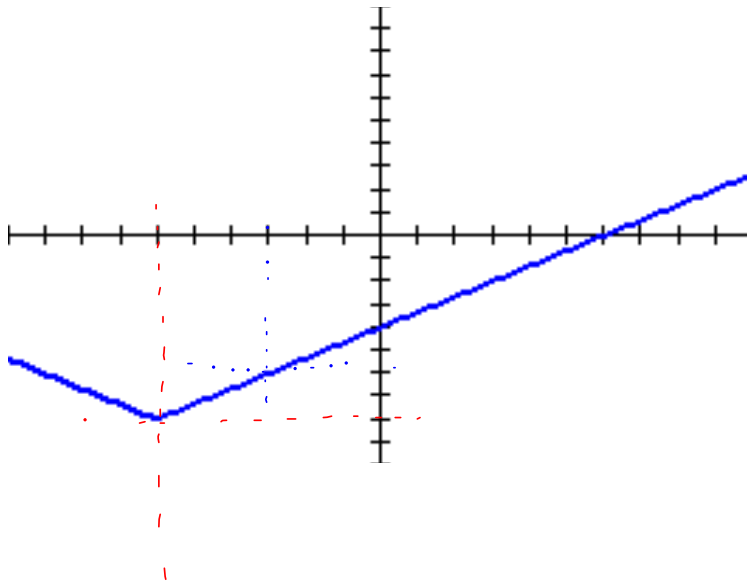


Bell work

Write the equation for the given graph. Use the point $(0, -4)$.



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

$$y = a|x + 6| - 8$$

$$-4 = a|0 + 6| - 8$$

$$\begin{array}{r} -4 = 6a - 8 \\ +8 \quad \quad +8 \\ \hline \end{array}$$

$$\frac{4}{6} = \frac{6a}{6}$$

$$a = \frac{2}{3}$$

$$1) \quad 2(x+3)^2 - 5(x+3) - 2$$

$$2(x^2 + 6x + 9) - 5x - 15 - 2$$

$$2x^2 + 12x + 18 - 5x - 15 - 2$$

$$\star 2x^2 + 7x + 1$$

$$2) \quad y = 2(x-5)^3 - 7 \quad \begin{array}{l} \text{right 5 down 7} \\ \text{vertical stretch by 2} \end{array}$$

$$3) \quad y = (3-x)^3 \quad \begin{array}{l} \text{right 3 reflects horizontally} \\ \text{cross y-axis} \end{array}$$

$$4) \quad f(x) = \sqrt{x-2} \rightarrow g(x) = -\sqrt{x-9}$$

move right 7 reflect down

$$5) \quad f(x) = |x+2| - 4 \rightarrow g(x) = |x-1| + 5$$

right 3 up 9

$$\begin{aligned}
 1) \quad & 3(x-2)^2 - 5(x+3) + 4 \\
 & 3(x^2 - 4x + 4) - 5x - 15 + 4 \\
 & 3x^2 - 12x + 12 - 5x - 15 + 4 \\
 & 3x^2 - 17x + 1
 \end{aligned}$$

$$2) \quad y = (4-x)^3 - 3 \quad \begin{array}{l} \text{right 4 down 3} \\ \text{horizontal reflection} \\ \text{y-axis} \end{array}$$

$$3) \quad y = 2(x-5)^3 \quad \begin{array}{l} \text{right 5} \\ \text{vertical stretch 2} \end{array}$$

$$4) \quad f(x) = \sqrt{x+3} + 2 \rightarrow g(x) = \sqrt{x-8} - 5$$

right 11 down 7

$$5) \quad f(x) = |x-7| \rightarrow g(x) = -|x+3|$$

left 10
reflects down
cross x-axis

Equations for Stretches and Shrinks

Horizontal stretch or shrink

$$y = f\left(\frac{x}{c}\right) \quad \begin{array}{l} c > 1 \text{ stretch} \\ c < 1 \text{ shrink} \end{array}$$

Describe what would happen?

Vertical Shrink $y = \frac{1}{4}f(x)$

Vertical stretch or shrink

$$y = c \cdot f(x) \quad \begin{array}{l} c > 1 \text{ stretch} \\ c < 1 \text{ shrink} \end{array}$$

Vertical stretch $y = 4f(x)$

horizontal stretch by 4 $y = f\left(\frac{x}{4}\right)$

$y = f(4x)$

Shrink by 1/4

*c is a positive real number

Given: $y = f(x) = x^3 - 16x$

1. Write the equation for a vertical stretch by a factor of 3.

$$y = 3f(x)$$

$$y = 3(x^3 - 16x)$$

$$y = 3x^3 - 48x$$

2. Write the equation for a horizontal shrink by a factor of $\frac{1}{2}$.

$$y = f(2x)$$

$$y = 8x^3 - 32x$$

$$y = (2x)^3 - 16(2x)$$

3. Write the equation for a horizontal stretch by a factor of 2.

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

$$y = \left(\frac{x}{2}\right)^3 - 16\left(\frac{x}{2}\right)$$

$$y = f\left(\frac{x}{2}\right)$$

$$y = \frac{x^3}{8} - 8x$$

$$y = \frac{1}{8}x^3 - 8x$$

The graph of $y = x^2$ undergoes the following transformations in order. Find the equation for the graph that results.

$$y = f(x) = x^2$$

A vertical stretch by a factor of 3

A horizontal shift 2 units to the right

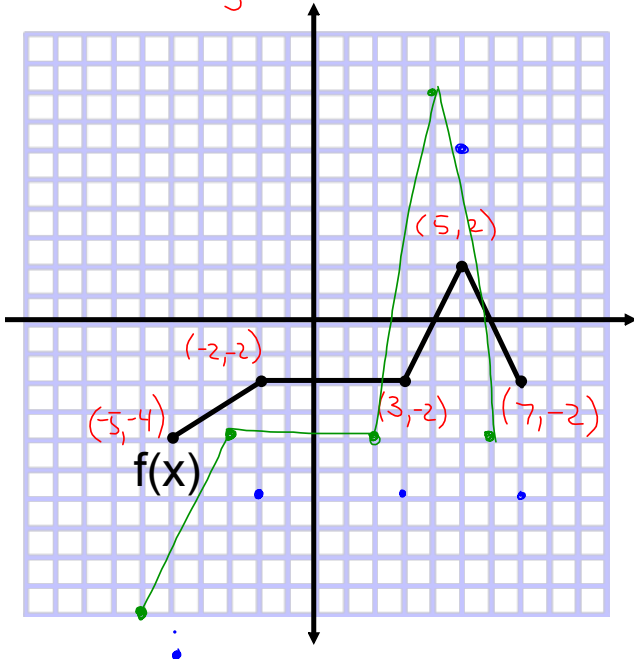
A vertical Translation 5 units up

$$f(x) = 3(x-2)^2 + 5$$

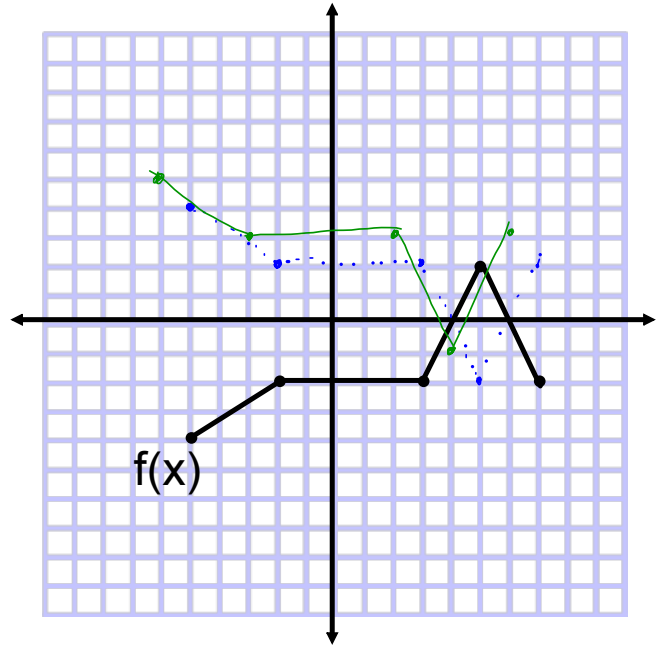
Determine the graph of the composite function $y = 2f(x + 1) - 3$ by describing the sequence of transformations on the graph of $y = f(x)$.

Vertical stretch by 2
left 1
down 3

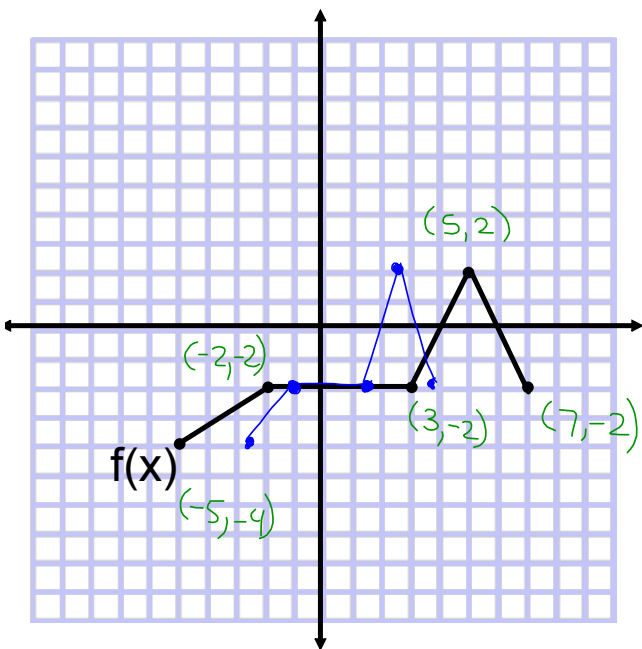
Graph $y = 2 + 3f(x+1)$
 $y = 3f(x+1) + 2$



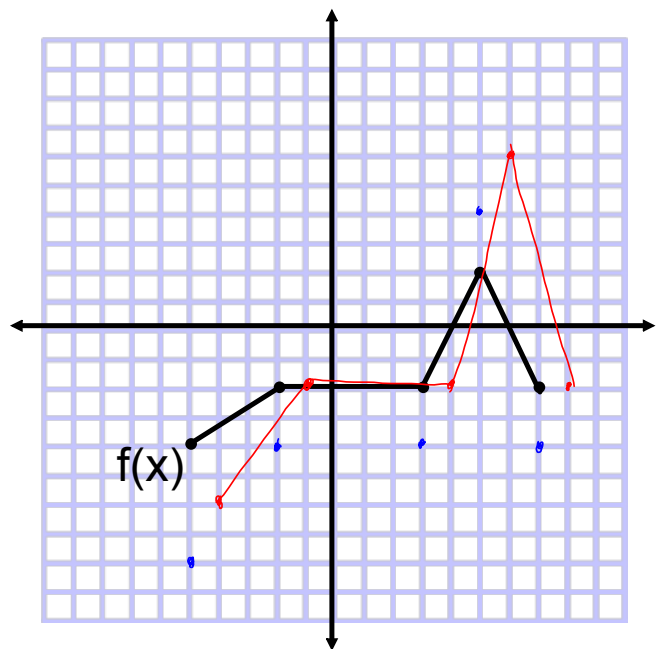
Graph $y = f(x+1) + 1$



horizontal shrink by 1/2
 Graph $y = f(2x)$



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



Section 1.6 day 2

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