

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.

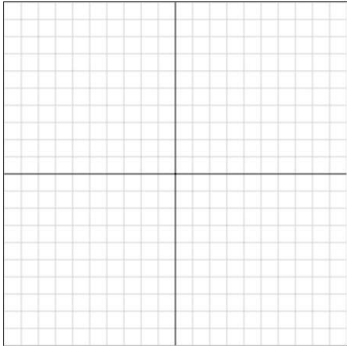
Example: Absolute Value Parent Function

<p>Verbal: Name: <i>Absolute Value Function</i></p> <p>Domain: $(-\infty, \infty)$ Range: $[0, \infty)$</p>	<p>Algebraic (Formula):</p> $y = x = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$
<p>Numerical (Anchor Points):</p> <p>$(-2, 2)$ $(-1, 1)$ $(0, 0)$ $(1, 1)$ $(2, 2)$</p>	<p>Graphical:</p>

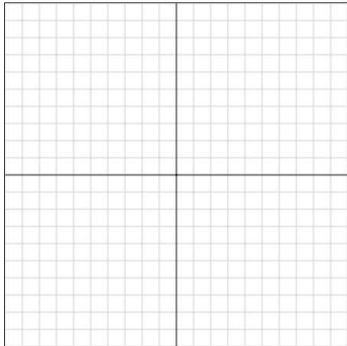
Problem Set I: Graphing Parent Functions and The Rule of Four

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

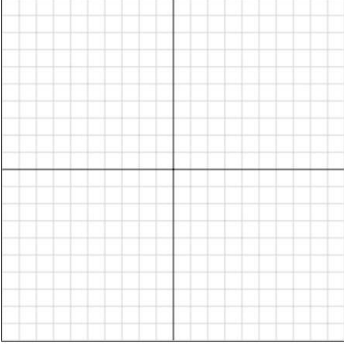
1. Quadratic Function

Verbal: Name: <i>Quadratic Function</i>	Algebraic (Formula):
Domain: Range:	
Numerical (Anchor Points):	Graphical: 

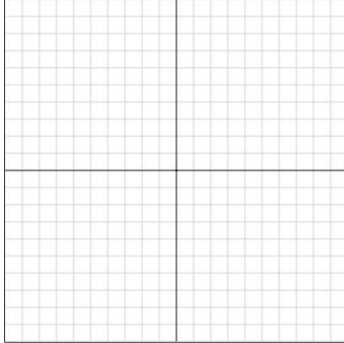
2. Square Root Function

Verbal: Name: <i>Square Root Function</i>	Algebraic (Formula):
Domain: Range:	
Numerical (Anchor Points):	Graphical: 

3. Cubic Function

Verbal: Name: <i>Cubic Function</i>	Algebraic (Formula):
Domain: Range:	
Numerical (Anchor Points):	Graphical:
	

4. Cube Root Function

Verbal: Name: <i>Cube Root Function</i>	Algebraic (Formula):
Domain: Range:	
Numerical (Anchor Points):	Graphical:
	

5. Reciprocal Function

Verbal: Name: <i>Reciprocal Function</i> Domain: Range:	Algebraic (Formula): $y = \frac{1}{x}$
Numerical (Anchor Points):	Graphical:

6. Reciprocal Square Function

Verbal: Name: <i>Reciprocal Square Function</i> 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. $[6 - 4x + 2(x - 7)] - 52 - 3(2x - 4) = 6[3(2x - 3) + 6]$

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

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

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

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

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

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

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

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

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

15. $\frac{3}{x-2} - \frac{1}{x-4} \leq 0$