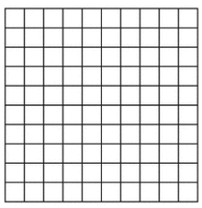
Name: _____ **Precalculus Unit 3, Lesson 2**

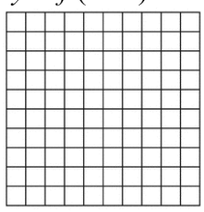
Aim: What are non-rigid transformations?

I. Do Now:

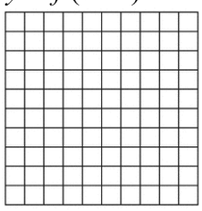
1. Given the graph of $y = f(x)$ below, graph each transformation:



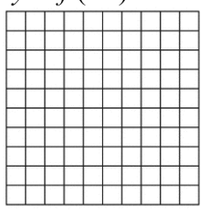
(a) $y = f(x-1)+2$



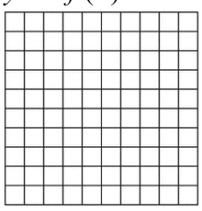
(b) $y = f(x+1)-3$



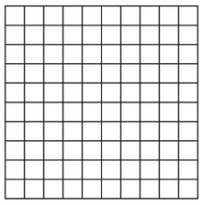
(c) $y = f(-x)$



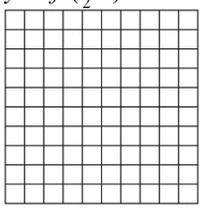
(d) $y = -f(x)$



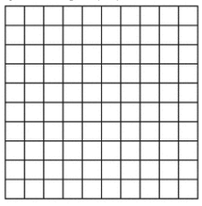
*(e) $y = f(2x)$



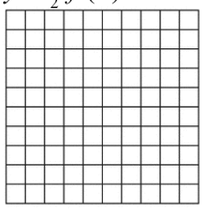
*(f) $y = f(\frac{1}{2}x)$



*(g) $y = 2f(x)$



*(h) $y = \frac{1}{2}f(x)$



II. Summary of Transformation Rules. (Assume that *a* represents a positive number.)

Rigid Transformations (size and shape are preserved)	Reflection in the *x*-axis	$(x,y) \rightarrow$	$-f(x)$
	Reflection in the *y*-axis	$(x,y) \rightarrow$	$f(-x)$
	Translation horizontally to the right	$(x,y) \rightarrow$	$f(x-a)$
	Translation horizontally to the left	$(x,y) \rightarrow$	$f(x+a)$
	Translation vertically up	$(x,y) \rightarrow$	$f(x)+a$
	Translation vertically down	$(x,y) \rightarrow$	$f(x)-a$
Non-Rigid Transformations (size and shape are NOT preserved)	Stretch/shrink horizontally	$(x,y) \rightarrow$	$f(ax)$ (stretches horizontally when _____) (shrinks horizontally when _____)
	Stretch/shrink vertically	$(x,y) \rightarrow$	$af(x)$ (stretches vertically when _____) (shrinks vertically when_____)

PERFORM MULTIPLE TRANSFORMATIONS IN THE FOLLOWING ORDER:

(1) Horizontal Translation

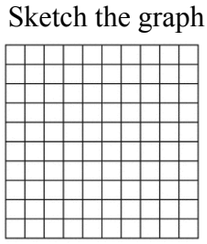
(2) Stretching or Shrinking

(3) Reflecting

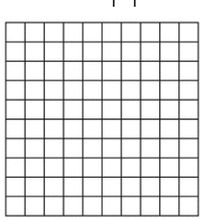
(4) Vertical Translation

III. Applications.

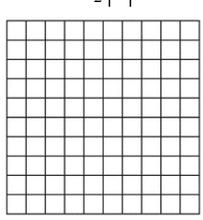
2. Sketch the graph of $f(x) = |x|$ below. Then use the rules above to sketch each transformation.



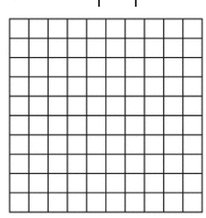
(a) $f(x) = 2|x|$



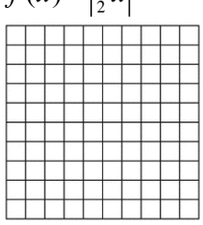
(b) $f(x) = \frac{1}{2}|x|$



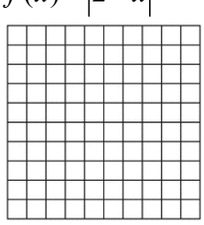
(c) $f(x) = |2x|$



(d) $f(x) = |\frac{1}{2}x|$



(e) $f(x) = |2-x|$



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