



Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Examination, Fall-2023

Course Code: MAT101, Course Title: Mathematics I

Level: L1 Term: T1 Batch: 65

Time: 1 Hour and 30 Minutes

Marks: 25

Answer ALL the Questions

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

1.	a) Show the number 1040 as the product of its prime factors in exponential form. List down all of its composite factors in ascending order.	3	CO1
	b) Three alarm clock rings at an interval of 16, 24 and 72. All three bell rang at 6:00 am. Utilize the LCM method to determine when the three balls will ring together next.	2	
2.	a) Construct the solution of inequality $8 - 2x - x^2 > 0$ in the interval notation using sign diagram.	3	CO1
	b) Find the value of y from the equation $\frac{7^{9y-1}}{(49)^{3y}} = \frac{(343)^{2+y}}{(49)^{3-y}}$.	2	
3.	What is the root of a polynomial? Solve the equation $3x^3 + x^2 - 12x - 4 = 0$ utilizing remainder theorem.	5	CO2
4.	a) Determine $\frac{dy}{dx}$ for the function (i) $y = (\sin x)^{\tan^{-1} x}$ (ii) $y = \ln(x + \sqrt{8 + x^2})$	3 2	CO3
	b) A biker is riding a bike on a hilly road where the equation of the path is $y = 3^x x^2 \sin^{-1} x$. Estimate the slope of the path at point $x = 0.5$.	5	