# MATHS

# BOOKS - MTG MATHS (BENGALI ENGLISH)

# MATHEMATICS (2011)

## Descriptive Type Questions

**1.** The harmonic mean of two numbers is 4. Their arithmetic mean A and the geometric

mean G satisfy the relation $2A + G^2 = 27$ .

Find the numbers

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**2.** If the area of a rectangle is 64 sq. unit, find the minimum value possible for its perimeter.

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**3.** Find the image of the point (-8, 12) with respect to the line $4x + 7y + 13 = 0$

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**4.** How many triangles can be formed by joining 6 points lying on a circle ?

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**5.** If $r^2 = x^2 + y^2 + z^2$ , then prove that $\tan^{-1}\left(\frac{yz}{rx}\right) + \tan^{-1}\left(\frac{zx}{ry}\right) + \tan^{-1}\left(\frac{xy}{rz}\right) = \frac{\pi}{2}$

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**6.** Determine the sum of imaginary roots of the equation

$$(2x^2 + x - 1)(4x^2 + 2x - 3) = 6$$

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**7.** If $\cos A + \cos B + \cos C = 0$, prove that

$$\cos 3A + \cos 3B + \cos 3C = 12 \cos A \cos B \cos C$$

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**8.** Let $\mathbb{R}$ be the set of real numbers and $f: \mathbb{R} \to \mathbb{R}$ be such that for all $x, y \in R$, $|f(x) - f(y)|^2 \leq (x - y)^3$ Prove that f is a constant function.

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**9.** Find the general solution of $(x + \log y)dy + ydx = 0$

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**10.** Prove that

$$I = \int_0^{\pi/2} \frac{\sqrt{\sec x}}{\sqrt{\operatorname{cosec} x} + \sqrt{\sec x}} dx = \frac{\pi}{4}$$

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