Algebra 2/Trig1 | Name ____________________
Unit 4 – Introduction to Functions | Block ___ Date ______________

VI. Finding the Domain (cont.):

From A Function:

Domain: The set of all real numbers for which the function is defined.

The Domain of a Function: Always All Real Numbers, **EXCEPT** for the following cases.

Fractions: Radicals:

Example: Example:

Practice:

1. $f(x) = x^2 - 25$
2. $f(x) = \frac{2x}{x^2-7x+10}$
3. $f(x)\frac{x+6}{x^2-64}$
4. $f(x) = \frac{x-5}{\sqrt{x^2-9}}$

VII. Inverse Functions:

An inverse is a relation that performs the opposite operation on x (the domain). The domain of *f(x)* is the range of $f^{-1}(x)$.

Examples:

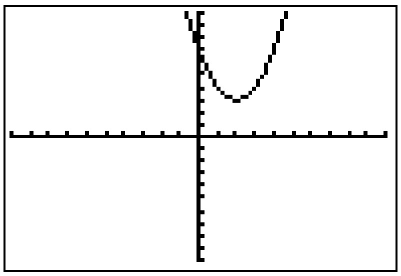
1. $f(x) = x - 3$
   $f^{-1}(x) =$
2. $g(x) = \sqrt{x}, x \geq 0$
   $g^{-1}(x) =$
3. $h(x) = 2x$
   $h^{-1}(x) =$

How do we know if an inverse function exists?

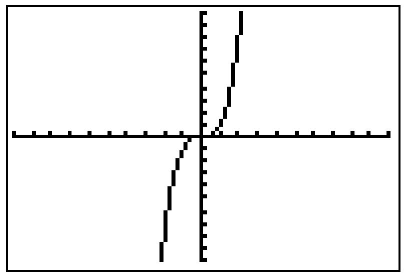
- Inverse functions only exist if the original function is ____________ (which means there are no repeated y-values.
- **Horizontal Line Test**: Used to test if the function is one to one.
  - If the horizontal line intersects the graph more than once, then it is not one to one.
  - Therefore there is not an inverse function and we call it an inverse relation.

Examples: Look at the following graphs and determine if an inverse function is possible.

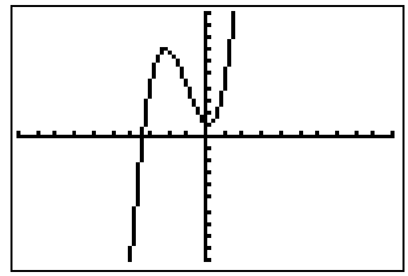
1. $f(x) = x^2 - 4x + 7$



2. $f(x) = x^3$

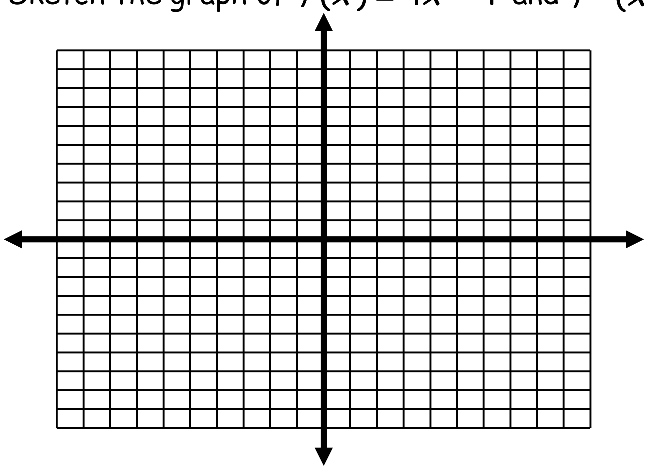


3. $f(x) = x^3 + 3x^2 - x - 1$



Finding Inverse Functions Graphically:

Sketch the graph of $f(x) = 4x - 4$ and $f^{-1}(x) = \frac{1}{4}x + 1$.



We say *the function and its inverse are symmetric over the line* _______.

Finding the Inverse Function Algebraically:

Steps

1. Use the horizontal line test to determine if f has an inverse function.
2. Write as y=
3. Switch x and y
4. Solve for y
5. Rewrite as y^{-1} or $f^{-1}(x)$

Examples:

1. $f(x) = -4x - 9$
2. $f(x) = \dfrac{5 - 3x}{2}$
3. $f(x) = \sqrt[3]{10 + x}$