**Section 2.7—Inverse Functions**

**Definition of the Inverse of a Function**

Let & be two functions such that

for every x in the domain of

and for every x in the domain of

* The function is the inverse of the function and is denoted (read ).
* Thus and .
* The domain of is equal to the range of , and vice versa.

**Example**—Show that each function is the inverse of the other.

**In an inverse**:

* In , -1 is **not** an exponent and **does not mean**
* The two functions “undo” each other.

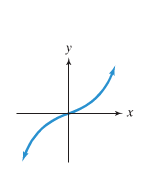
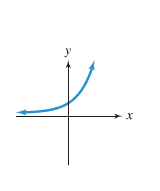
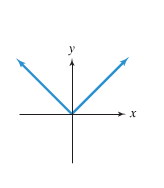
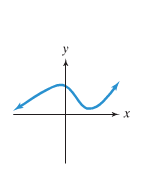
**Finding the Inverse of a Function**

* 1. Replace with y in the equation.
  2. Interchange x & y.
  3. Solve for y.
     + If this equation is not a function, then does not have an inverse.
     + If this equation is a function, it does have an inverse.
  4. If has an inverse, replace y in Step 3 with .
  5. Check this by showing that .

**Example**—Find the inverse of each of the following:

**Horizontal Line Test for Inverse Function**—a function has an inverse if there is no horizontal line that intersects the graph of function at more than one point.

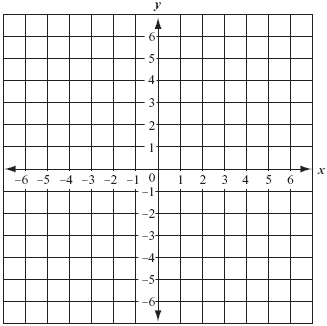
**Example**—which of the following graphs represent functions that have inverse functions?



**One-to-One Function**—a function in which no two different ordered pairs have the same second component

* any function that passes the horizontal line test is a one-to-one function.
* The graph of is a reflection of the graph of about the line y = x.
* If the point is on the graph of , then is on the graph of .

**Example**—the graph of consists of two line segments, one from to and a second from to . Graph and use the graph to graph the inverse.



**Example**—Find the inverse of . Graph and

in the same coordinate system

