Precalculus Plus
Summer Assignment 2021 **Name** _____

Part I: Graphing Parent Functions and the Rule of Four

Quick Review – The Rule of Four

There are four basic ways of representing functions: **verbal, algebraic, numerical, and graphical**.

- Verbal includes listing the name of the function and describing its characteristics.
- Algebraic includes writing the equation of the parent function.
- Numerical includes writing 5 key anchor points and features, such as the location of any hole(s) and the equations for all asymptotes (if any). Choose "nice" x values – often we use x values of -2, -1, 0, 1, 2 unless the function is not defined for those values or those values are hard to compute.
- Graphical includes plotting points and sketching the graph. Please indicate your scale on both axes.

Example: Absolute Value Parent Function

Verbal:

Name: *Absolute Value Function*

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

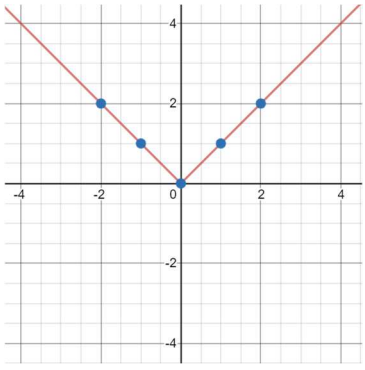
Algebraic (Formula):

$$y = |x| = \begin{cases} x & if \quad x \geq 0 \\ -x & if \quad x < 0 \end{cases}$$

Numerical (Anchor Points):

$(-2, 2)$
$(-1, 1)$
$(0, 0)$
$(1, 1)$
$(2, 2)$

Graphical:



Problem Set I: Graphing Parent Functions and The Rule of Four

Given the name of the following parent functions, complete the "Rule of Four" charts for each.

1. Quadratic Function

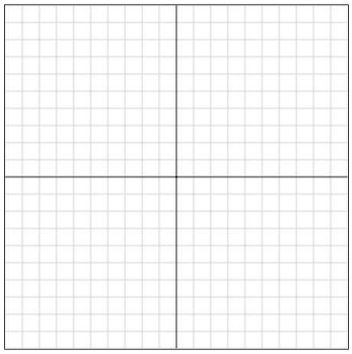
Verbal:
Name: *Quadratic Function*

Domain: Range:

Algebraic (Formula):

Numerical (Anchor Points):

Graphical:



2. Square Root Function

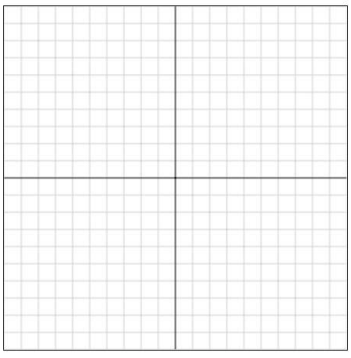
Verbal:
Name: *Square Root Function*

Domain: Range:

Algebraic (Formula):

Numerical (Anchor Points):

Graphical:



3. Cubic Function

Verbal:

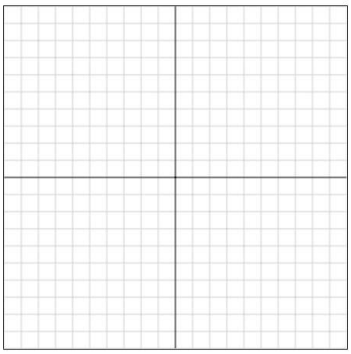
Name: *Cubic Function*

Domain: Range:

Algebraic (Formula):

Numerical (Anchor Points):

Graphical:



4. Cube Root Function

Verbal:

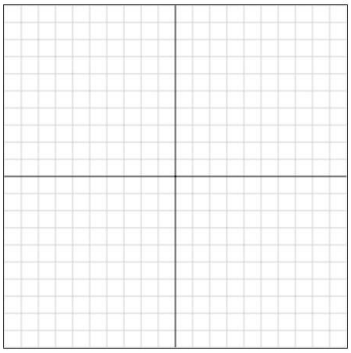
Name: *Cube Root Function*

Domain: Range:

Algebraic (Formula):

Numerical (Anchor Points):

Graphical:



5. Reciprocal Function

Verbal:

Name: *Reciprocal Function*

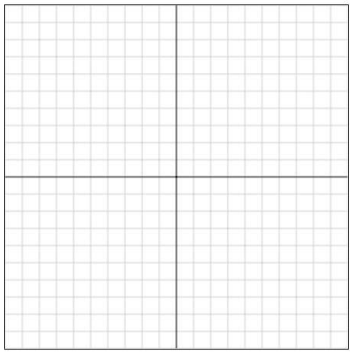
Domain: Range:

Algebraic (Formula):

$$y = \frac{1}{x}$$

Numerical (Anchor Points):

Graphical:



6. Reciprocal Square Function

Verbal:

Name: *Reciprocal Square Function*

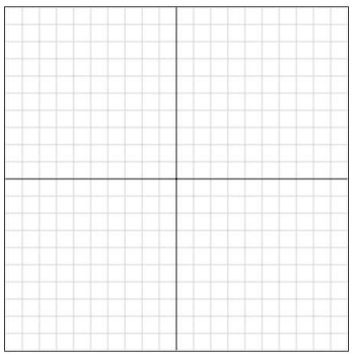
Domain: Range:

Algebraic (Formula):

$$y = \frac{1}{x^2}$$

Numerical (Anchor Points):

Graphical:



Part II: Solving Equations and Inequalities

Students should be able to solve linear, quadratic, polynomial, rational, radical, and absolute value equations and inequalities.

Problem Set III-A: Solve the following equations. You should NOT use a calculator to solve. All solutions should be given as an exact answer (preferably simplified) – **NO decimal approximations.**

1. $\left[6-4x+2\left(x-7\right)\right]-52-3\left(2x-4\right)=6\left[3\left(2x-3\right)+6\right]$

2. $8-3\left|\frac{1}{2}b-4\right|=2$

3. $-2\left(2x-3\right)^2+14=0$

4. $4t^3+4t^2-2t=0$

5. $\frac{x}{x+2}-4=\frac{x+1}{x}$

6. $\dfrac{2x}{x-1}+\dfrac{1}{x-3}=\dfrac{2}{x^2-4x+3}$

7. $2\sqrt{4-y}+10=12$

8. $\sqrt{x+2}=6-\sqrt{7x+2}$

9. $x^{2/3}+3x^{1/3}+2=0$

10. $p(2p-5)^2-3(2p-5)=0$

Problem Set III-B: Solve the following inequalities. Show all work including any sign chart analysis.

11. $-6 \le 1 - 4(x+2) \le 16$

12. $|1-2x| < 4$

13. $|2-5x| > 0$

14. $6x^2 - 7x < 20$

15. $\dfrac{3}{x-2} - \dfrac{1}{x-4} \le 0$