

Solutions to Quiz # 1 for MA 113 - Calculus I

21 January 2010

This quiz is intended to help you prepare for the exams. Thus, you should attempt all questions and write their answers (including your explanations) in the space provided.

This quiz will not be collected or graded.

1. Find the inverse of the function $f(x) = 2x^3 + 3$.

Solution:

Write the function with y for $f(x)$.

$$y = 2x^3 + 3$$

Subtract 3 from both sides of the equation.

$$y - 3 = 2x^3$$

Divide both sides of the equation by 2.

$$\frac{y-3}{2} = x^3$$

Take the cube root of both sides of the equation.

$$\sqrt[3]{\frac{y-3}{2}} = x$$

Exchange x and y so that we have y as a function of x .

$$\sqrt[3]{\frac{x-3}{2}} = y$$

Write the final answer.

$$f^{-1}(x) = \sqrt[3]{\frac{x-3}{2}}$$

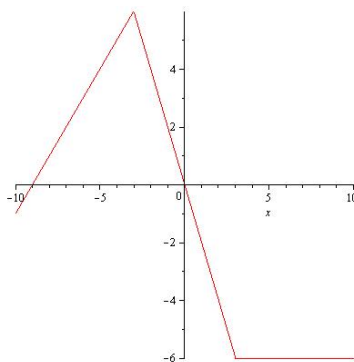
2. Find the domain and sketch the graph of the following function:

$$f(x) = \begin{cases} x + 9 & x < -3 \\ -2x & -3 \leq x \leq 3 \\ -6 & x > 3 \end{cases}$$

Solution:

Since for any real number x the function returns a real number $f(x)$, the domain of the function is \mathbb{R} or $(-\infty, \infty)$.

Graph of function:



The graph can be broken up into three parts: on the interval $(-\infty, -3)$ the graph is the line $y = x + 9$; on $[-3, 3]$ the graph is the line $y = -2x$; and on $(3, \infty)$ the graph is the horizontal line $y = -6$.