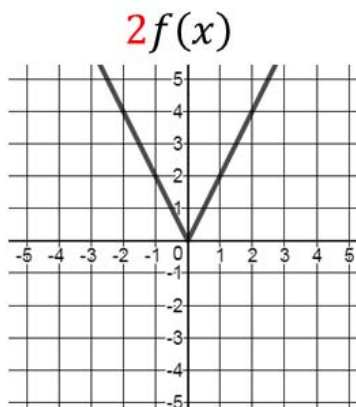
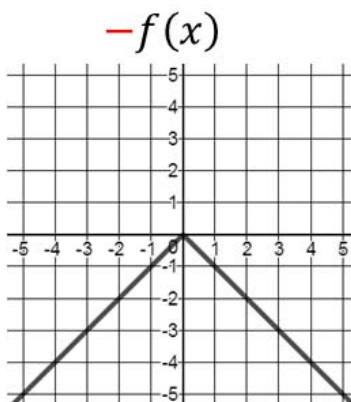
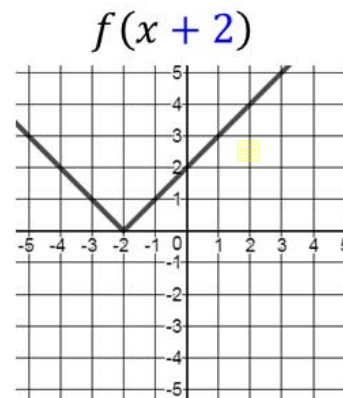
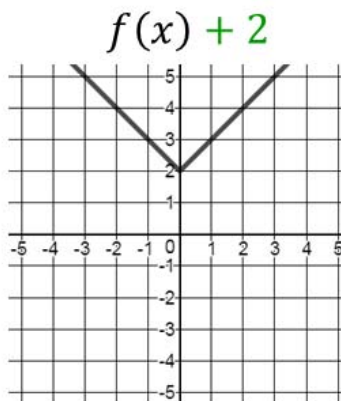
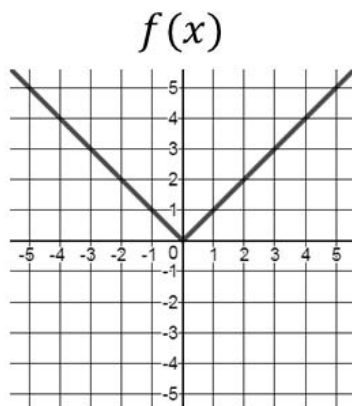


Objective: Graph transformations of a parent graph.

Concept

Given the graph of a parent function  $f(x)$ , transformations of the function are written in the form  $g(x) = a \cdot f(x - h) + k$ .



$a$  affects the  $y$  coordinates by a factor of  $a$

$h$  changes the  $x$  coordinates (a translation left/right of  $|h|$  units)

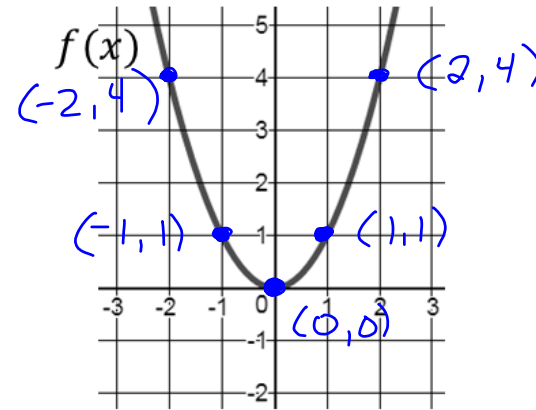
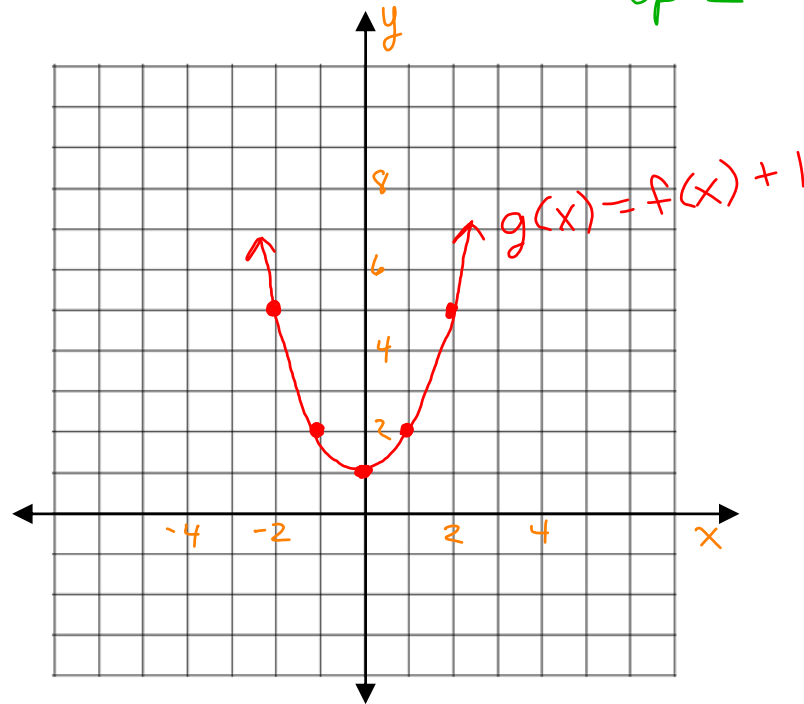
$k$  changes the  $y$  coordinates (a translation up/down of  $|k|$  units)



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

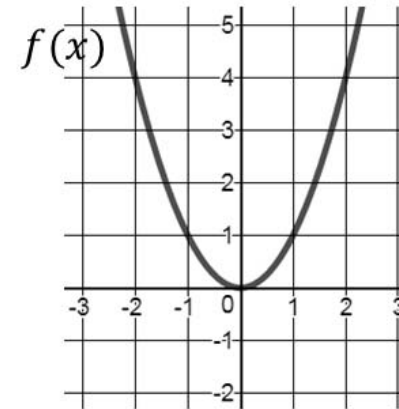
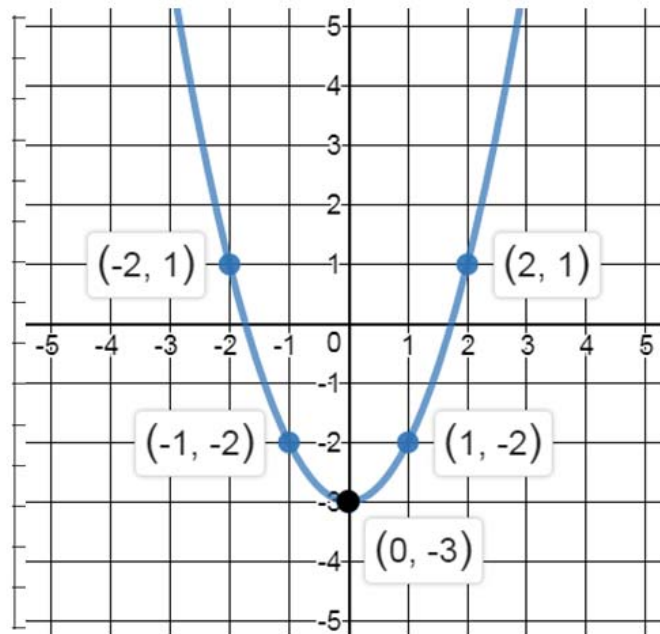
Ex) Graph  $g(x) = f(x) + 1$   
 (Handwritten notes:  $+1$  is circled in green with a 'k' above it, and 'up 1' written below it.)



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

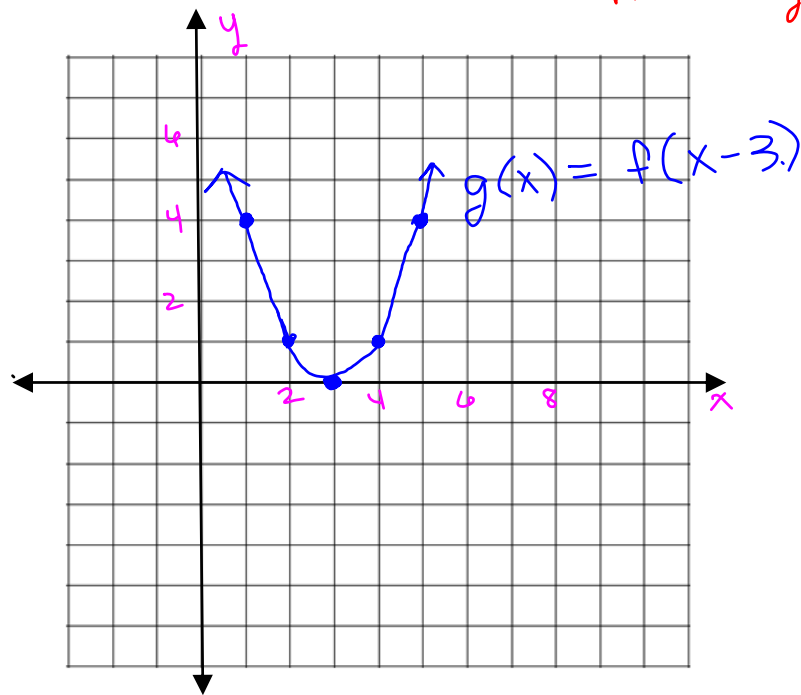
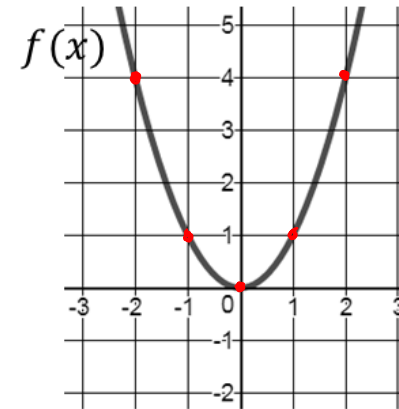
Practice) Graph  $g(x) = f(x) - 3$



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

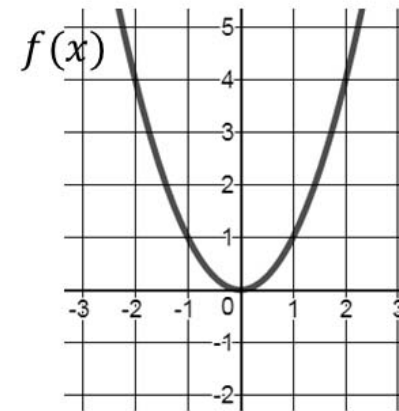
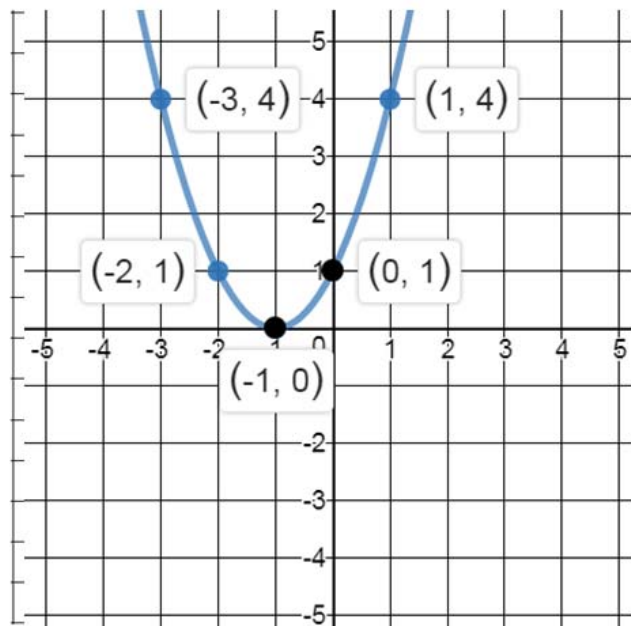
Ex) Graph  $g(x) = f(x - 3)$   
*opp=h*  
*h=3 right*



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

Practice) Graph  $g(x) = f(x + 1)$

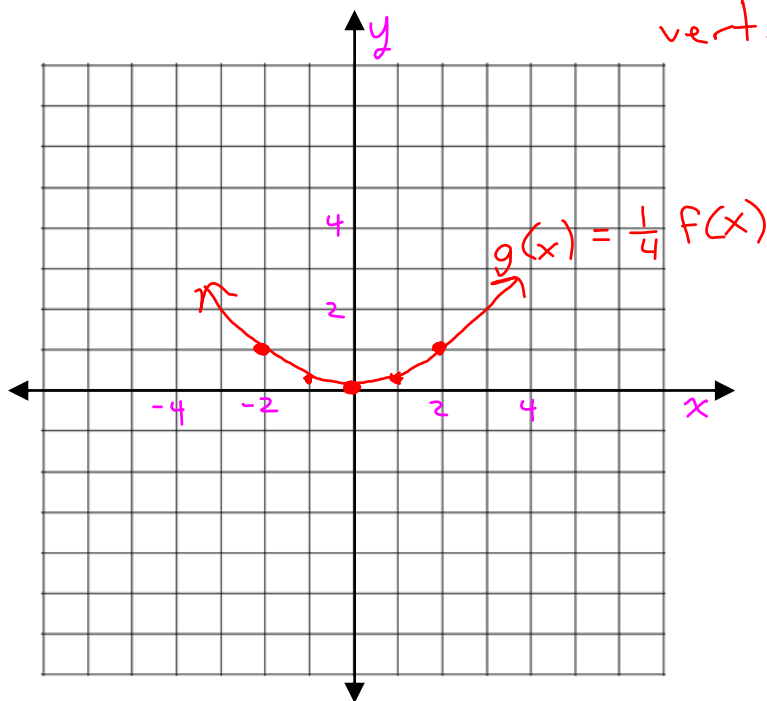
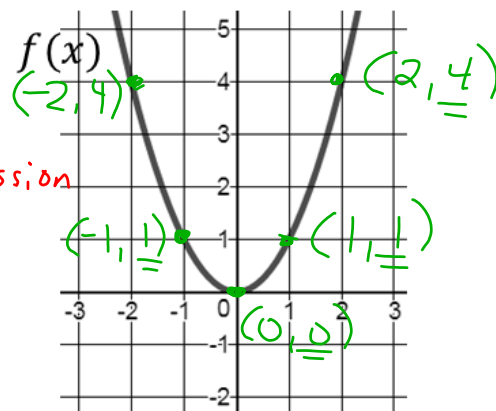


Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

Ex) Graph  $g(x) = \frac{1}{4}f(x)$

$|a| = |\frac{1}{4}|$   
 $= \frac{1}{4} < 1$   
 vert. compression

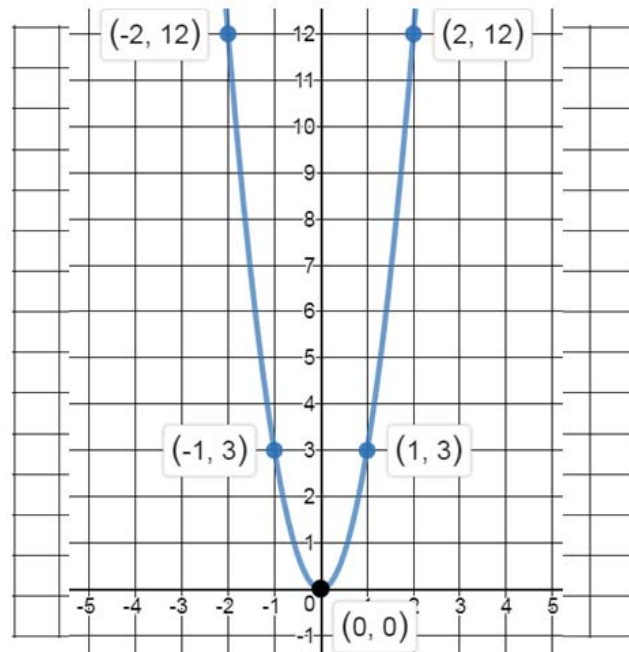
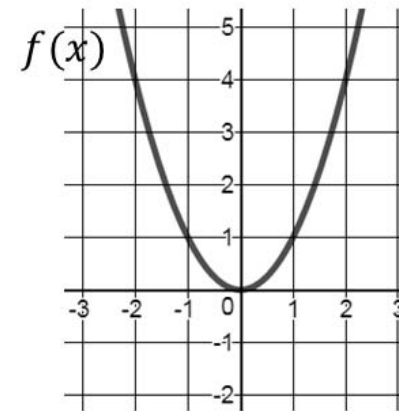


$(0, \frac{1}{4} \cdot 0) = (0, 0)$   
 $(1, \frac{1}{4} \cdot 1) = (1, \frac{1}{4})$   
 $(-1, \frac{1}{4} \cdot 1) = (-1, \frac{1}{4})$   
 $(2, \frac{1}{4} \cdot 4) = (2, 1)$   
 $\frac{4}{4} = 1$   
 $(-2, \frac{1}{4} \cdot 4) = (-2, 1)$

Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

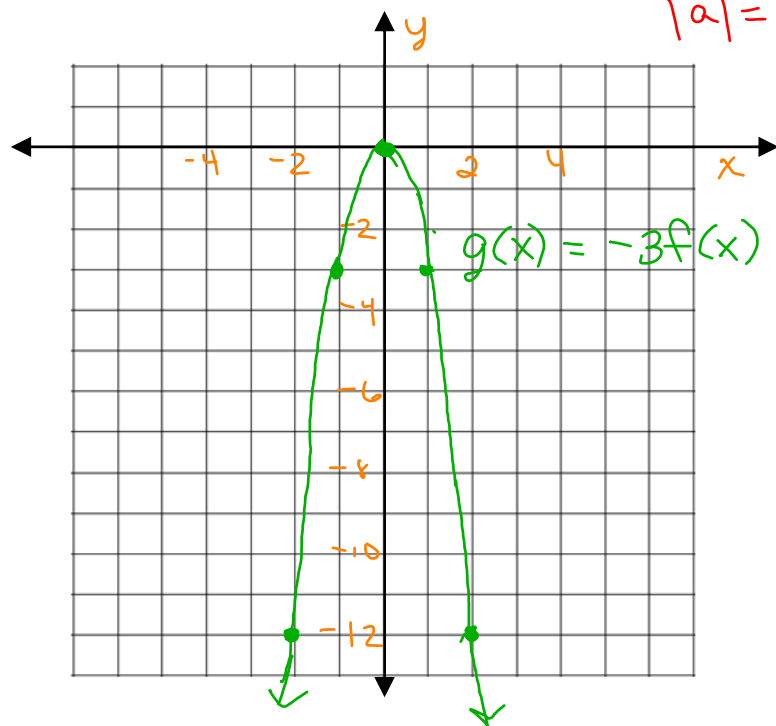
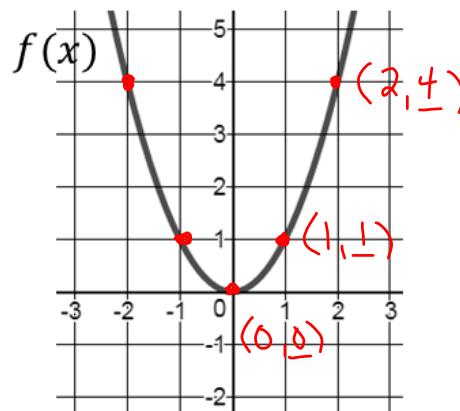
Practice) Graph  $g(x) = 3f(x)$



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

Ex) Graph  $g(x) = -3f(x)$   <sup>$a$</sup>   
 $a = -3 < 0$   
 x-axis refl.  
 $|a| = |-3| = 3 > 1$   
 vert. stretch



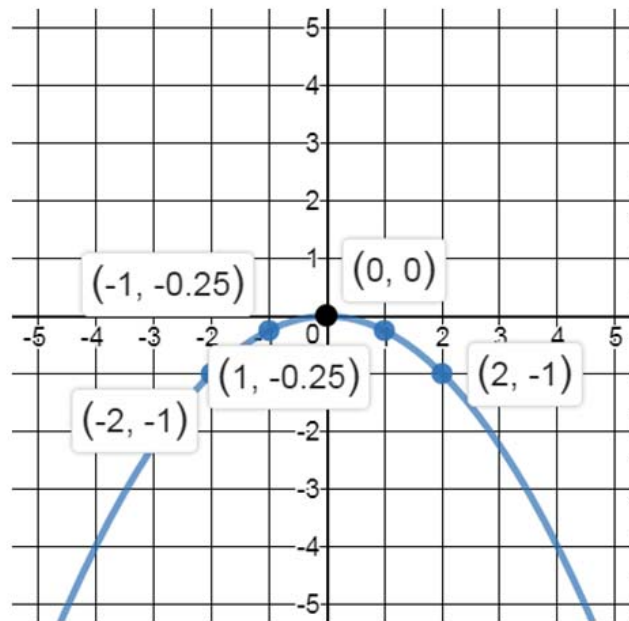
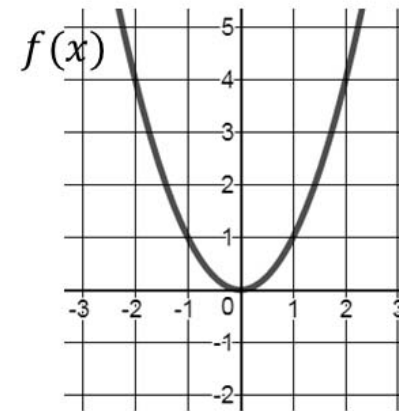
$$\begin{aligned} (0, -3 \cdot 0) &= (0, 0) \\ (1, -3 \cdot 1) &= (1, -3) \\ (-1, -3 \cdot 1) &= (-1, -3) \\ (2, -3 \cdot 4) &= (2, -12) \\ (-2, -3 \cdot 4) &= (-2, -12) \end{aligned}$$



Objective: Graph transformations of a parent graph.

Using the graph of the parent function  $f(x)$ , graph each transformation.

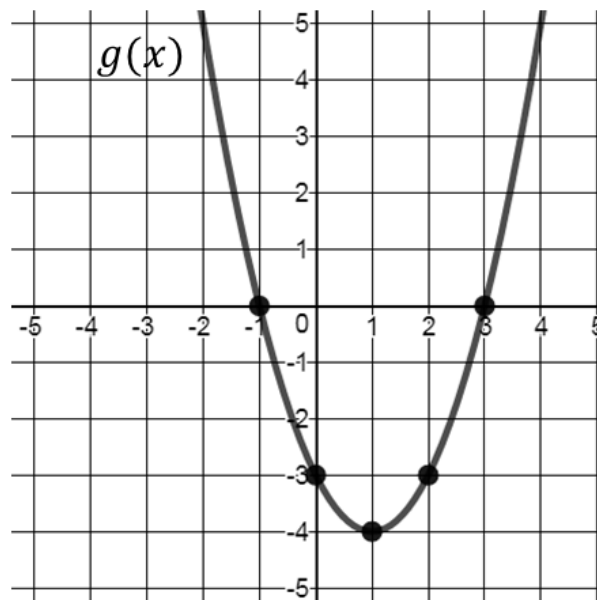
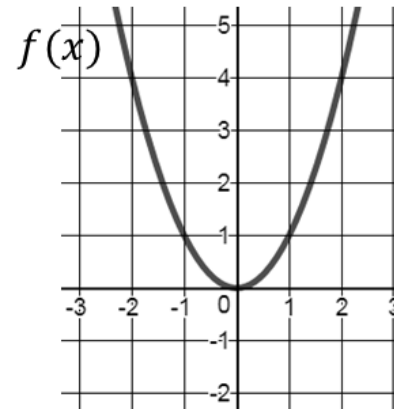
Practice) Graph  $g(x) = -\frac{1}{4}f(x)$



Objective: Graph transformations of a parent graph.

Closure

Using the graph of  $f(x)$ , a student graphed the function  $g(x) = f(x + 1) - 4$ . Explain the student's error.



The student made the mistake of using an  $h$  value of 1 and translating 1 unit right instead of the correct parameter of  $h = -1$  and translating 1 unit left.