

Laboratory Assignment 6
PH 508 NUMERICAL METHODS & PROGRAMMING

Problem 1 Write a program for each of the methods given below

1. Trapezoidal Rule
2. Simpson's 1/3 Rule
3. Simpson's 3/8 Rule

Problem 2 Write a program to calculate an integral by Monte-Carlo method. Use problem 3 of the Home Assignment for verification.

Home Assignment 6
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Problem 3 From the following data, compute the value of $f'(0.242)$.

x_i	0.15	0.21	0.23	0.27	0.32	0.35
f_i	0.1761	0.3222	0.3617	0.4314	0.5051	0.5441

Compare with the actual value calculated from the function $f(x) = 1 + \log_{10}(x)$

Problem 4 Derive five point central difference formula and estimate error.

Problem 5 Estimate the integral

$$I = \int_0^1 \frac{dx}{1+x^2}$$

using (a) trapezoidal rule and (b) Simpson's 1/3 rule. Use $n = 4$ in both cases. Find the exact answer and compare.

Problem 6 The table below shows the speed of a car at various intervals of time. Find the distance travelled by the car at the end of two hours.

Time, hr	0	0.5	1.0	1.5	2.0	2.5
Speed, Km/hr	0	40	60	50	45	65