Use these two functions:

$f(x) = (x+2)^3 - 1 \qquad g(x) = \sqrt[3]{x+1} - 2$

1. Find f(g(x)). Simplify as much as possible.

$f(g(x)) = \left(\sqrt[3]{x+1} - 2 + 2\right)^3 - 1$

$= \left(\sqrt[3]{x+1}\right)^3 - 1$

$= x + 1 - 1$

$f(g(x)) = x$

Use these same two functions:

$f(x) = (x+2)^3 - 1 \qquad g(x) = \sqrt[3]{x+1} - 2$

2. Find g(f(x)). Simplify as much as possible.

$g(f(x)) = \sqrt[3]{(x+2)^3 - 1 + 1} - 2$

$= \sqrt[3]{(x+2)^3} - 2$

$= x + 2 - 2$

$g(f(x)) = x$

Whenever f(g(x))=x and g(f(x))=x

the functions f(x) and g(x) are called INVERSES

Are these functions inverses?

$f(x) = \dfrac{x+1}{x} + 5 \qquad g(x) = \dfrac{1}{x-6}$

only if $f(g(x)) = x$ AND $g(f(x)) = x$

f(g(x)):

$\dfrac{\frac{1}{x-6} + 1}{\frac{1}{x-6}} + 5$

$= \dfrac{\frac{1}{x-6} + \frac{x-6}{x-6}}{\frac{1}{x-6}} + 5$

$= \dfrac{\frac{x-5}{x-6}}{\frac{1}{x-6}} + 5$

$= \dfrac{x-5}{x-6} \cdot \dfrac{x-6}{1} + 5$

$= \dfrac{x-5}{1} + 5$

$= x - 5 + 5 = x$

$f(g(x)) = x$

Now find g(f(x)). See next page.

Are these functions inverses?

$$f(x) = \frac{x+1}{x} + 5 \qquad g(x) = \frac{1}{x-6}$$

only if $f(g(x)) = x$ AND $g(f(x)) = x$

$$g(f(x)) = \frac{1}{\frac{x+1}{x} + 5 - 6} = \frac{1}{\frac{x+1}{x} - 1} = \frac{1}{\frac{x+1}{x} - \frac{x}{x}} = \frac{1}{\frac{1}{x}} = 1 \cdot \frac{x}{1} = x$$

$g(f(x)) = x$

Since both f(g(x)) and g(f(x)) = x

the functions f(x) and g(x) are

inverses.

You can now finish Hwk #6:

Practice Sheet Sec 7-6: Composite Functions

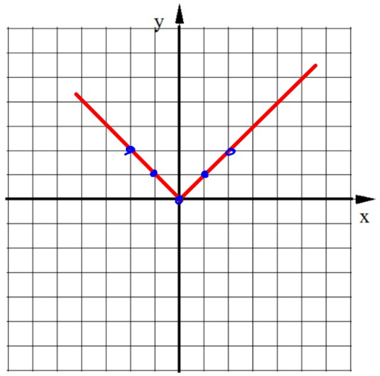
Due Tomorrow

Sec 2-5: Graphs of Absolute Value Functions.

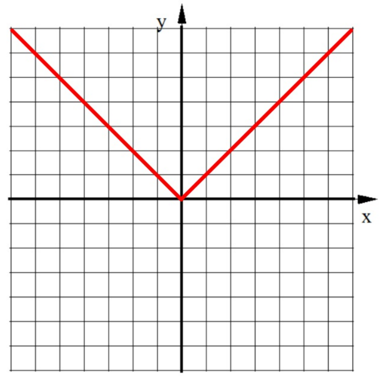
Graph of Parent Absolute Value Function:

$y = |x|$

X	Y
-2	2
-1	1
0	0
1	1
2	2



The sides of the Parent Absolute Value Function have a slope of ±1



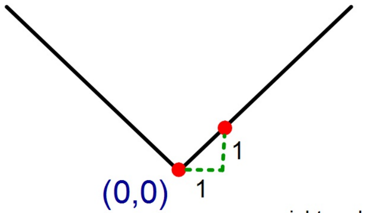
What type of symmetry does the graph of the Parent Absolute Value Function have?

symmetry about a vertical line (y-axis).

Parent Absolute Value Function: $y = |x|$

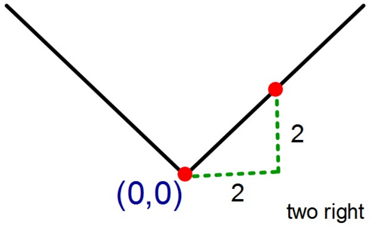
Graph is a "V" that opens UP. Vertex is the point (0,0)

1st "good" point:



one right and one up from the vertex

2nd "good" point:



two right and two up from the vertex

If you can find the vertex and the first two "good" points on one side you can then use the Line of Symmetry to get points on the other side to complete the "V".

Transformed Absolute Value Function: $y = |x - h| + k$

Graph has Translated:
h Units Horizontally and k Units Vertically.

$|x - h|$ h units RIGHT $|x + h|$ h units LEFT

$|x| + k$ k units UP $|x| - k$ k units DOWN

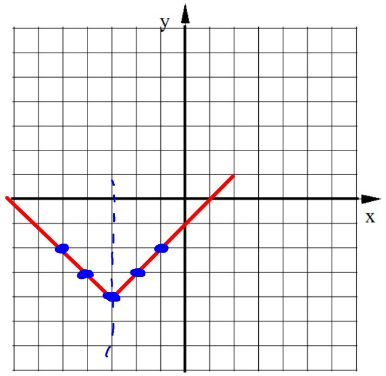
Vertex: (h,k)

Graph the given function using at least five points.

$y = |x + 3| - 4$

3 Left 4 down

Vertex (-3, 4)



- Plot the Vertex
- Find the first two "good" pts on the right side
- Use symmetry to get two points on the left side