

5. a) Using Newton forward difference formula, find the sum  
 $S_n = 1^3 + 2^3 + 3^3 + \dots + n^3$
- b) Find the unique polynomial of degree 2 such that  $f(0) = 1$ ,  $f(1) = 3$ ,  $f(3) = 55$  using Newton's divided difference interpolation method.

6. a) From the following table, compute the value of  $\tan(0.12)$

x	0.10	0.15	0.20	0.25	0.30
tan x	0.1003	0.1511	0.2027	0.2553	0.3093

- b) Evaluate  $I = \int_0^1 \frac{dx}{1+x^2}$  using Trapezoidal rule with  $h=0.2$
7. a) Evaluate  $I = \int_0^{\pi/2} \sin\theta d\theta$  using Simpson's 1/3<sup>rd</sup> rule taking four subinterval
- b) Find  $y(0.6)$  from  $\frac{dy}{dx} = x + y$ ,  $y(0) = 0$  using Euler's Method, where  $h=0.2$
8. a) Using Gauss Quadrature 2-pt formula, evaluate the integral  $\int_0^1 x dx$
- b) Determine the maximum error in evaluating the integral  $\int_0^{\pi/2} \cos x dx$  by both Trapezoidal and Simpson's rule using 4 sub interval