MATH 373: CLASS 1

1. Exercise

1) We know the roots of polynomial degree two, $f(x) = ax^2 + bx + c$ where a, b, c are numbers are $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$.

Derive this formula.

2) Let f be a continuous function. Show that between two roots of f, there is at least one local minimum or local maximum.

(Hint: which theorem you need to apply?).

3) Let $f(x) = x^3 + x - 1$.

a) Show that there is *at least* one root lies in $[0, 1]$.

b) Show that there is at *exactly* one root lies in $[0, 1]$.

c) Show that there is *exactly* one root lies in $(-\infty, \infty)$.

d) Is this contradict the fundamental theorem of algebra?

Date: July 9, 2007.