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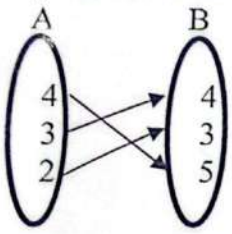
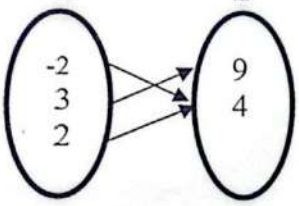
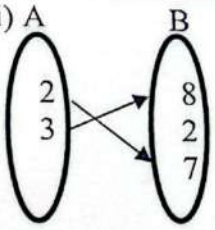
Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science & Engineering
Mid Examination, Summer 2025
Course Code: MAT101, Course Title: Mathematics I
Level: L1 Term: T1 Batch: 69

Time: 01:30 Hrs **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)***	Classify the Relation is an Injective, Surjective, and Bijective Function and why: i)  ii)  iii)  	**3**	**CO1**
	b)	Demonstrate the Differentiability of the following function at the point $x=2$ $f(x)=\begin{cases}\ln x; 0<x\le 1\\ 0; 1<x\le 2\\ 1+x^2; x>2\end{cases}$	**3**	
2.		Find the solution of the inequality $\frac{x^2-2x-15}{x^2-14x+49}\ge 0$ using sign table.	**4**	**CO1**
3.		Apply the Factor Theorem to solve the following polynomial equation $x^4-6x^2-7x-6=0$	**5**	**CO2**
4.	***a)***	Inspect the rate of change of y with respect to x, or $\frac{dy}{dx}$ of the function $(\cos x)^y = xy$.	**3**	**CO3**
	b)	A bike rider riding a bike on a hill road, if the equation of path is $y=\sin^{-1}\left(\frac{1-x^2}{1+x^2}\right)+(\cos x)^{e^{\ln x}}$ then, Inspect the slope of the path at $x=0.5$	**4**	
	c)	If $y=e^{\ln\left(\cos^{-1}\left(\cos\left(10^x\right)\right)\right)}$ and $z=x+\sqrt{x^2+1}$ then, Inspect the rate of change of z with respect to y, or $\frac{dz}{dy}$.	**3**	

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