MATH 133 – Calculus with Fundamentals 1
Practice on Inverse Functions
September 17, 2015

Background

If a function f from a domain D to a range R has the *one-to-one* property (that is, each y in the range R is $y = f(x)$ for *exactly one* x in the domain D), then we can define a second function f^{-1} with domain R and range D such that

$$x = f^{-1}(y) \text{ exactly when } y = f(x).$$

This is called the *inverse function* of f. As we said in today's video: CAUTION. This is not the same as $\frac{1}{f}$(!) We want to work with a few examples of this idea today.

Questions

1) Look at Figure 19 on page 39 of our text.

   (a) Which of the graphs there define functions with the one-to-one property?

   (b) For the ones that are not, how could we *restrict the domain* to get an inverse function? Is there just one way to do that, or is there more than one?

   (c) Recall from Video 1.5 that there is a geometric way to get the graph of an inverse function from the graph of a one-to-one function. Draw the graphs of inverse functions for each of the ones from part (a) and then for each restricted domain function from part (b).

2) For this problem you can take as given that the function is one-to-one. Find a formula for the inverse function by setting up an equation $y = f(x)$ and solving for x as a function of y. In each case state what the domain of the inverse function is.

   (a) $f(x) = 7x + 3$

   (b) $f(x) = \frac{1}{x+1}$