



Assignment – 1 (03-08-2022)

Programme	B.Tech. (All Branches)	Semester	Fall 2022-2023
Course Name	Discrete Mathematics And Graph Theory	Course Code	MAT2002
Faculty Name	Dr. Navneet Kumar Verma	Slot / Class No	A21+A22+A23
Submission date	03-08-2022	Max. Marks	10

Answer ALL the Questions

Q. No.	Question Description
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Each question is of equal marks

1. The function $f : R \rightarrow R$ defined as $f(x) = 2x + 3 \forall x \in R$ is both one-to-one onto functions.
2. Let $f, g, : R \rightarrow R$ is defined by $f(x) = 2x + 1, g(x) = \frac{x}{3} \forall x \in R$. Then verify that $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.
3. Prove by the principle of mathematical induction the inequality $(a + 1)^n \geq 1 + na$, for $a > -1$ & $n \geq 2$
4. Prove using mathematical induction that $1.2 + 2.3 + \dots + n.(n + 1) = \frac{n(n + 1)(n + 2)}{3}$, where n is positive integer.
5. Fibonacci number F_n , are defined by $F_0 = 0, F_1 = 1, F_n = F_{n-1} + F_{n-2}$ for all $n \geq 2$ let the sequence of number G_n be defined by $G_1 = 1, G_2 = 3$, & $G_n = G_{n-1} + G_{n-2} + 1$ for all $n \geq 3$ prove, using induction, that $G_n = 2F_n - 1 \forall n \geq 1$.
6. Show using mathematical induction, that any positive integer n greater than or equal to 2 is either a prime or a product of prime.