**CSE 317, Section 3 Time 40 mins**

**Class Test 1 SET A Total Points 20 + 5 (Bonus)**

**Name:**

**ID:**

**Answer the following questions.**

1. **[15 points]**
   1. Find the 2nd order Taylor approximation *fT2(x)* of a given function *f(x) = 2x5 – 5sin 5x at x = 2.*

**N.B:** x is in radian

* 1. Find the derivative of the *f(x)* using the central divided difference formula at x = 2. [use h = 0.05]. Calculate the True percentage error.
  2. Find the integral of the function *f(x)* within the interval [1, 3] using the analytical way for the second order Taylor polynomial (*fT2*) found in part (a). That is calculate: *dx*
  3. Calculate the integral of the function *f(x)* within the interval [1, 3] using numerical way with simple simpson’s 1/3 rule.
  4. Calculate analytical integration: *dx.* Also find the true percentage error for the integration found at 1d.

1. **[10 points]**

Consider the function     . Use *x0 = 0*

* 1. Find the root after 2 iterations (*x2*) using newton Raphson method. Calculate Approximate Relative error in each iteration.
  2. Assume *x1 = 0.5*, Find the root after 2 iterations (*x3*) using Secant method. Calculate Approximate Relative error in each iteration.
  3. Calculate the equation of the tangent line drawn at the root (*x3*) found at 2b.