#

Algebra 2/Trig
Unit 4 Notes Packet

Name:
Date:
Period:

Parent Graphs

1. Pg 426 #6 – 13

2. Pg 426 – 427 #14 – 31 Column, #36 – 54 Column

3. Pg 426 – 427 #15, #17 – 23 Column, #26 – 32 Column, #37 – 55 Column

4. Pg 426 – 427 #18 – 24 Column, #33 – 35 All, #38 – 56 Column

5. Pg 987-988 #1-16 column (need graph paper)

6. Pg 987-988 #2-17 column (need graph paper)

7. Pg 434-435 #15-21 odd; 22-40 column (need graph paper)

8. Pg 434-435 #16-20 even; 23-41 column (need graph paper)

9. Pg 543-544 #11-38 column (need graph paper)

10. Pg 543-544 #12-39 column (need graph paper)

11. Chapter Review

Inverse Relation:
The domain of the inverse relation is the range of the original relation and that the range of the inverse relation is the domain of the original relation.

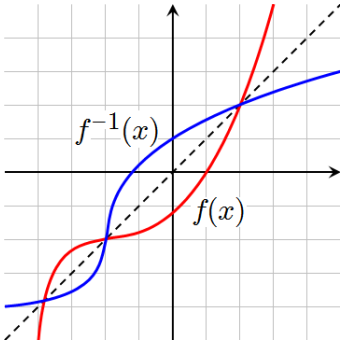
Original relation

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

Inverse relation

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

The graph of an inverse relation is the *reflection* of the graph of the original relation. The line of reflection is y=x.



To find the inverse of a relation that is given by an equation in x and y, switch the roles of x and y and solve for y (if possible).

The inverse of f is denoted f^{-1} and is read "f inverse."

<u>The Horizontal Line Test</u>
If no horizontal line intersects the graph of a function f more than once, then the inverse of f is itself a function.

* The inverse of every non-horizontal linear function is also a function*

E1. Find an equation for the inverse of the relation
y = 2x – 4

P1. Find an equation for the inverse of the relation
y = -3x + 6

E2. Verify that $f(x) = 2x - 4 \; and \; f^{-1} = \frac{1}{2}x + 2$ are inverses

P2. Verify that $f(x) = -3x + 6 \; and \; f^{-1} = -\frac{1}{3}x + 2$ are inverses

E3. Find the inverse of the function $f(x) = x^2, x \geq 0$.

P3. Find the inverse of the function $f(x) = x^5$.

E4. Consider the function $f(x) = \frac{1}{2}x^3 - 2$. Determine whether the inverse of f is a function. Then find the inverse.

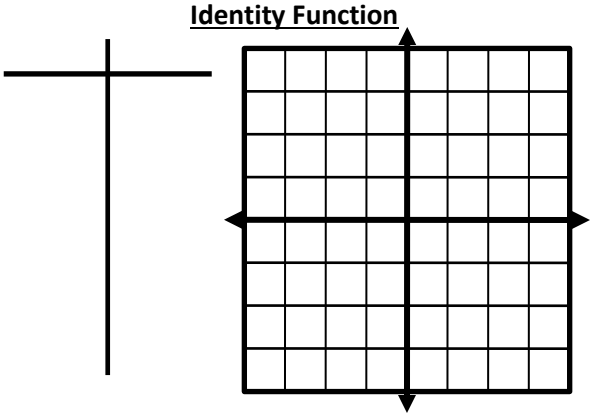
P4. Consider the function $f(x) = 2x^2 - 4$. Determine whether the inverse of f is a function. Then find the inverse.

Appendix 1 (Pg 985), 7.5 and 9.2 (include constant, linear, abs value, quad, cubic, sq root, cube root, quartic, reciprocal/rational

Parent Graphs And Functions

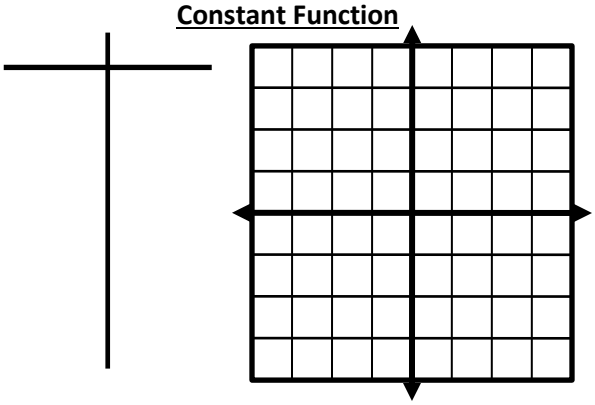
In mathematics, you see certain graphs over and over again. For that reason, these original, common functions are called ***parent graphs***, and they include graphs of quadratic functions, square roots, absolute values, cubics and cube roots. We are going to learn about ten such graphs.

Identity Function



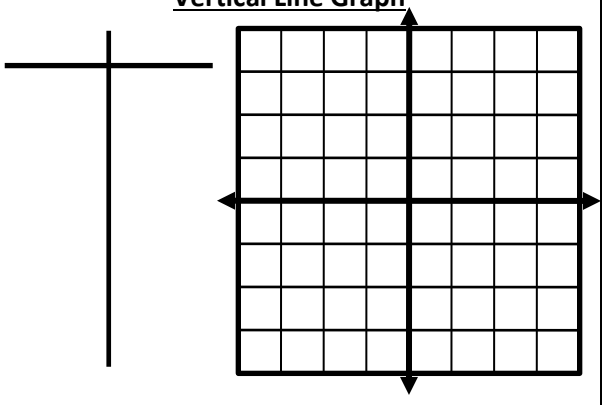
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____

Constant Function



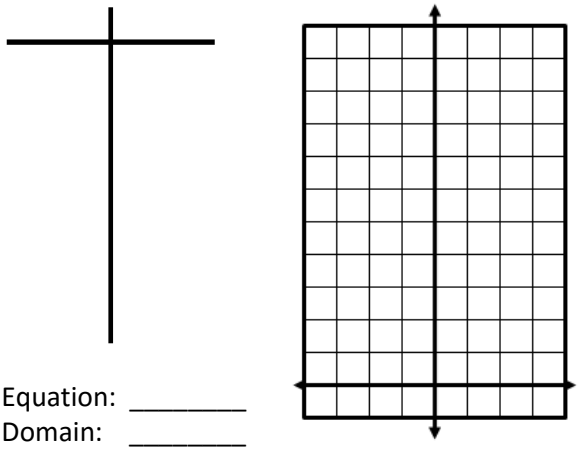
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____

Vertical Line Graph



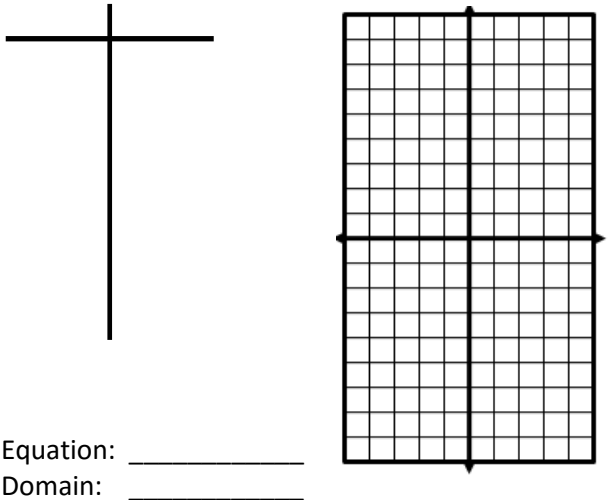
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____

Quadratic Function



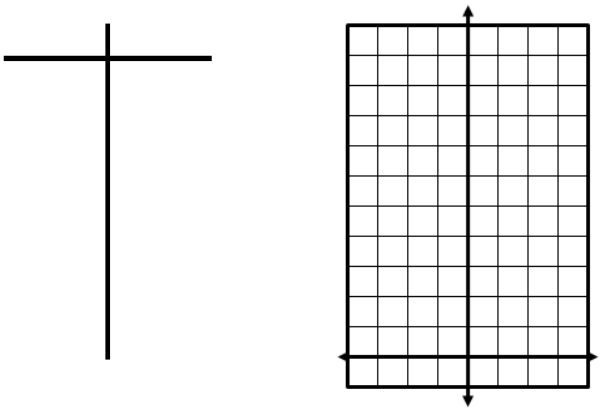
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

Cubic Function



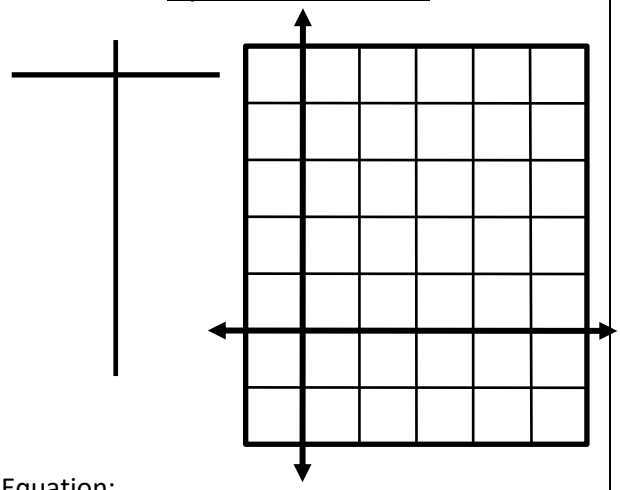
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

Quartic Function



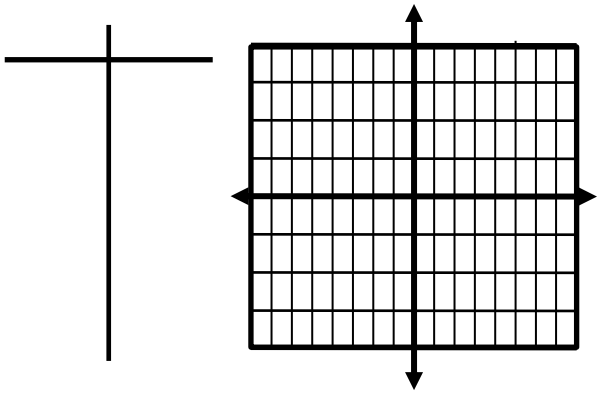
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

Square Root Function



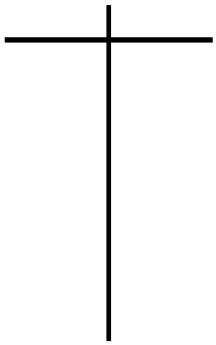
Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

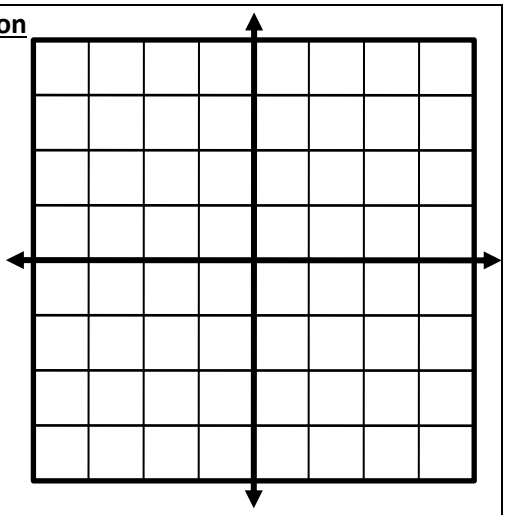
Cube Root Function



Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

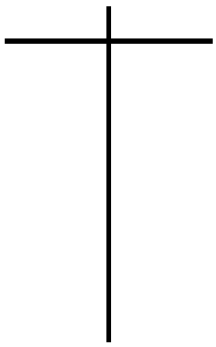
Absolute Value Function

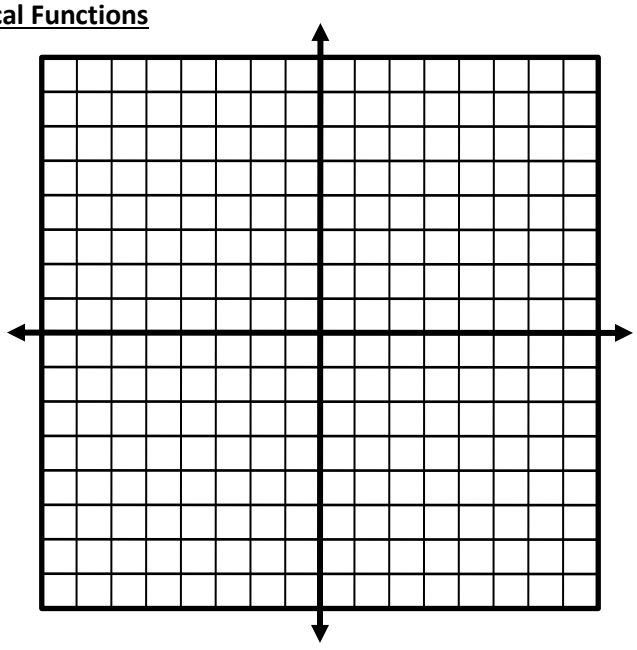




Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximum_____

Reciprocal Functions





Equation: _____
Domain: _____
Range: _____
Special Characteristics:_____
_____
x-intercept_____y-intercept_____
Minimum_____Maximim_____
Horizontal Asymptote_____Vertical Asymptote_____

Transforming Functions

Knowing how a function can be transformed makes it easier to graph the function.

Rigid Transformations:

1. Horizontal Shifts

   To shift c units to the **right**, subtract a number inside the function: $y = (x - 4)^2$

   To shift c units to the **left**, add a number inside the function: $y = (x + 4)^2$

2. Vertical Shifts

   To shift c units **up** add a number outside the function: $y = x^2 + 4$

   To shift c units **down** subtract a number outside the function: $y = x^2 - 4$

   You can combine shifts by adding/subtracting numbers inside and outside the function.

3. Reflections (over the x-axis or y-axis)

   A reflection of a graph flips the graph over the x-axis or y-axis by putting a negative in front of the function or inside the function.

   Reflections over the **x-axis** have a negative in front of the function: $y = -x^2$

   Reflections over the **y-axis** have a negative inside the function: $y = (-x)^2$

Nonrigid Transformations:

Nonrigid transformations are those that cause distortions.

Vertical stretch a graph you multiply outside the function by a number greater than 1:
$y = 2|x - 3|$

Vertical shrink a graph you multiply outside the function by a fraction less than 1 and greater than 0: $y = ½|x - 3|$

Horizontal stretch a graph you multiply inside the function by a fraction less than 1and greater than 0: $y = |\ ½(x - 3)|$

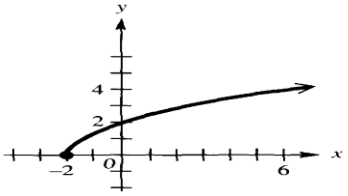
Horizontal shrink a graph you multiply inside the function by a number greater than 1:
$y = |3(x - 3)|$

Steps for Multiple Transformations

Use the following order to graph a function involving more than one transformation:

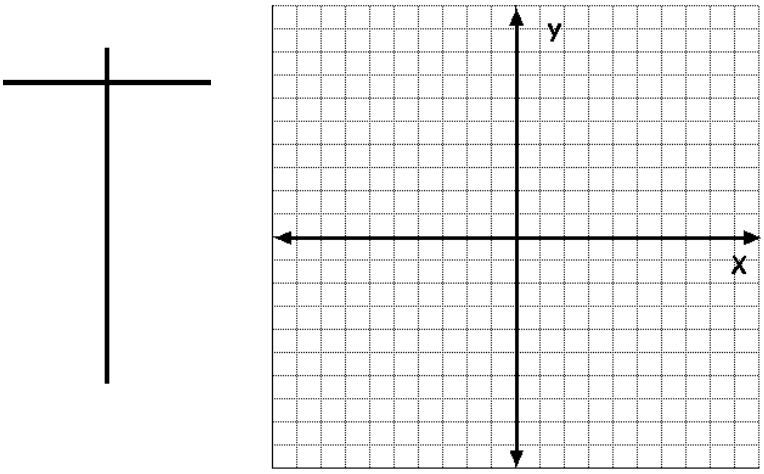
1. Horizontal Translation
2. Stretching or shrinking
3. Reflecting
4. Vertical Translation

E1. Tell whether the function represented by the graph has a parent function of $y = |x|$, $y = \sqrt{x}$, $y = x^2$, or $y = 2^x$. Write the function represented by the graph, using the graph of the parent function.



Graph the function by translating the graph of its parent function.

E2. $y = -(x-4)^3 + 1$



Domain: _____

Range: _____

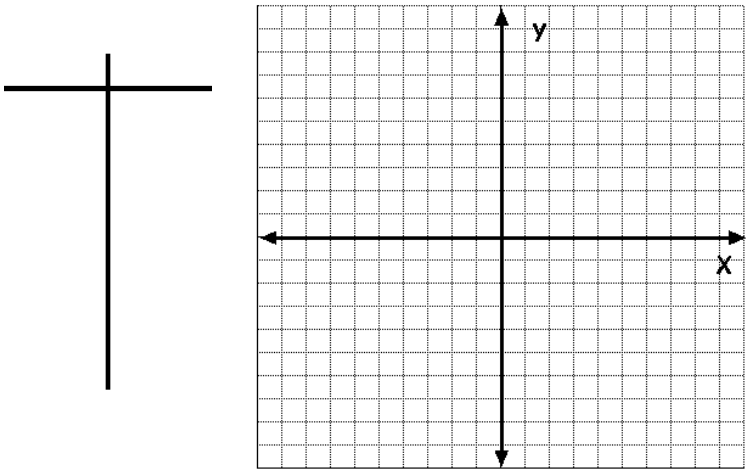
x-intercept: _____

y-intercept: _____

Minimum: _____

Maximum: _____

E3. $y - 2 = (x+1)^2$



Domain: _____

Range: _____

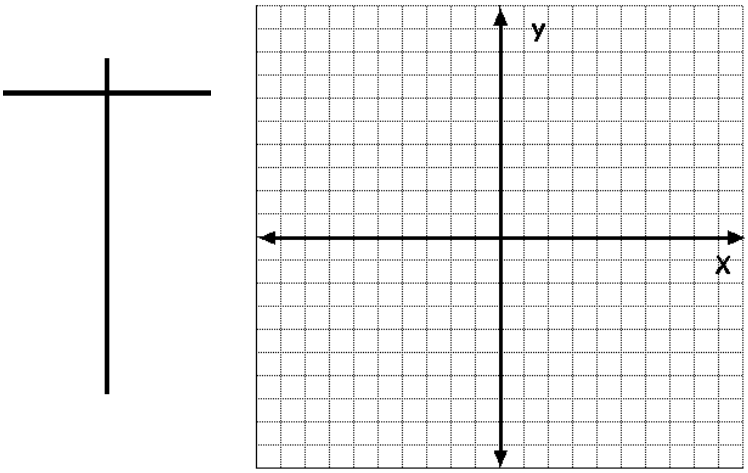
x-intercept: _____

y-Intercept: _____

Minimum: _____

Maximum: _____

E4. $y = \frac{1}{2}(x+2)^4 - 1$



Domain: _____

Range: _____

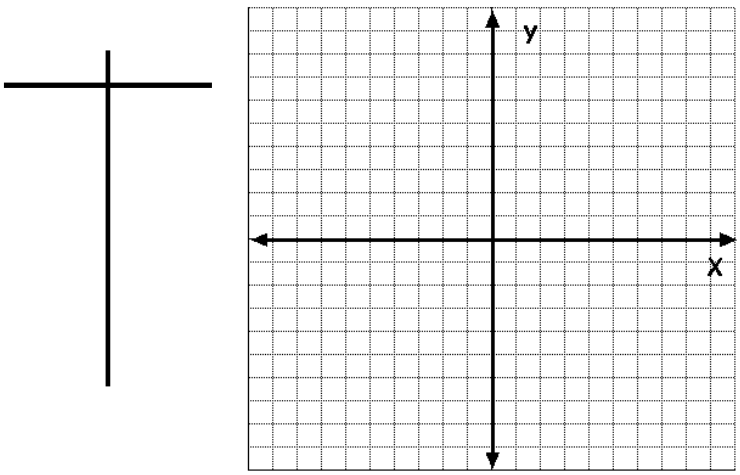
x-intercept: _____

y-intercept: _____

Minimum: _____

Maximum: _____

E5. $y + 3 = -|x+2|$



Domain: _____

Range: _____

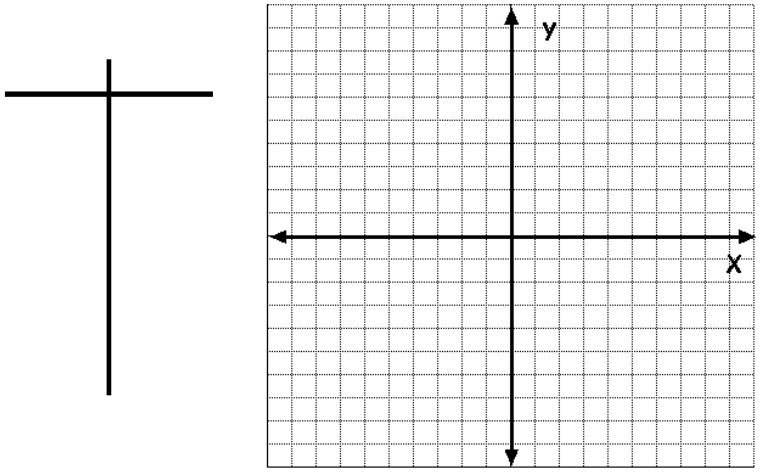
x-intercept: _____

y-Intercept: _____

Minimum: _____

Maximum: _____

E6. $y = -3\sqrt{x-2}+1$



Domain: _____

Range: _____

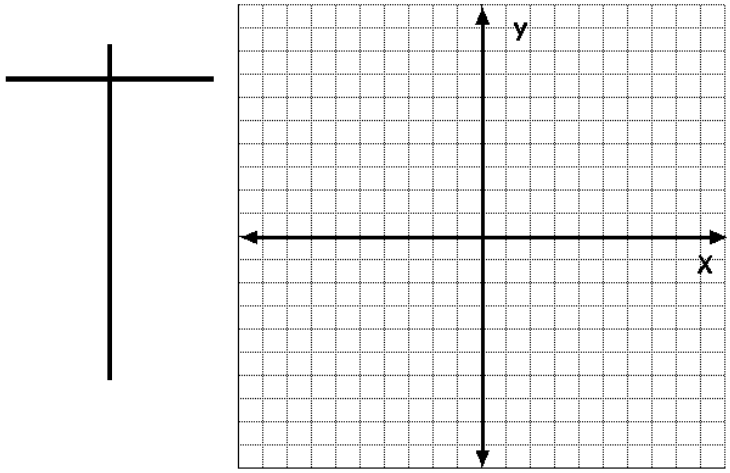
x-intercept: _____

y-intercept: _____

Minimum: _____

Maximum: _____

E7 . $y = 3\sqrt[3]{x+2}-1$



Domain: _____

Range: _____

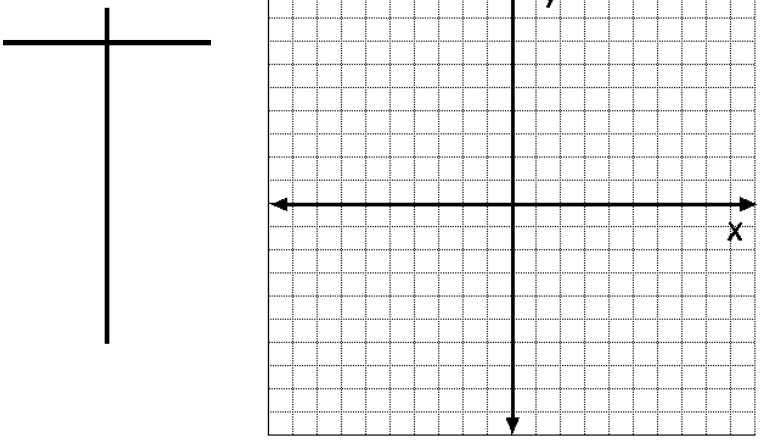
x-intercept: _____

y-Intercept: _____

Minimum: _____

Maximum: _____

E8. Graph: $y = \frac{1}{x+1} - 1$



Domain: _____

Range: _____

x-intercept: _____

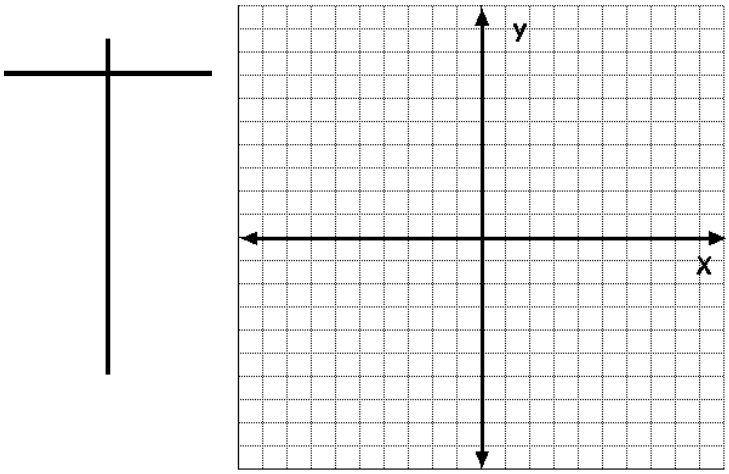
y-intercept: _____

Minimum: _____

Maximum: _____

Asymptote: _____

E9. Graph: $y = -2|2x - 1| + 1$



Domain: _____

Range: _____

x-intercept: _____

y-Intercept: _____

Minimum: _____

Maximum: _____

Asymptote: _____

Warm-ups

Use the provided spaces to complete any warm-up problem or activity

Date:	Date:
Date:	Date:
Date:	Date:
Date:	Date:
Date:	Date:

Warm-ups

Use the provided spaces to complete any warm-up problem or activity

Date:	Date:
Date:	Date:
Date:	Date:
Date:	Date:
Date:	Date: