## Honors Algebra 2 Summary of Transformation Rules NOTES

Name: \_\_\_\_\_ Date: \_\_\_\_\_

These rules change the y values.

New function	How points in graph of $f(x)$ become points of new graph	visual effect
f(x) + d	$(a,b)\mapsto (a,b+d)$	shift up by $d$
f(x) - d	$(a,b)\mapsto (a,b-d)$	shift down by $d$
cf(x)	$(a,b)\mapsto (a,cb)$	stretch vertically by $c$
$\frac{1}{c}f(x)$	$(a,b)\mapsto (a,\frac{1}{c}b)$	shrink vertically by $\frac{1}{c}$
-f(x)	$(a,b)\mapsto (a,-b)$	flip over the $x$ -axis

## These rules change the x values.

New function	How points in graph of $f(x)$ become points of new graph	visual effect
f(x+d)	$(a,b)\mapsto (a-d,b)$	shift left by $d$
f(x-d)	$(a,b)\mapsto (a+d,b)$	shift right by $d$
f(cx)	$(a,b)\mapsto (rac{1}{c}a,b)$	shrink horizontally by $\frac{1}{c}$
$f(\frac{1}{c}x)$	$(a,b)\mapsto (ca,b)$	stretch horizontally by $c$
f(-x)	$(a,b)\mapsto (-a,b)$	flip over the $y$ -axis

## These two rules are special cases.

f(x)	f( x )
Reflects all negative y-values from Q3 and Q4 onto Q2 and Q1 respectively. All points on the x-axis stay on the x-axis.	All negative x-values become positive which causes the points in Q1 and Q4 to replace all the points in Q2 and Q3 respectively with the reflection of the positive x-values. It is a reflection over the y-axis of only the positive x-values.