



Daffodil International University

Faculty of Science & Information Technology
Department of Computing and Information System

Mid-Term Examination, Summer-2026

Course Code: MAT 101, Course Title: Mathematics I

Level: 1 Term: 2

Exam Duration: 1.5 Hours

Marks: 25

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.	a)	i) Define function with example.	[2 Marks]	CO-1
		ii) Compute the domain and range of the function $f(x) = \frac{4x+9}{3-5x}$	[2 Marks]	
	b)	Express the function $y = x + 3$ graphically.	[2 Marks]	
2.	a)	i) Define rational number with example.	[1 Marks]	CO-1
		ii) Compute the value of x for which $\sqrt{1 + \frac{x}{144}} = \frac{13}{12}$.	[2 marks]	
	b)	i) Define complex number with example.	[1 Marks]	
		ii) Convert the complex number $\frac{4+5i}{3-2i}$ into the form $a + ib$.	[2 marks]	
3.	a)	Compute the solution set for the inequality $ 2x - 5 < 3$.	[2 Marks]	CO-2
	b)	Calculate the values of k for which the equation $x^2 - 4x - 1 - 2k(x - 5) = 0$ has <u>two real equal roots</u> .	[5 Marks]	
4.	a)	Define the continuity of a function.	[1 Marks]	CO-3
	b)	A function $f(x)$ is defined as follows $f(x) = \begin{cases} x^2 & ; x < 1 \\ 2.5 & ; x = 1 \\ x^2 + 1 & ; x > 1 \end{cases}$ Determine whether the limit of $f(x)$ exists at the point $x = 1$.	[2 Marks]	
	c)	A function $f(x)$ is defined as follows $f(x) = \begin{cases} -x^2 & ; x \leq 0 \\ 5x - 4 & ; 0 < x \leq 1 \text{ L.H.L} \\ 4x^2 - 3x & ; 1 < x < 2 \text{ R.H.L} \\ 3x + 4 & ; x \geq 2 \end{cases}$ Determine whether $f(x)$ is continuous or not at $x = 1$.	[3 Marks]	