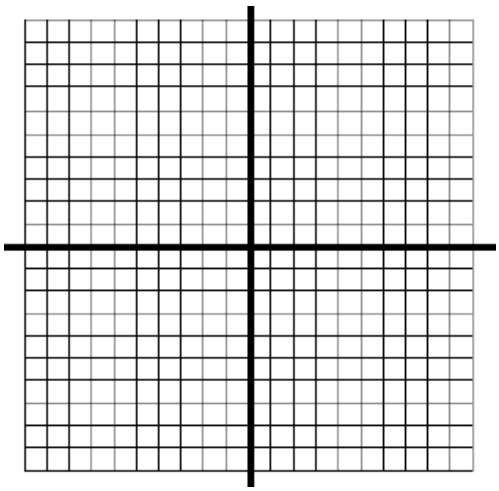
Section 1-5
One-to-One Functions and Inverse Functions

Inverse functions f and f^{-1} undo each other. For example, suppose in f the input x = 5 corresponds to the output y = 10. In the inverse function, f^{-1}, the input x = 10 would correspond to the output y =5. The x and y's are switched.

1. Given f(x) = (-2, -2), (-1, 0), (0, 2), (3, 4)
   Graph f^{-1}(x)



*Note: The inverse is reflected about the line

Write an equation for the inverse by interchanging the variables and solving for y.
Then, graph both f and f^{-1} on the same screen. (you can graph y = x, too)
Is the inverse a function?

2. y = ½ x^2 + 3

*There is a simpler way to plot the inverse of a function using **parametric** equations.

One-to-One Function Each x in the domain has one and only one image in the range

- no y's can repeat, or the original function f(x) passes the *horizontal line test*)
- Strictly increasing or strictly decreasing functions are one-to-one functions
- One-to-One Functions are considered *invertible*

3. Suppose you have fixed costs of owning a car (car payments, insurance, etc) of $300 per month and operating costs of $0.25 per mile you drive. The monthly cost of owning the car is given by the linear function c(x) = 0.25x + 300 where x is the number of miles you drive and c is the number of dollars per month you spend.

a. Find c(1000). Explain the real-world meaning of the answer.

b. Find $c^{-1}(x)$. What does this new equation mean?