Unit #1: Functions

Portfolio

Section #1: Vocabulary (words and/or diagrams)

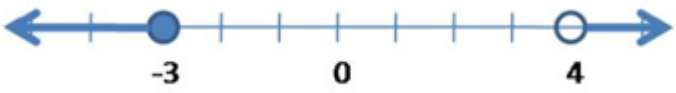
Define each:

Relation-	**Vertical line test-**	**Relative maximum/ minimum-**
Function-	**Horizontal line test-**	**Absolute maximum/ minimum-**
Parent function-	**X-intercept-**	**Increasing/Decreasing function**
Domain-	**Y-intercept-**	**Where function positive-**
Range-	**Inverse function-**	**Where function negative-**
One to one function-	**Inverse function notation-**	

Section #2: Formulas/Equations/Rules

- **Set notation: Express each in both set builder notation AND interval notation.**

A) 

B) 

- **Composition rule: If f(x)= $x^2 - 1$ and g(x) = 3x + 2, evaluate each:**
  C) f(g(x)) express as a trinomial **D) $(g \circ f)(x)$ express as a binomial**

- **Restricted domains: Determine the restricted domain for each function by showing your process!!**

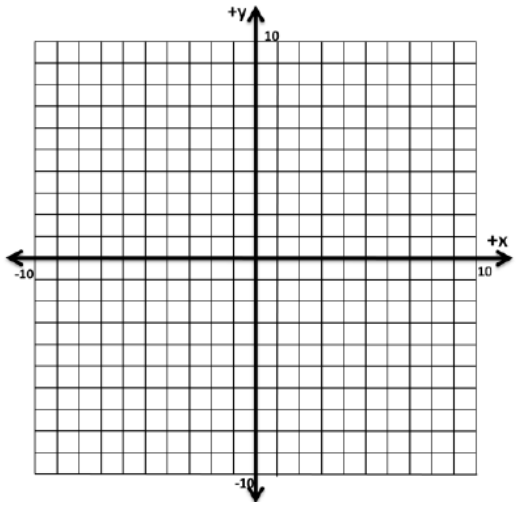
E) f(x) = $\frac{4x^2}{x-7}$ **F) g(x) =** $\sqrt{x-8}$ **G) h(x) =** $\frac{2}{\sqrt{x+4}}$

<u>Section #3: Key methods and concepts (show a solved example for each)</u>

- **The inverse of a function is also a function if the original function is_____.**

- **A) Show how to find the inverse of f(x) =** $\frac{3}{7}x - 10$ **<u>graphically and algebraically.</u>**

<u>Algebraically</u> **<u>Graphically</u>**

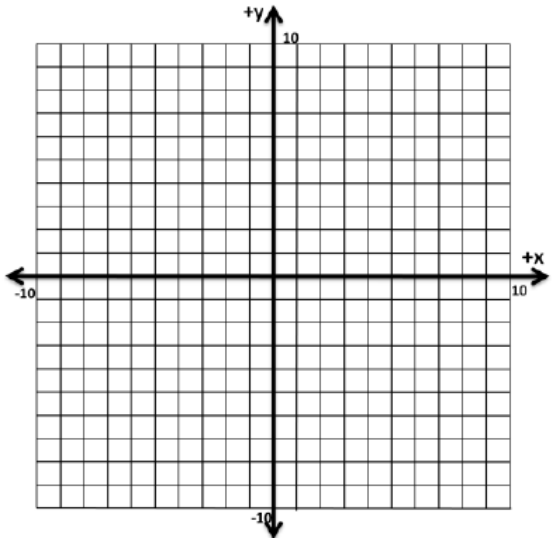


Reflect over the line y = _____

- **3 ways to prove an inverse- Show that f(x) =** $x^2 + 3$ **in the domain** $x \geq 0$ **and g(x)=** $\sqrt{x-3}$ **in the domain** $x \geq 3$ **are inverses.**
  Graphically, Algebraically and Using compositions

Algebraically

Graphically

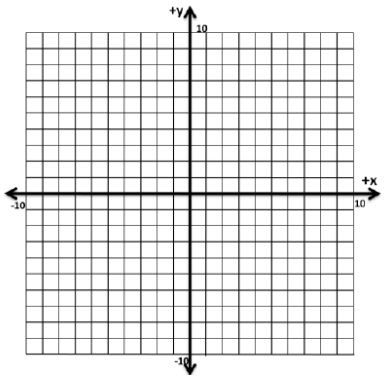


Compositions

Answers: 2A) $\{0 \leq x < 4\}$ $[0, 4)$ **B)** $\{x \leq -3 \text{ or } x > 4\}$ $(-\infty, -3] \cup (4, \infty)$ **C)** $9x^2 + 12x + 3$ **D)** $3x^2 - 1$ **E)** $x \neq 7$ **F)** $x \geq 8$ **G)** $x > -4$ **3A)** $f^{-1}(x) = \frac{7}{3}x + \frac{70}{3}$

- **Parent functions: Graph all the given** parent functions on the next page!!!

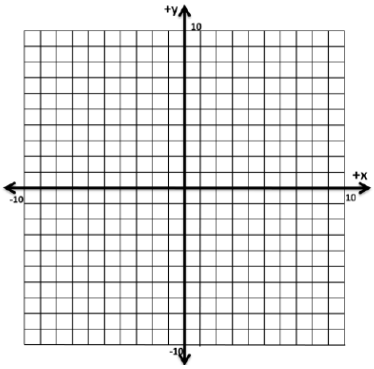
1. Linear Function $f(x) = x$ or $y = x$



Domain:

Range:

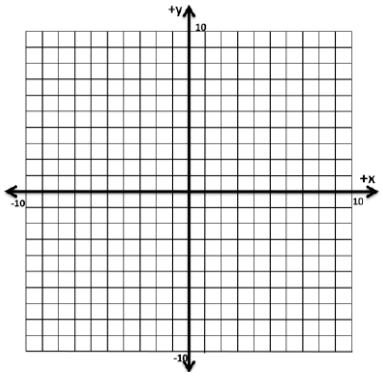
2. Absolute Value Function $f(x) = |x|$ or $y = |x|$



Domain:

Range:

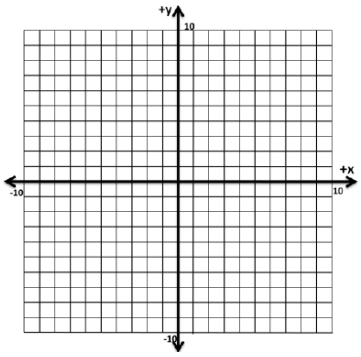
3. Quadratic Function $f(x) = x^2$ or $y = x^2$



Domain:

Range:

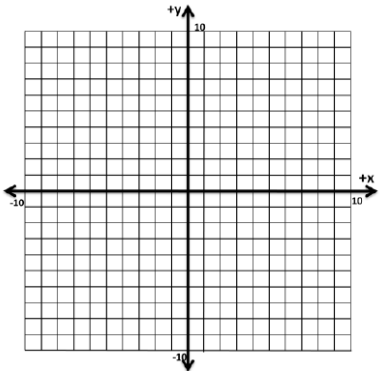
4. Square Root Function $f(x) = \sqrt{x}$ or $y = \sqrt{x}$



Domain:

Range:

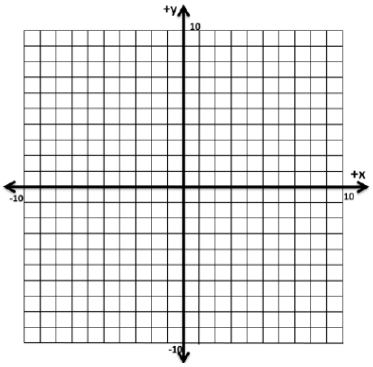
5. Exponential Function $f(x) = b^x$ or $y = b^x$



Domain:

Range:

6. Logarithmic Function $f(x) = \log_b x$ or $y = \log_b x$

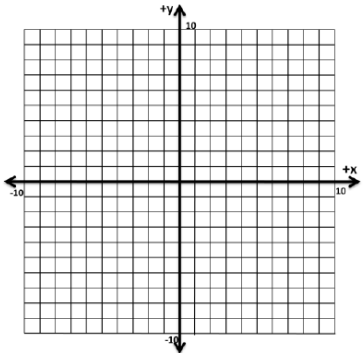


Domain:

Range:

7. Rational Function (Reciprocal Function)

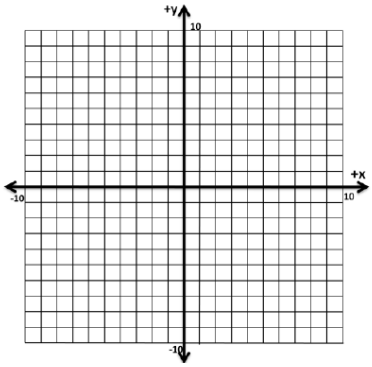
$f(x) = \frac{1}{x}$ or $y = \frac{1}{x}$



Domain:

Range:

8. Cubic Function $f(x) = x^3$ or $y = x^3$



Domain:

Range: