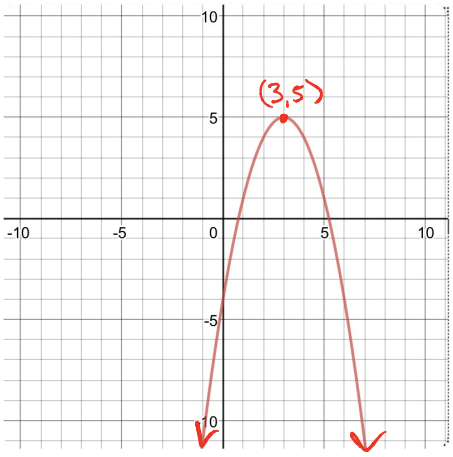
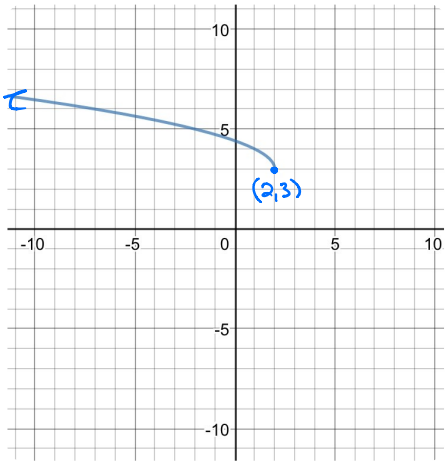
Homework 1.1

Write the transformations, in words, that exist in the equation of the function that cause the graph to be different from the basic function. Then, graph the function. (Calculator NOT Permitted)

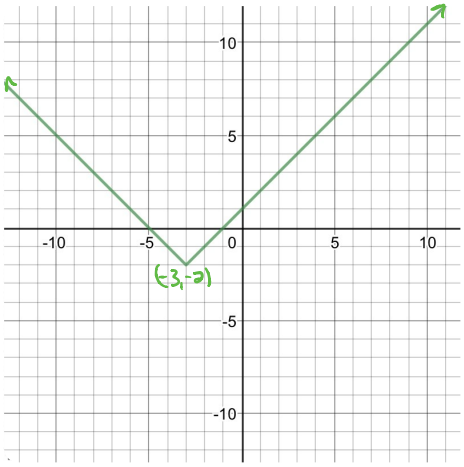
1. $f(x) = -(x-3)^2 + 5$ vertex (3,5)



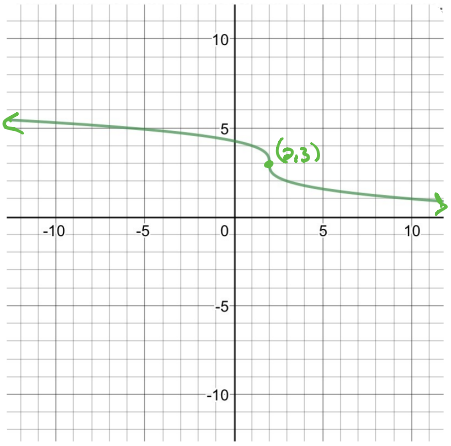
2. $f(x) = \sqrt{-x+2} + 3 = \sqrt{-(x-2)} + 3$



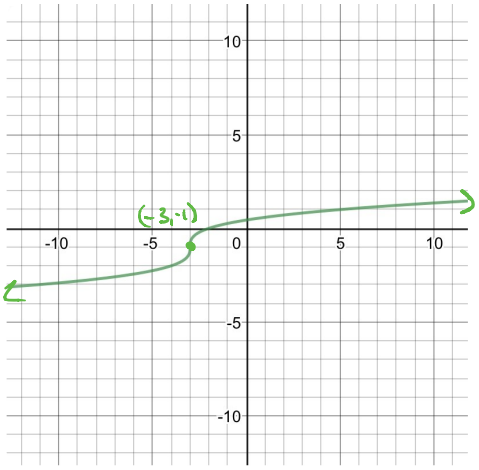
3. $f(x) = |x+3| - 2$



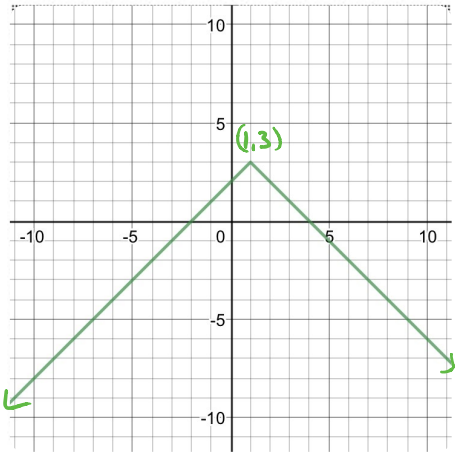
4. $f(x) = -\sqrt[3]{x-2} + 3$



5. $f(x) = \sqrt[3]{x+3} - 1$



6. $f(x) = -|x-1| + 3$



7. The graph of $f(x)$ is formed by connecting the points in the table in exercise #9 below with straight line segments. Graph $f(x)$ on the grid below.

8. The function $p(x)$ is such that $p(x) = 3f(-x - 2) + 2$. State the shifts, reflections, and/or stretches that $f(x)$ would undergo to obtain the graph of $p(x)$. Write the $x - y$ rule that would transform points on the graph of $f(x)$ into points on $p(x)$.

$p(x) = 3f[-(x+2)] + 2$

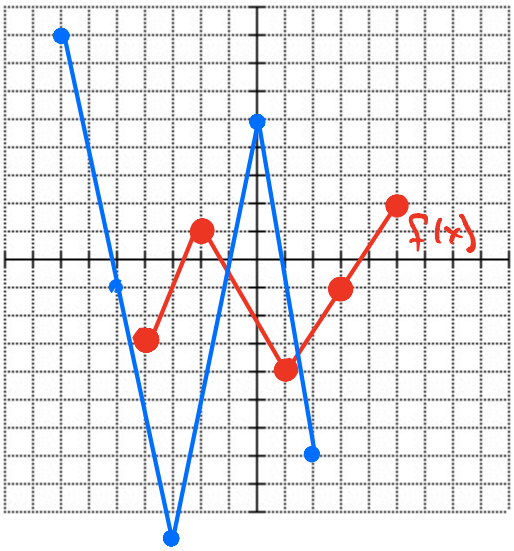
Rule
$(x, y) \to (-x-2, 3y+2)$

Horizontal
- Reflection
- Translate left 2

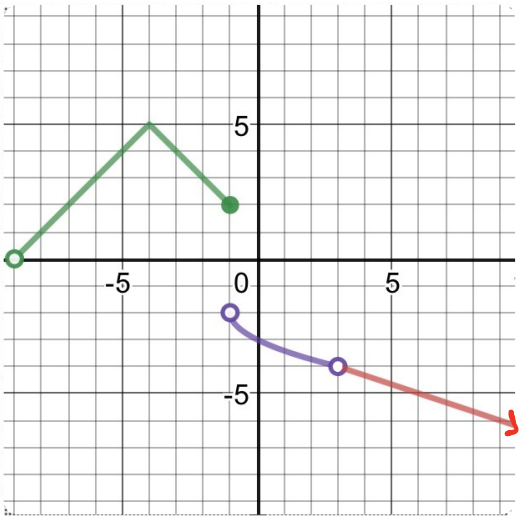
vertical
- Dilate by factor of 3
- Translate up 2

9. Perform the appropriate operations to determine the corresponding ordered pairs on the graph of $p(x)$. Complete the table to the right. Then, graph $p(x)$ on the same coordinate grid as $f(x)$. Graph them them using two different colors of highlighters.

Coordinates on $f(x)$	x coordinate on $p(x)$	y coordinate on $p(x)$	Ordered Pairs on $p(x)$
$(-4, -3)$	$4-2=2$	$3(-3)+2=-7$	$(2, -7)$
$(-2, 1)$	$2-2=0$	$3(1)+2=5$	$(0, 5)$
$(1, -4)$	$-1-2=-3$	$3(-4)+2=-10$	$(-3, -10)$
$(3, -1)$	$-3-2=-5$	$3(-1)+2=-1$	$(-5, -1)$
$(5, 2)$	$-5-2=-7$	$3(2)+2=8$	$(-7, 8)$



10. Graph $F(x) = \begin{cases} -|x+4|+5, & -9 < x \le -1 \\ -\sqrt{x+1}-2, & -1 < x < 3 \\ -\frac{1}{3}x - 3, & x > 3 \end{cases}$.



What is the domain of $F(x)$? $(-9, 3) \cup (3, \infty)$

What is the range of $F(x)$? $(-\infty, -4) \cup (-4, -2) \cup (0, 5]$