Math 3200	Section 1.4	Inverses	Name:

The inverse of a relation is found by interchanging the x-coordinates and y-coordinates of the ordered pairs of the relation. In other words, for every ordered pair (x, y) of a relation, there is an ordered pair (y, x) on the inverse of the relation. This means that the graphs of a relation and its inverse are reflections of each other in the line $y = x$.

$(x, y) \rightarrow (y, x)$

The -1 in $f^{-1}(x)$ does not represent an exponent; that is $f^{-1}(x) \neq \frac{1}{f(x)}$.

1. Graphing an inverse relation

Example 1

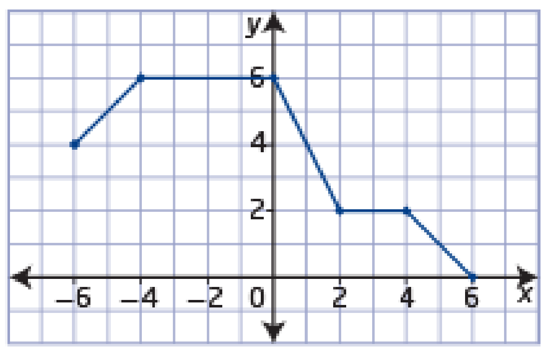
Graph an Inverse

Consider the graph of the relation shown.

a) Sketch the graph of the inverse relation.

b) State the domain and range of the relation and its inverse.

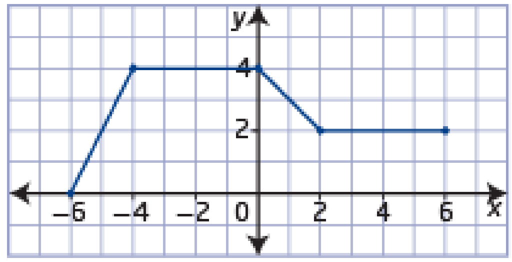
c) Determine whether the relation and its inverse are functions.



horizontal line test

- a test used to determine if the graph of an inverse relation will be a function
- if it is possible for a horizontal line to intersect the graph of a relation more than once, then the inverse of the relation is not a function

Your Turn



Consider the graph of the relation shown.

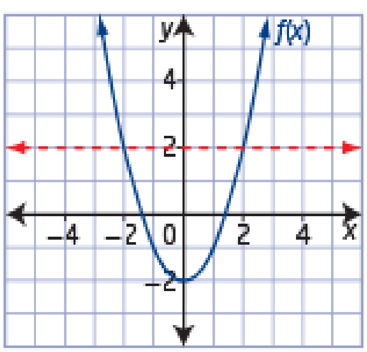
a) Determine whether the relation and its inverse are functions.

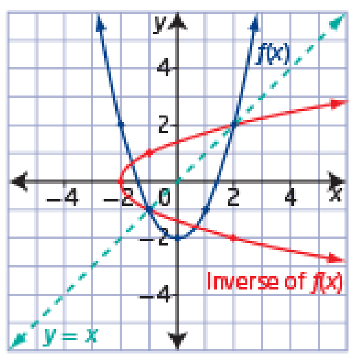
b) Sketch the graph of the inverse relation.

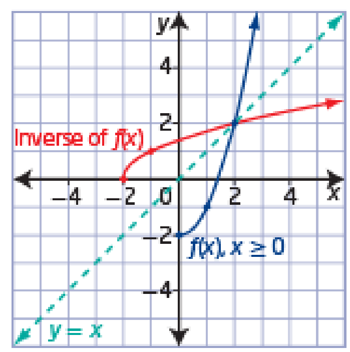
c) State the domain, range, and intercepts for the relation and the inverse relation.

d) State any invariant points.

2. Restrict the domain







3. Determine the equation of the inverse

a. Replace *f(x)* with *y*.

b. Replace *y* with an *x*. and each *x* with a *y*.

c. Solve this equation for *y*.

Example: Algebraically determine the inverse of $f(x) = 3x - 1$