



Daffodil International University

Faculty of Science & Information Technology

Department of Software Engineering

Final Examination, Summer 2026

Course Code: MAT101; Course Title: Mathematics I

Batch: 47; Section: A-H; Teachers Initial: MMH, SST, AMS

RIA

Time: 2 Hours

Marks: 40

Answer ALL Questions

[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially]

1.	Explain the following terms: a. Geometrical Concept of Critical Point. b. Geometrical Concept of Integration.	$2 \times 2 = 4$	
2.	Compute the <u>maximum/minimum</u> value of the following function $f(x) = \frac{\log x}{x}$ A garden is to be laid out in a rectangular area and protected by a chicken wire fence. Compute is the largest possible area of the garden if only 100 running feet of chicken wire is available for the fence. Compute the <u>critical points</u> of the following function. Identify the intervals on which <u>y is increasing and decreasing</u>, <u>concave up and concave down</u>. Also find the <u>inflection points</u>, if any, of the above function. $y = 3x^4 + 4x^3 - 12x^2 - 2$	3 $4 \times 2 = 8$	CLO-1 L-2
3.	Calculate the followings: a. $\int \sin^4 x \, dx$ b. $\int_1^e \frac{(x+1)(\ln x+x)^3}{x} \, dx$ c. $\int_0^{1-x} \int_0^{2-x} xy \, dx \, dy$ d. $\int_0^\pi x \sin^6 x \cos^4 x \, dx$ e. $\int \frac{\tan x}{\sec x + \tan x} \, dx$	$3 \times 5 = 15$	CLO-2 L-3
4.	Identify the area of the circle $x^2 + y^2 = 25$. Identify the area enclosed between the circle $x^2 + y^2 = 8x$ and the curve $y = 2\sqrt{x}$.	5 5	CLO-3 L-4