Assignment 3

1. For the data given below write a program using least-squares regression to fit a straight line.

x	6	7	11	15	17	21	23	29	29	37	39
y	29	21	29	14	21	15	7	7	13	0	3

2. Write a program to evaluate the following integral:
$\int_0^6 \frac{dx}{1+x^2}$
by taking n = 6 and using the following rules:
(i) Trapezoidal rule and (ii) Simpson's one-third rule (iii) Use Simpson's 3/8 rule

3. Write a program to evaluate the following integral by taking (i) n = 2 (ii)n= 3 and using Gauss quadrature formula
$\int_{-1}^1 \frac{dx}{1+x^2}$

4. Write a program to use Euler's method to solve $y' = 1 + y^2$ and compute y(0.8) taking h = 0.2

5. Write a program to use 4th order RK method to solve y' = x + y from x =0 to 0.4 taking h = 0.1

6. Write a program to solve the differential equation $y' = y - x^2$, is satisfied by $y(0) = 1$, $y(0.2) = 1.12186$, $y(0.4) = 1.46820$, $y(0.6) = 1.7359$. Compute the value of $y(0.8)$ by Milne's predictor-corrector formula.

7. Write a program to solve $y' = 1 - y$ with the initial condition $x = 0$, $y = 0$, using Euler's algorithm and tabulate the solutions at $x = 0.1, 0.2, 0.3, 0.4$. Using these results find $y(0.5)$, using Adams-Bashforth predictor-corrector method.

8. Write a program to Compute $f'(0)$ from the data

x	0	1	2	3	4
y	1	2.718	7.381	20.086	54.598