

MS JUNIOR COLLEGE
Hyderabad

GUESS PAPER - 1
INTERMEDIATE 1st YEAR
MATHEMATICS- IB

Time: 3hours

Max.Marks:75

- I. i) Very Short Answer Type Questions. (10 x 2 = 20)
ii) Answer **ALL** questions.
iii) Each question carriers **TWO** marks.
1. Find the value of y if the line joining (3, y) and (2, 7) is parallel to the line joining the points (-1, 4) and (0, 6).
 2. Find the set of value of a if the points (1, 2) and (3, 4) to the same side of the straight line $3x-5y + a = 0$.
 3. If the point (1, 2, 3) is changes to the point (2, 3, 1) through translation of axes find the new origin.
 4. Find the equation of the plane passing through (-2, 1, 3) and having (3, -5, 4) as direction ratios of its normal.
 5. Evaluate $\lim_{x \rightarrow 2^+} ([x] + x)$ and $\lim_{x \rightarrow 2^-} ([x] + x)$.
 6. Evaluate $\lim_{x \rightarrow 0} \frac{\log(1+5x)}{x}$.
 7. If $y = \sec(\sqrt{\tan x})$, then find $\frac{dy}{dx}$.
 8. Find the derivative of $\tan^{-1} \sqrt{\frac{1-\cos y}{1+\cos y}}$ with respect to x.
 9. If the increase in the side of a square is 4%, find the percentage of change in the area of the square.
 10. Let $f(x) = (x-1)(x-2)(x-3)$. Prove that there is more than one 'c' in (1, 3) such that $f'(c) = 0$.
- II. i) Short Answer Type Questions. (5 x 4 = 20)
ii) Answer any **FIVE** questions.
iii) Each question carriers **FOUR** marks.
11. If the distances from P to the points (2, 3) and (2, -3) are in the ratio 2 : 3, then find the equation of locus of P.
 12. Show that the axes are to be rotated through an angle of $\frac{1}{2} \tan^{-1} \left(\frac{2h}{a-b} \right)$ so as to remove xy term from the equation $ax^2 + 2hxy + by^2 = 0$ if $a \neq b$ and through an angle $\pi/4$ if $a = b$.
 13. Find the equation of the line passing through the point of intersection of $2x + 3y = 1$, $3x + 4y = 6$ and perpendicular to the line $5x - 2y = 7$.
 14. Show that $f(x) = \begin{cases} \frac{\cos ax - \cos bx}{x^2} & \text{if } x \neq 0 \\ \frac{1}{2}(b^2 - a^2) & \text{if } x = 0 \end{cases}$, where a and b are real constants is continuous at 0.
 15. Find the derivatives of the function using the definition $\sec 3x$.

16. The radius of an air bubble is increasing at the rate of $\frac{1}{2}$ cm/sec. At what rate is the volume of the bubble increasing when the radius is 1 cm?
17. Show that the tangent at $P(x_1, y_1)$ on the curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$ is $yy_1^{-1/2} + xx_1^{-1/2} = a^{1/2}$.
- III. i) Long Answer Type Questions. **(5 x 7 = 35)**
 ii) Answer any **FIVE** questions.
 iii) Each question carries **SEVEN** marks.
18. The base of an equilateral triangle is $x + y - 2 = 0$ and the opposite vertex is $(2, -1)$. Find the equations of the remaining sides.
19. Show that the area of the triangle formed by the lines $ax^2 + 2hxy + by^2 = 0$ and $\ell x + my + n = 0$ is $\frac{n^2 \sqrt{h^2 - ab}}{|am^2 - 2h\ell m + b\ell^2|}$ sq. units.
20. Show that the equation $2x^2 - 13xy - 7y^2 + x + 23y - 6 = 0$ represents a pair of straight lines. Also find the angle between them and coordinates of point of intersection of the lines.
22. Show that the lines whose d.c's are given by $\ell + m + n = 0$, $2mn + 3n\ell - 5\ell m = 0$ are perpendicular to each other.
22. If $\sqrt{1-x^2} + \sqrt{1-y^2} = a(x-y)$, then prove that $\frac{dy}{dx} = \sqrt{\frac{1-y^2}{1-x^2}}$.
23. Find the angle between the curves $2y^2 - 9x = 0$, $3x^2 + 4y = 0$ (in the 4th quadrant).
24. A window is in the shape of a rectangle surmounted by a semicircle. If the perimeter of the window is 20 ft, find the maximum area.

***** All the Best*****