertical Stretch

k – Vertical Shift
 $0 < a < 1$ - Vertical Shrink

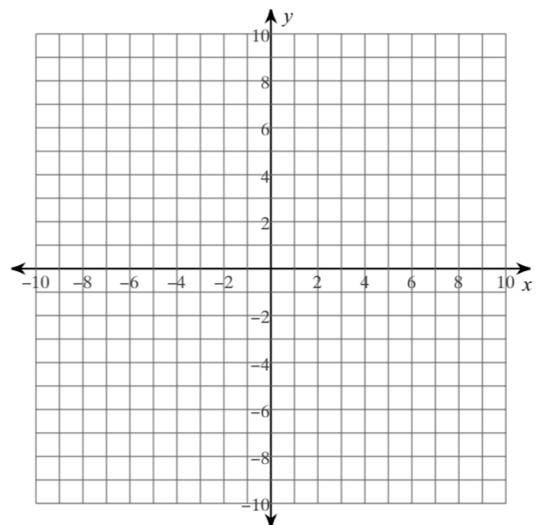
Example 1: Graphing an Absolute Value Function

Use an input/output table to graph $f(x) = |x|$



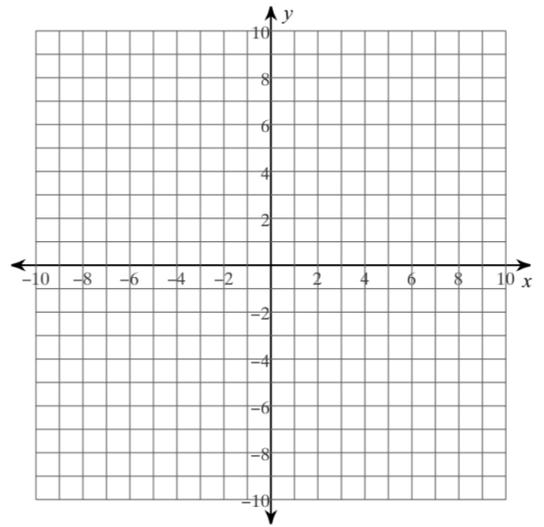
Example 2: Graphing an Absolute Value Function

Use an input/output table to graph $f(x) = |x| + 2$



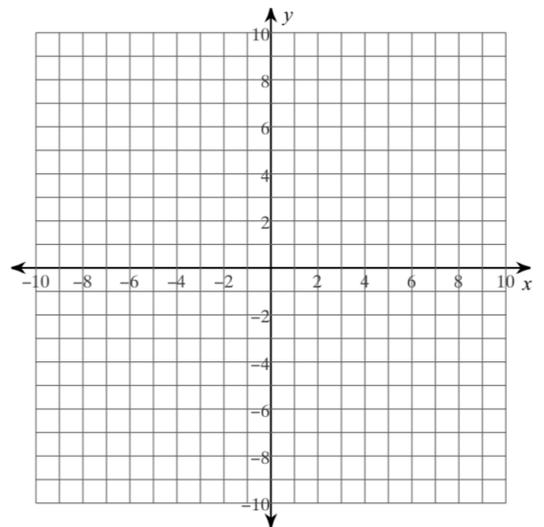
What is different from example 1?

Example 3: Graphing an Absolute Value Function
Use an input/output table to graph $f(x) = |x - 2|$



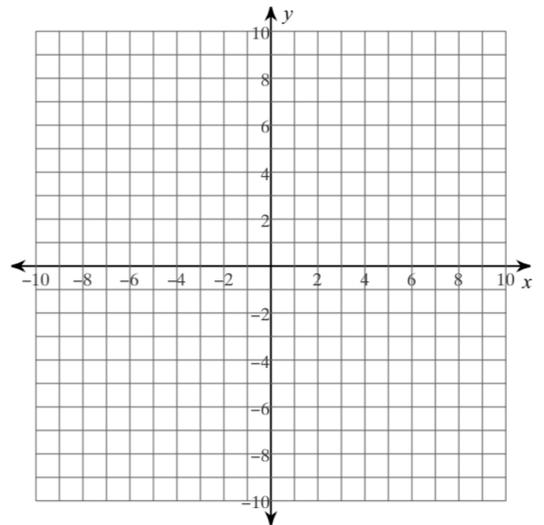
Compare to example 1?

Example 4: Compound Transformations
Use an input/output table to graph $f(x) = |x + 3| - 5$



Describe the transformation:

Try on your own: Compound Transformations
Use the input/output table to graph $f(x) = |x - 4| + 3$

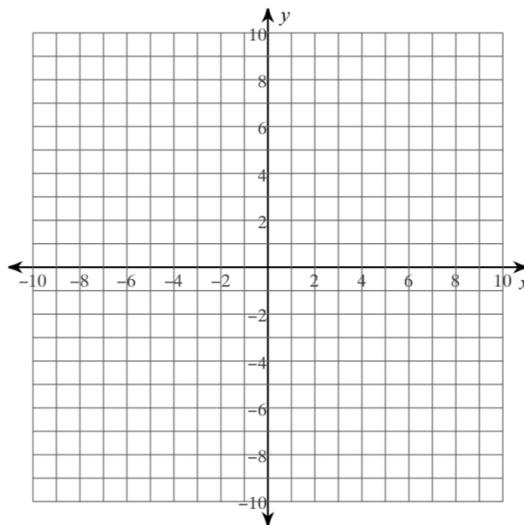


Describe the transformation:

Example 5: Vertical Stretch/Shrink

Use an input/output table to graph $f(x) = 2|x|$

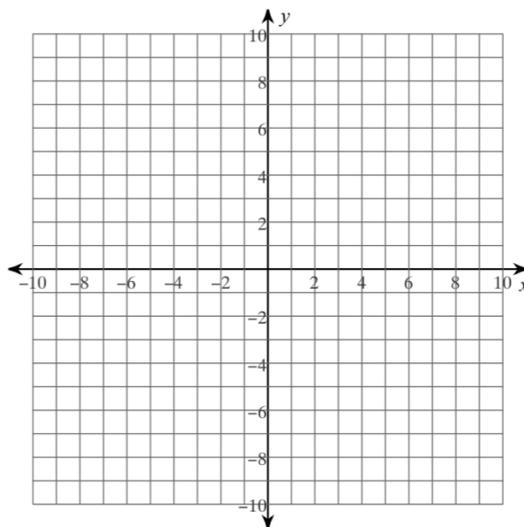
Describe the transformation:



Example 6: Vertical Stretch/Shrink

Use an input/output table to graph $f(x) = \frac{1}{2}|x|$

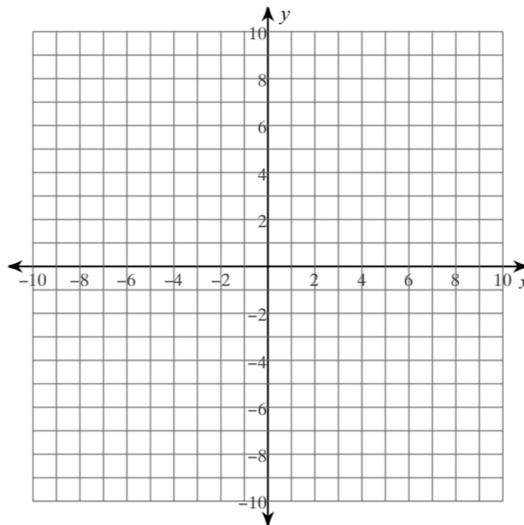
Describe the transformation:



Try on your own:

Graph: $f(x) = 3|x - 2| - 4$

Describe the transformation:



Critical Thinking:

In your DESMOS app on line 1 graph: $y = |x - 2| + 3$

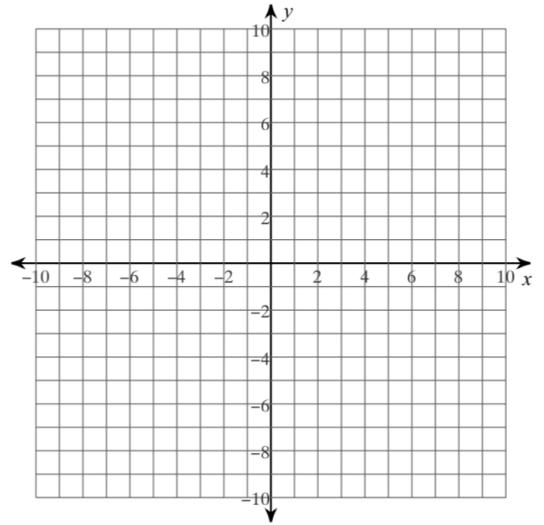
Manipulate the equation so that the graph is reflected over the x-axis. Write the equation down: _____

Manipulate the equation so that the graph is reflected over the y-axis. Write the equation down: _____

Example 7: Reflections

Use an input/output table to graph $f(x) = -|x|$

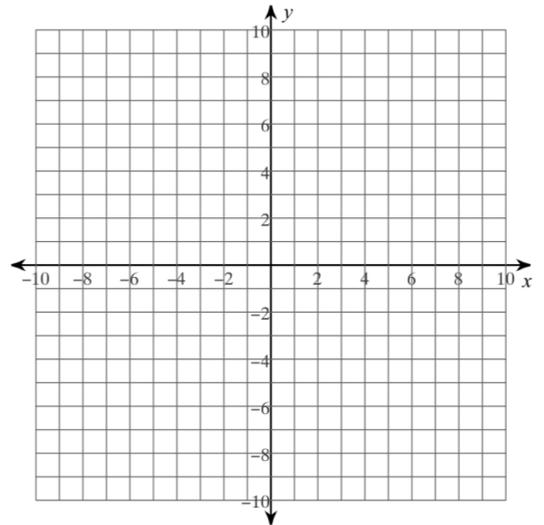
Describe the transformation:



Example 8: Reflections

Use an input/output table to graph $f(x) = |-x - 2|$

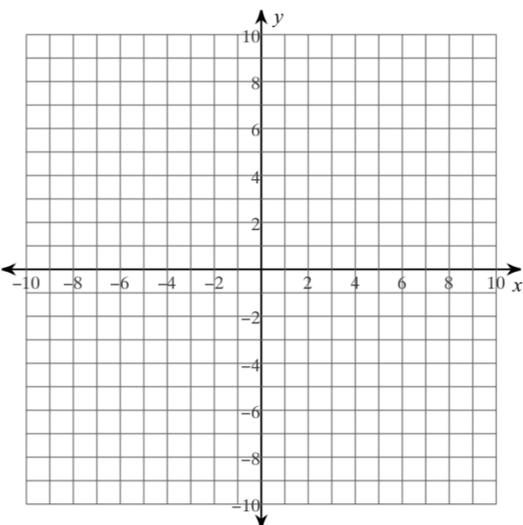
Describe the transformation:



Try on your own:

Graph the following:

$$f(x) = -2|x + 5| + 2$$



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

