Pre-Calculus 12 Name _____

3.1 – Translating Graphs of Functions Block _____

In this chapter, we will look at various ways of transforming (changing) graphs of functions.

There are many types of transformations we can make; one of these is **translations**.

A translation is a vertical or horizontal "shift" or "slide" left or right, up or down.

Complete "Construct your Understanding" on p. 162/163 in your worktext.

note: $y-1=|x|$ is the same as $y=|x|+1$

In General: If $y=f(x)$, then:

	$y=f(x-h)$	if $h>0$, then translate right	$y=f(x-3)$
		$h<0$, then translate left	$y=f(x+3)$
	$y-k=f(x)$	if $k>0$, then translate up	$y=f(x)+3$
or	$y=f(x)+k$	$k<0$, then translate down	$y=f(x)-3$

Example #1: Describe each translation to the graph of $y=f(x)$.

a) $y=f(x-3)$

right 3 units

b) $y=f(x+3)$

left 3 units

c) $y-3=f(x)$ $\Rightarrow y=f(x)+3$

up 3 units

d) $y=f(x)-3$

down 3 units

e) $y+3=f(x+1)$

$\Rightarrow y=f(x+1)-3$

left 1 unit

down 3 units

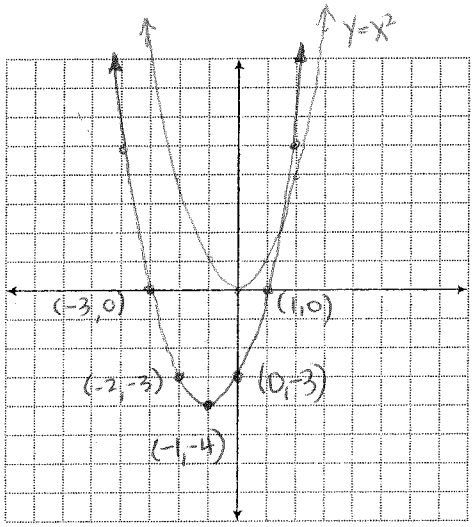
f) $y=f(x+3)-1$

left 3 units

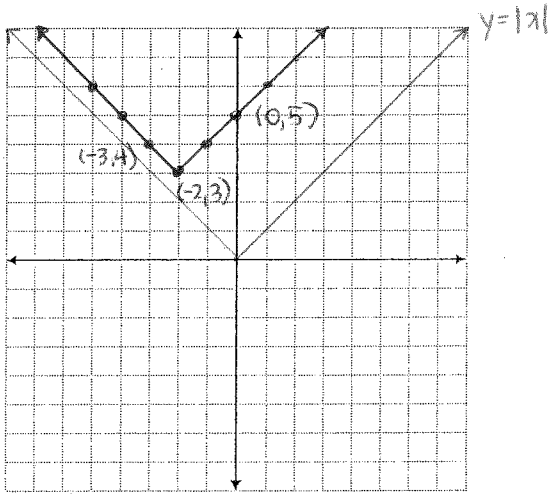
down 1 unit

Example #2: Describe the translation(s) for each function. Then, sketch the graph of each function.

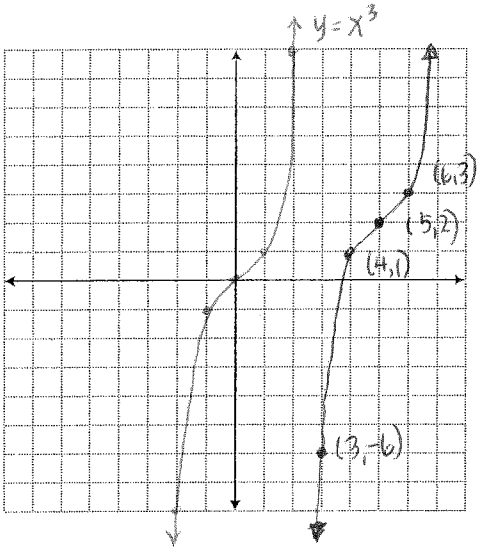
a) $y = x^2$ and $y = (x+1)^2 - 4$ left 1 down 4



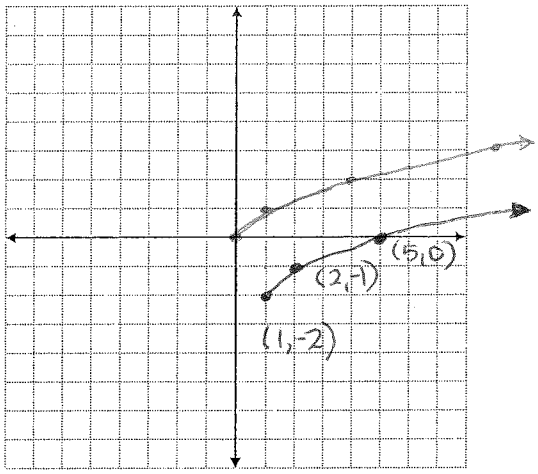
b) $y = |x|$ and $y = |x+2| + 3$ left 2 up 3



c) $y = x^3$ and $y = (x-5)^3 + 2$ right 5 up 2



d) $y = \sqrt{x}$ and $y + 2 = \sqrt{x-1}$ $\Rightarrow$ $y = \sqrt{x-1} - 2$ right 1 down 2



Homework: p. 169 #4 – 16