

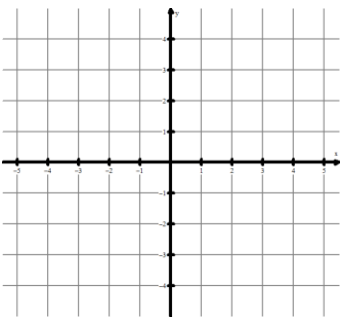
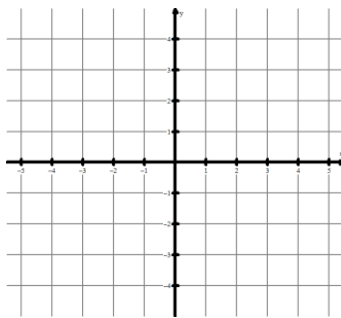
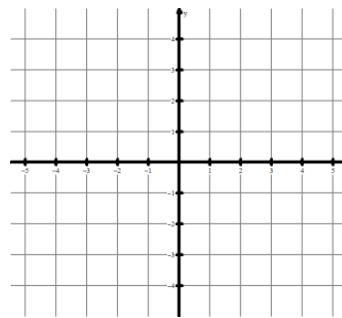
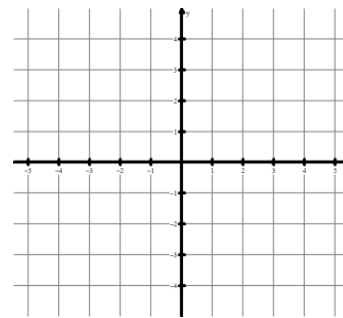
**A. Lesson Context**

BIG PICTURE of this UNIT:	<ul style="list-style-type: none"> <li>• How &amp; why do we build NEW knowledge in Mathematics?</li> <li>• What NEW IDEAS &amp; NEW CONCEPTS can we now explore with specific references to QUADRATIC FUNCTIONS?</li> <li>• How can we extend our knowledge of FUNCTIONS, given our BASIC understanding of Functions?</li> </ul>		
CONTEXT of this LESSON:	Where we've been In Lessons 1 & 2, you were introduced to <b>vertical stretches &amp; compressions</b> and <b>translations</b> $y = a(x - h)^2 + k$	Where we are HOW do we transform ANY parent function?	Where we are heading How do we extend our knowledge & skills of quadratic functions, given the new ideas & concepts we now know about functions.

**B. Lesson Objectives**

- Review NEW IDEAS from our new parent functions,  $y = 2^x$ ,  $y = 1/x$ ,  $y = |x|$ ,  $y = \sqrt{x}$
- Investigate the role of the parameters **a** and **c** and **d** in the equation  $y = af(x - c)^2 + d$  and relate that role to the concept of TRANSFORMATIONS
- Consolidate an understanding of stretches and translations of functions

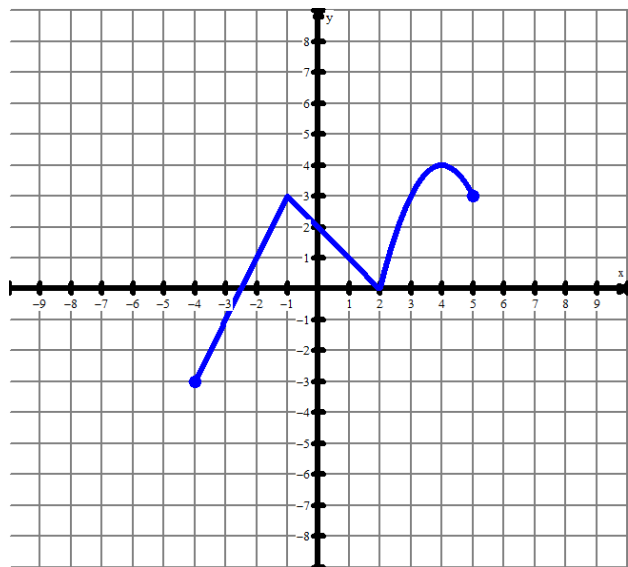
**C. Fast Five** (Skills Review Focus)

Mini White Boards QUIZLET → Sketching variations of $f(x) = a(x - h)^2 + k$			
Sketch $y = 1/x$  Label Key Points/Features	Sketch $y = 2^x$  Label Key Points/Features	Sketch $y =  x $  Label Key Points/Features	Sketch $y = \sqrt{x}$  Label Key Points/Features

**D. Observation Table for Class Exercises**

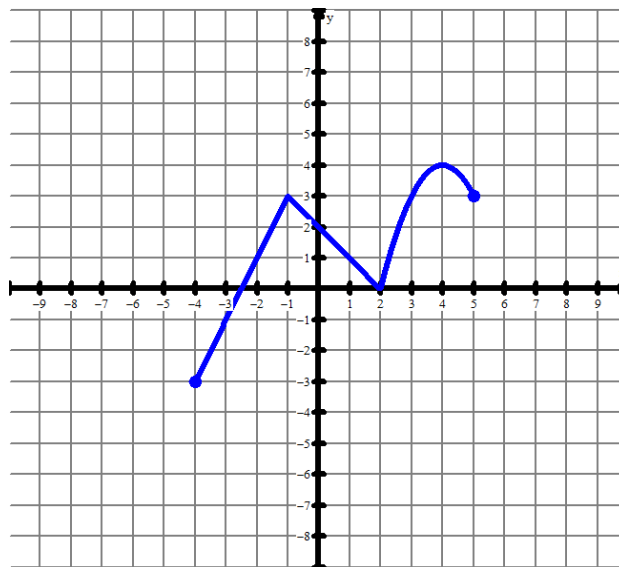
**PART 1: Transforming with the piecewise function  $y = f(x)$**

Graph the new function  $g(x)$  where  $g(x) = -2f(x) + 3$



AP/HL Challenge → Graph  $y = -|f(x)|$

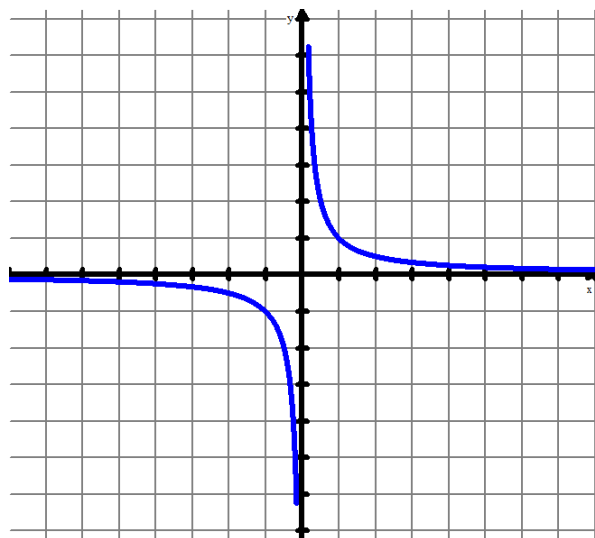
Graph the new function  $g(x)$  where  $g(x) = \frac{1}{2}f(x+6) - 5$



AP/HL Challenge →  $y = f(0.5x - 1)$

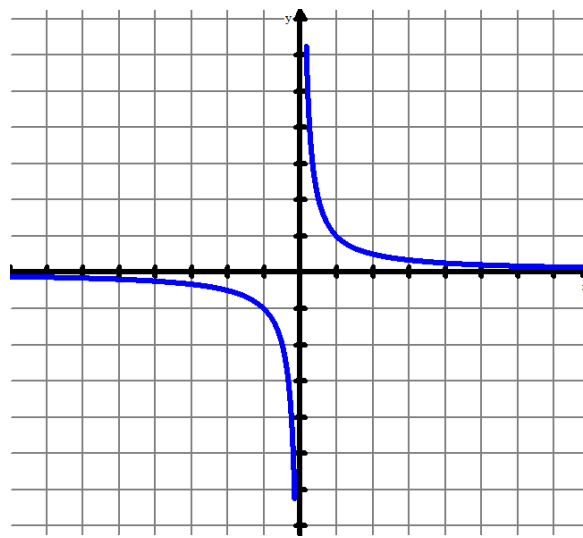
**Part 2: Transforming with  $f(x) = 1/x$**

Graph the new function  $g(x)$  where  $g(x) = f(x+2) - 4$



Key Features:

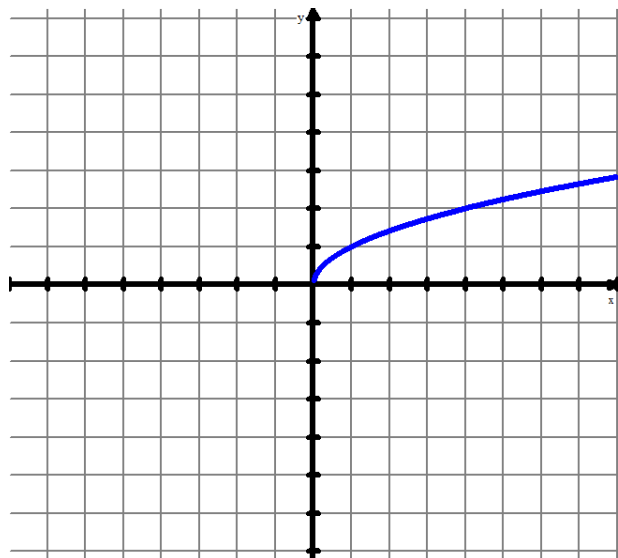
Graph the new function  $g(x)$  where  $g(x) = 3 - f(x - 4)$



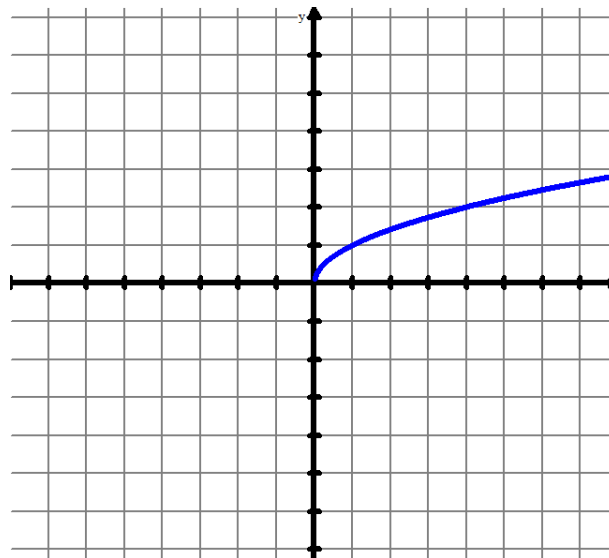
Key Features:

Part 3: Transforming with  $y = \sqrt{x}$

Graph  $y = 2\sqrt{x+1} - 3$

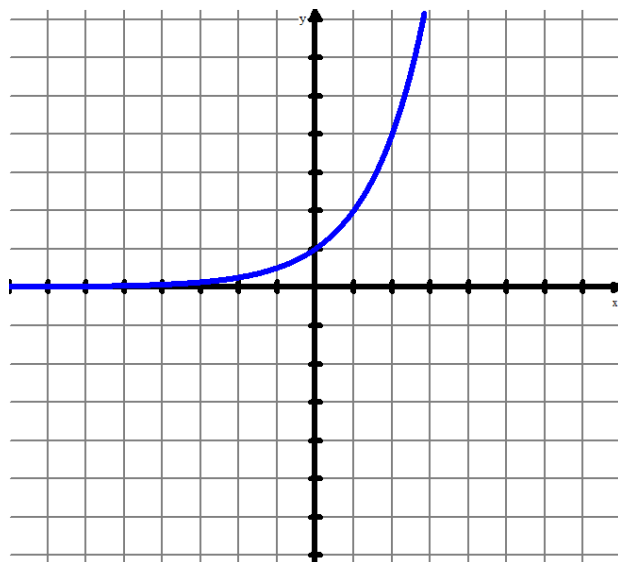


$g(x) = -f(x-3) - 2$



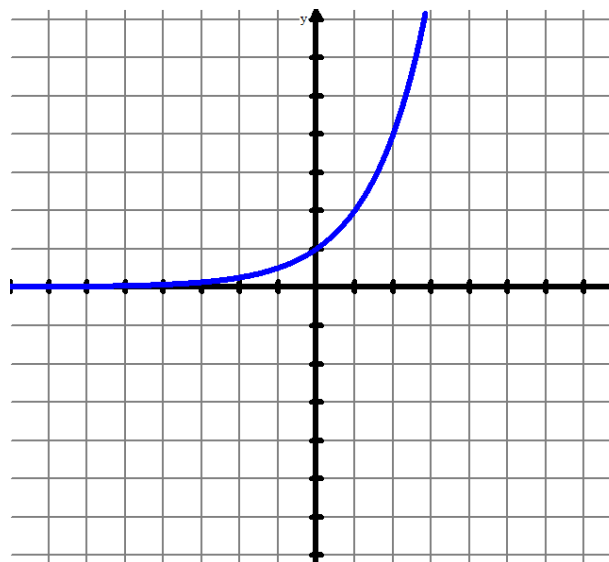
Part 4: Transforming with  $y = 2^x$

Graph the new function  $g(x)$  where  $g(x) = \frac{1}{4}f(x-3) - 6$

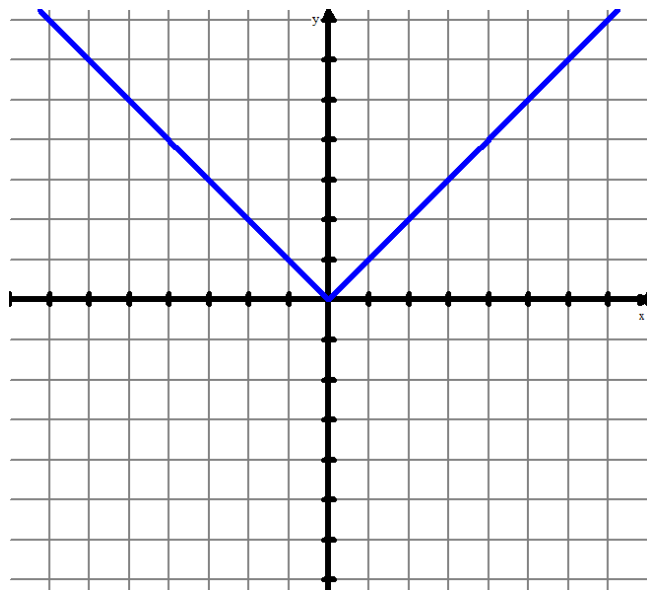


Key features:

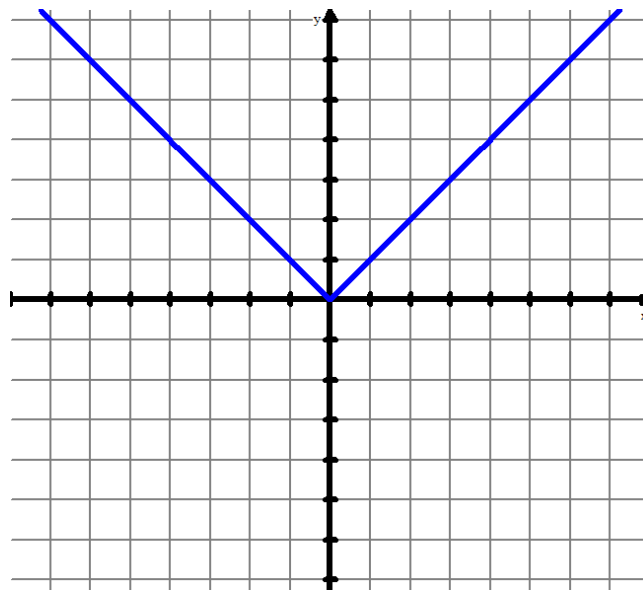
Graph the new function  $g(x)$  where  $y = 1.5(2)^{x+2} + 1$



Key features:

Part 5: Transforming with  $y = |x|$ Graph the new function  $g(x)$  where  $g(x) = -2f(x - 1) + 3$ 

Key Features

Graph the new function  $g(x)$  where  $y = 3|x + 4| - 6$ 

Key Features

**E. Closing Exercise: Why Transform Functions in the First Place?**

To help you through this transformation exercise, I have set up a DESMOS graph for you already. [Follow this link to the graph in DESMOS](#) for the quadratic data set exercise

To help you through this transformation exercise, I have set up a DESMOS graph for you already. [Follow this link to the graph in DESMOS](#) for the exponential data set exercise

To help you through this transformation exercise, I have set up a DESMOS graph for you already. [Follow this link to the graph in DESMOS](#) for the quadratic data set exercise