Work sheet-5

1. Using Euler's method solve the I.V.P. $y' = t^2 + y^2$ with $y(0) = 1$ over $0 \le t \le 1$.
2. Compute Euler's solution to the I.V.P $y' = 1 - t\sqrt[3]{y}$ with $y(0) = 1$ over $0 \le t \le 5$.
3. Do Q#1 using 4th order Runge-Kutta method.
4. Do Q#2 using 4th order Runge-Kutta method.
5. Given $f[x] = e^{-x} \text{Sin}[x]$, find numerical approximations to the second derivative $f''[1.0]$, using three points and the central difference formula, use step sizes, h=0.1, 0.01, 0,001.
6. 2. Numerically approximate the integral $\int_0^3 (3 e^{-x} \text{Sin}[x^2] + 1)\, dx$ by using the trapezoidal rule with m = 1, 2 and 4 subintervals.
7. 3. Numerically approximate the integral $\int_0^3 (3 e^{-x} \text{Sin}[x^2] + 1)\, dx$ by using Simpson's rule with m = 1, 2 and 4.
8. Numerically approximate the integral $\int_0^3 (3 e^{-x} \text{Sin}[x^2] + 1)\, dx$ by using Simpson's 3/8 rule with m = 1, 2 and 4.