Name: ______________________ Date: ______________________ **Unit 1 Class Work**

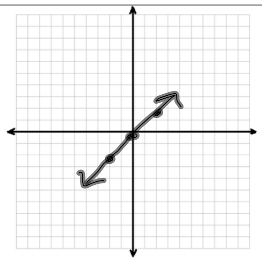
Parent Functions

For each function, write its name, sketch its graph, list its domain, and range, and write a possible child! ☺

Linear

$y = x$

x	y
-2	-2
0	0
2	2



(x) **DOMAIN:** left, right $(-\infty,\infty)$ can input any #

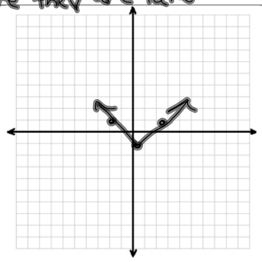
(y) **RANGE:** down, up $(-\infty,\infty)$ output can be any #

EXAMPLE(S): $y=-2x+1$, $y=5x+3$ — we will see where they are later

Absolute Value

$y = |x|$ graph is "V" shaped

x	y
-2	2
0	0
2	2



DOMAIN: L, R $(-\infty,\infty)$ can input any #

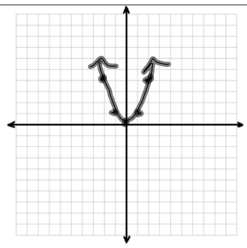
RANGE: output has to be pos./0 $[0,\infty)$

EXAMPLE(S): $y=-|5x+3|$, $y=3|4x|$

Quadratic

$y = x^2$ parabola

x	y
-2	4
-1	1
0	0
1	1
2	4



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

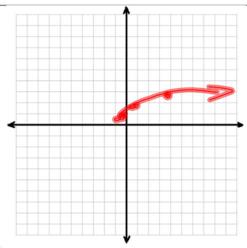
RANGE: cannot be negative $[0,\infty)$

EXAMPLE(S): $y=3x^2+5x$, $y=-x^2+9$

Square Root / Radical

$y = \sqrt{x}$

x	y
-2	imaginary
0	0
1	1
4	2



(x) **DOMAIN:** $[0,\infty)$ neg. √'s are imaginary

(y) **RANGE:** $[0,\infty)$

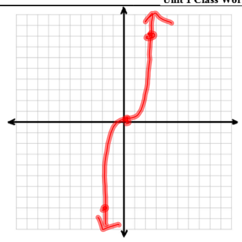
EXAMPLE(S): $y=2\sqrt{x+5}$, $y=\sqrt{3x}-9$

Name: ______________________ Date: ______________________ **Unit 1 Class Work**

Cubic

$y = x^3$

x	y
-2	-8
0	0
2	8



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

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

Example(s): $y = (x+2)^3 - x^2$

$y = -x^2 + 5x - 1$

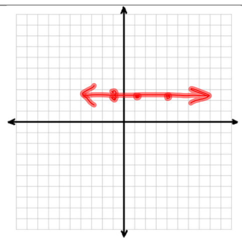
Constant

ex. $y=3$

$y = c$

horizontal line

x	y
-2	3
0	3
2	3



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

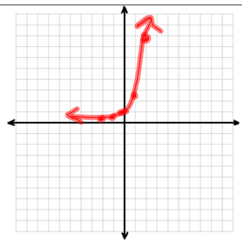
Range: $\{c\}$

Example(s): $y=5$ $y=-8$ $y=\frac{1}{2}$

Exponential

$y = e^x$

x	y
-2	.135
-1	.37
0	1
1	2.7
2	7.4



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

Range: $(0, \infty)$

Example(s): $y = e^{x+5}$ $y = 2e^{-x+1}$

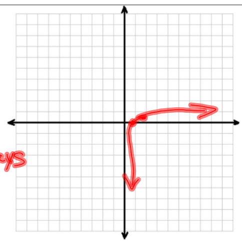
Natural Log

$y = \ln(x)$

inverse of e^x

x	y
-2	Domain Error
0	Error
1	0
2	.30

sideways "L"



Domain: $(0, \infty)$

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

Example(s):

Name: ____________ Date: ____________ **Unit 1 Class Work**

Rational (Odd)

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

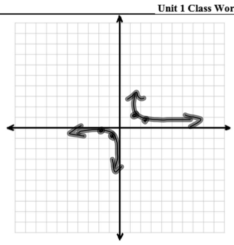
x	y
-2	-1/2
-1	-1
1	1
2	1/2

*cannot divide by 0

Domain: $(-\infty, 0) \cup (0, \infty)$

Range: $(-\infty, 0) \cup (0, \infty)$

Example(s):



Rational (Even)

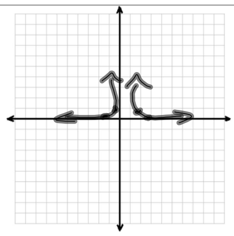
$$y = \frac{1}{x^2}$$

x	y
-2	1/4
-1	1
1	1
2	1/4

Domain: x $(-\infty, 0) \cup (0, \infty)$

Range: y $(0, \infty)$

Example(s):



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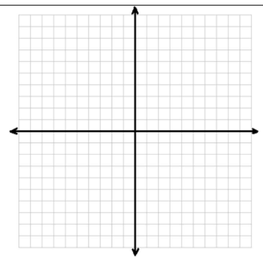
$$y = [x]$$

Domain: ____________

Range: ____________

Example(s):



✎ **Quick Practice:**

1. State the name of the parent function for each.

a. $y = 2x^3 - 1$ b. $f(x) = 1/5x$ c. $f(x) = 9$

2. Name each function. Then sketch a graph, and state the domain and range of each.

a. $y = e^x$ b. $f(x) = 1/x^2$ c. $y = [x]$

3. Write any function that is in the family of each parent function.

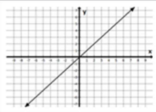
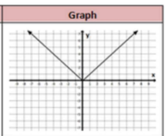
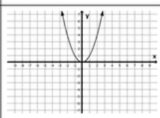
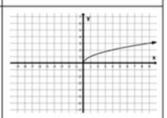
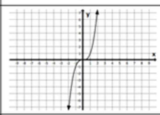
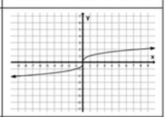
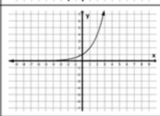
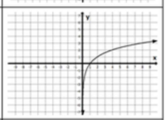
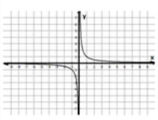
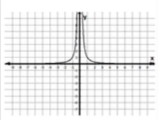
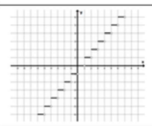
a. Logarithmic b. Quadratic c. Linear

Name: ______________________________ Date: ________________________ **Unit 1 Class Work**

Exit Activity:

On a post-it note, Write a "Tweet" about anything you learned today. (40 characters or less!)

Post it on the board when you are done, and draw a star on your "favorite!"

Parent Function	Graph	Parent Function	Graph
$y = x$ **Linear**, Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ End Behavior: $x \to -\infty, y \to -\infty$ $x \to \infty, y \to \infty$		$y = \lvert x \rvert$ **Absolute Value**, Even Domain: $(-\infty, \infty)$ Range: $[0, \infty)$ End Behavior: $x \to -\infty, y \to \infty$ $x \to \infty, y \to \infty$	
$y = x^2$ **Quadratic**, Even Domain: $(-\infty, \infty)$ Range: $[0, \infty)$ End Behavior: $x \to -\infty, y \to \infty$ $x \to \infty, y \to \infty$		$y = \sqrt{x}$ **Radical**, Neither Domain: $[0, \infty)$ Range: $[0, \infty)$ End Behavior: $x \to \infty, y \to \infty$	
$y = x^3$ **Cubic**, Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ End Behavior: $x \to -\infty, y \to -\infty$ $x \to \infty, y \to \infty$		$y = \sqrt[3]{x}$ **Cube Root**, Odd Domain: $(-\infty, \infty)$ Range: $(-\infty, \infty)$ End Behavior: $x \to -\infty, y \to -\infty$ $x \to \infty, y \to \infty$	
$y = b^x$, $b > 1$ **Exponential**, Neither Domain: $(-\infty, \infty)$ Range: $(0, \infty)$ End Behavior: $x \to -\infty, y \to 0$ $x \to \infty, y \to \infty$		$y = \log_b(x)$, $b > 1$ **Log**, Neither Domain: $(0, \infty)$ Range: $(-\infty, \infty)$ End Behavior: $x \to 0^+, y \to -\infty$ $x \to \infty, y \to \infty$	
$y = \frac{1}{x}$ **Rational (Inverse)**, Odd Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(-\infty, 0) \cup (0, \infty)$ End Behavior: $x \to -\infty, y \to 0$ $x \to \infty, y \to 0$		$y = \frac{1}{x^2}$ **Rational (Inverse Squared)**, Even Domain: $(-\infty, 0) \cup (0, \infty)$ Range: $(0, \infty)$ End Behavior: $x \to -\infty, y \to 0$ $x \to \infty, y \to 0$	
$y = \text{int}(x) = [x]$ **Greatest Integer**, Neither Domain: $(-\infty, \infty)$ Range: $\{y : y \in \mathbb{Z}\}$ (integers) End Behavior: $x \to -\infty, y \to -\infty$ $x \to \infty, y \to \infty$		$y = C$ ($y = 2$ in the graph) **Constant**, Even Domain: $(-\infty, \infty)$ Range: $\{y : y = C\}$ End Behavior: $x \to -\infty, y \to C$ $x \to \infty, y \to C$