Transformational Graphing

Transformations:

Translations:

- $y = f(x) + a$ is $f(x)$ shifted up a.
- $y = f(x) - a$ is $f(x)$ shifted down a.
- $y = f(x + a)$ is $f(x)$ shifted left a.
- $y = f(x - a)$ is $f(x)$ shifted right a.

$y=f(cx)$
$y=f(cx)$

Dilations:

- $y = cf(x)$ $c > 1$ is $f(x)$ stretched vertically
- $y = cf(x)$ $0 < c < 1$ is $f(x)$ shrunk vertically
- ~~$y = f(x)$~~ $c > 1$ is $f(x)$ **shrunk** horizontally
- ~~$y = f(x)$~~ $0 < c < 1$ is $f(x)$ **streched** horizontally

Steps:

1. Reflections in X or y
2. Vertical Dilation
3. Horizontal Dilation
4. Translation

List the steps to graph each function.

1) $-5f(8 - 4x) + 6$

$-4(x-2)$

- Reflection in x + y
- Vertical Stretch of 5
- Horizontal Shrink of 4
- R2 U6

2) $\frac{1}{2}g\left(\frac{x}{3} + 2\right) - 7$

$\frac{1}{3}(x+6)$

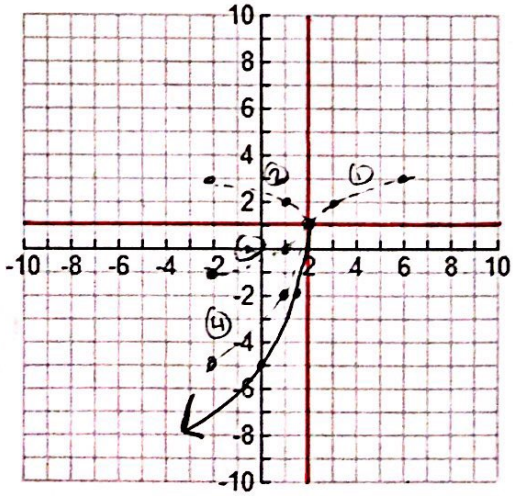
- Vertical Shrink of 2
- Horizontal Stretch of 3
- L6 D7

List the steps to graph each function. Then graph.

3) $f(x) = -3\sqrt{4 - 2x} + 1$

$-2(x-2)$

- Reflection in x + y
- Vertical Stretch 3
- Horizontal Shrink 2
- R2 U1



4)

$$g(x) = \frac{1}{2}\left(\frac{x}{3} - 1\right)^2 - 3$$

$\frac{1}{3}(x3)$

- Vertical Shrink 2
- Horizontal Stretch 3
- R 3 D 3