Analysis 2

Q. show that $\lim_{x\to c} x^3 = c^3$ for any c belongs to R?

Q. 2 let f: R -> R , let I be an open interval in R, and c belongs to I. If f_1 is the restriction of f to I, show that f_1 has a limit at c if and only if f has a limit at c , and that the limits are equal.

Q. 3 let f be defined on (0, ∞) to R. prove that $\lim_{x\to\infty} f[x] = L$ if and only if $\lim_{x\to 0+} f[1/x] = L$

Q. 4 show that f: (a, ∞) -> R is such that $\lim_{x\to\infty} xf[x] = L$ where L belong to R, then $\lim_{x\to\infty} f[x] = 0$

Q. 5 let f and g be defined on (a, ∞) and suppose $\lim_{x\to\infty} f[x] = L$ and $\lim_{x\to\infty} g[x] = \infty$. Prove that $\lim_{x\to\infty} fog = L$.

Q. 6 show that every polynomial of odd degree with real coefficient has at least one real root.

Q.7 show that the polynomial p[x]:= x^4 + 7 x^3 – 9 has at least two real roots . use a calculator to locate these roots to within two decimal places.

Q. 8 use the mean value thm to prove that |sin x – sin y |<= |x-y| for all x, y in R.

Q. 9 give an ex of a uniformly continuous function on [0,1] that is differentiable on (0,1) but whose derivative is not bounded on (0,1).

Q.10 use taylor's thm with n=2 to obtain more accurate approximation for $\sqrt{1.2}$ and $\sqrt{2}$.

Q. 11 calculate e correct to 7 decimal places.

Q.12 approximate the solution of the equation x = cos x , accurate to with in six decimals.