Adv Alg

Name NOTES
Date: ____________ Pd ________

AA2: INTRO TO TRANSFORMATIONS

Function notation is a way to indicate that an equation is a function. Function notation looks like "f(x)" and represents "y" in an equation. Equations define the relationships between one or more variables. Functions maintain that for every input (x –value), there is only one output (y-value). The output or "y" is the dependent variable. The input or "x" is the independent variable.

Instead of writing y = 2x + 1, we can write $f(\underset{\text{input}}{x}) = \underbrace{2x + 1}_{\text{output}}$. Doing so allows us to evaluate the function at varying values of x.

$f(\overset{x}{2}) = 2(\overset{x}{2}) + 1$
$= 5$ which means that f(2) = 5 which implies that there is a point (2, 5) on the graph of this function.

You try: Given $g(x) = x^2 - 2$, find $g(\overset{x}{3})$.

$g(\underset{x}{3}) = (\underset{x}{3})^2 - 2 = 9 - 2 = 7 \quad \therefore \; g(3) = 7 \Rightarrow (3, 7)$ is on the graph of $g(x)$

Evaluating functions is helpful for graphing. When given a function, one tool to help graph it is creating a table of values. By evaluating the function for values of "x", we can find the "y" values.

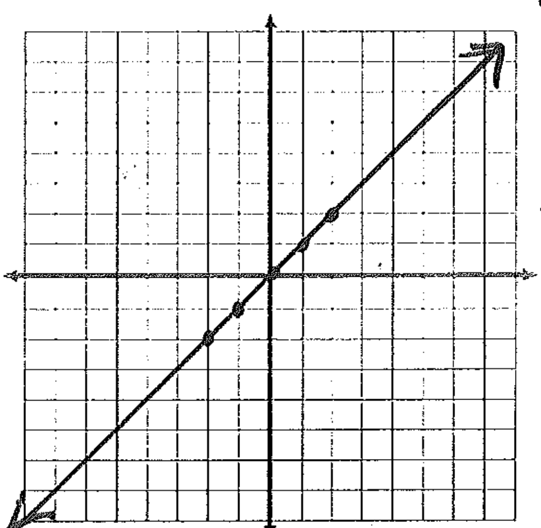
A ***parent function*** is the most basic function of a family of functions. Functions can be transformed by performing vertical shifts, horizontal shifts, compressions, stretches, and reflections. The families of functions we will be exploring are linear, quadratic, cubic, square root, cube root, and absolute value.

Let's explore the graphs of some parent functions.

LINEAR
f(x) = x

x	f(x)	
-2	-2	⇒ (-2, -2)
-1	-1	⇒ (-1, -1)
0	0	
1	1	
2	2	

f(-2) = -2
f(-1) = -1
⋮



→ span of "x" values, how far right + left can the graph extend?

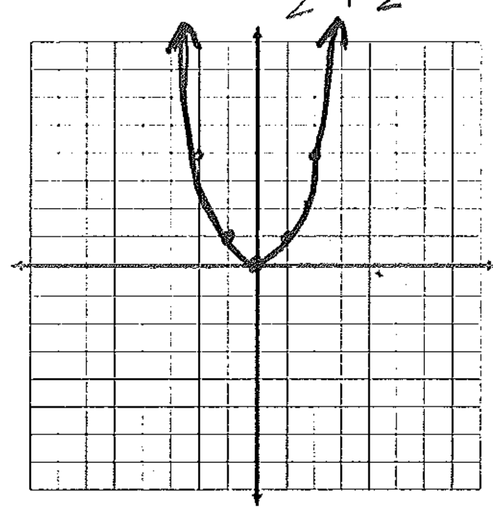
Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$
span of "y" values

QUADRATIC
$f(x) = x^2$

x	f(x)
-2	4
-1	1
0	0
1	1
2	2

$f(-2) = (-2)^2 = 4$
$f(-1) = (-1)^2 = 1$
$f(0) = 0^2 = 0$
⋮



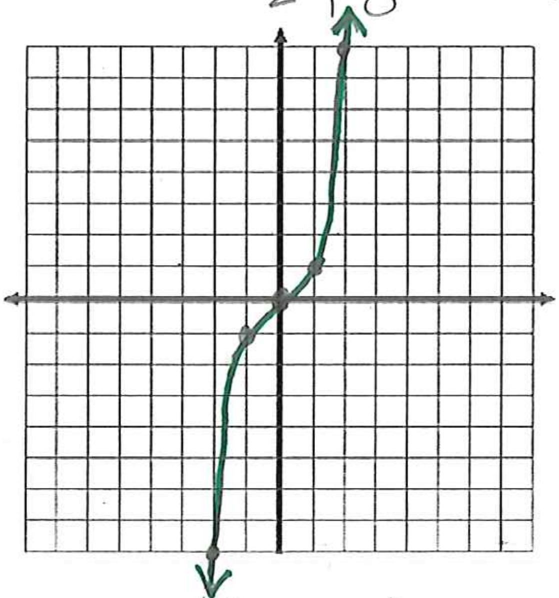
Domain: $(-\infty, \infty)$

Range: $[0, \infty)$
inclusive of

CUBIC
$f(x) = x^3$

x	f(x)
-2	-8
-1	-1
0	0
1	1
2	8

$f(-2)=(-2)^3$
$=-8$
$f(-1)=(-1)^3$
$=-1$
⋮



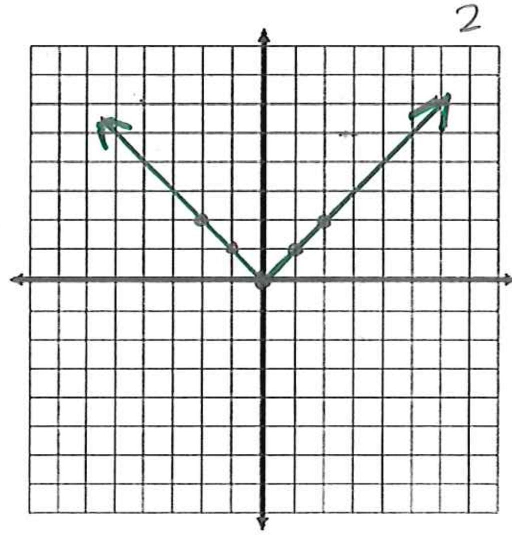
Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

ABSOLUTE VALUE
$f(x) = |x|$

x	f(x)
-2	2
-1	1
0	0
1	1
2	2

$f(-2)=|-2|$
$=2$
$f(-1)=|-1|$
$=1$
⋮

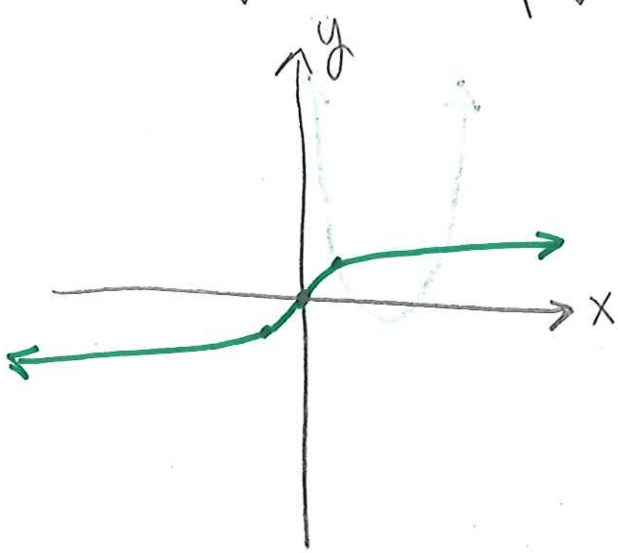


Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

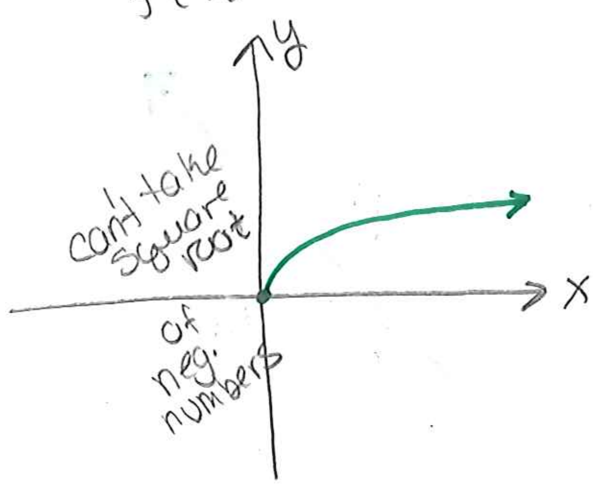
Cube Root
$f(x)=\sqrt[3]{x}$

TI-84:
MATH
#4: $\sqrt[3]{\ }$



Domain: $(-\infty, \infty)$
Range: $(-\infty, \infty)$

Square root
$f(x)=\sqrt{x}$



Domain: $[0, \infty)$
Range: $[0, \infty)$