MATHS

BOOKS - MTG MATHS (BENGALI ENGLISH)

QUESTION PAPER 2010

Descriptive Type Qeustions

1. Prove that the equation $\cos 2x + a \sin x = 2a - 7$

possesses a solution if $2 \leq a \leq 6$.

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2. Find the values of x, $(-\pi < x < \pi, x \neq 0)$ satisfying the equation ,

$8^{1 + |\cos x| + |\cos^2 x| + \ldots \infty} = 4^3$

3. Prove that the centre of the smallest circle passing through origin and whose centre lies on $y = x + 1$ is $\left(-\dfrac{1}{2}, \dfrac{1}{2} \right)$

4. Prove by induction that for all $n \in N$, $n^2 + n$ is an even integer $(n \geq 1)$.

5. If A, B are two square matrices such that AB = A and BA = B, then prove that $B^2 = B$

6. If $N = n!(n \in N, n > 2)$, then find

$$\lim_{N \to \infty} \left[(\log_2 N)^{-1} + (\log_3 N)^{-1} + \ldots + (\log_n N)^{-1} \right]$$

7. Use the formula $lt_{x \to 0} \dfrac{a^x - 1}{x} = \log_e a$, to compute $lt_{x \to 0} \dfrac{2^x - 1}{\sqrt{1 + x} - 1}$

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8. $\dfrac{dy}{dx} = \left(1 + x^2\right)\left(1 + y^2\right)$

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9. Evaluate the following integral $\displaystyle\int_{-1}^{2} |x \sin \pi x| dx$

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10. If $f(a) = 2, f'(a) = 1, g(a) = -1$ and $g'(a) = 2$, find the value of

$$\lim_{x \to a} \frac{g(x)f(a) - g(a)f(x)}{x - a}$$

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