

Aimstutorial model Guess paper-5

MATHS - 1B

(Board of Intermediate Education Model Paper)

SECTION - A

I. Answer ALL the following Very Short Answer Questions:

[10 x 2 = 20]

- Find the value of x , if the slope of the line passing through $(2,5)$ and $(x,3)$ is 2.
- Find the length of the perpendicular from the point $(-2,-3)$ to the straight line $5x-2y+4=0$
- Find the centroid of the tetrahedron whose vertices are $(2,3,4), (-3,3,-2), (-1,4,2), (3,5,1)$
- Find the direction cosines of the normal to the plane $x+2y+2z-4=0$
- Compute $\lim_{x \rightarrow 0} \frac{e^x - \sin x - 1}{x}$
- Is the function f defined by $f(x) = \begin{cases} \frac{\sin 2x}{x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases}$ continuous at 0?
- Find $\frac{d}{dx}(\sec\sqrt{\tan x})$
- If $y = \sin^{-1}(\cos x)$, then find $\frac{dy}{dx}$
- If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.
- Verify Rolle's theorem for the function $f(x) = x(x+3)e^{-x/2}$ on $[-3,0]$

SECTION - B

II. Answer any FIVE of the following Short Answer Questions:

[5 x 4 = 20]

- Find the equation of locus of a point P , if $A=(2,3)$, $B=(2,-3)$ and $PA+PB=8$
- When the axes are rotated through an angle $\pi/4$, Find the transformed equation of $3x^2+10xy+3y^2=9$
- Find the equation of the line perpendicular to the line $3x+4y+6=0$ and making an intercepts -4 on the x -axis.
- Compute $\lim_{x \rightarrow a} \left(\frac{x \sin a - a \sin x}{x - a} \right)$
- If $y = a \cos(\sin x) + b \sin(\sin x)$ then prove that $y' + (\tan x)y' + y \cos^2 x = 0$
- Show that the curves $6x^2 - 5x + 2y = 0$ and $4x^2 + 8y^2 = 3$ touch each other at $(1/2, 1/2)$
- The volume of a cube is increasing when the length of the edge is 10 centimeters?

SECTION - C

III. Answer any FIVE of the following Long Answer Questions. :

[5 x 7 = 35]

18. Find the circumcentre of the triangle whose vertices are (1,3),(0,-2),(-3,1)
19. Show that the area of the triangle formed by the lines $ax^2+2hxy+by^2=0$ and $lx+my+n=0$ is
- $$\frac{n^2\sqrt{h^2-ab}}{|am^2-2h/m+bl^2|}$$
20. Find the equation of the pair of straight lines joining the origin to the points of intersection of the line : $6x-y+8=0$ with the pair of straight lines $3x^2+4xy-4y^2-11x+2y+6=0$ and show that the lines obtained make equal angles with the coordinate axes.
21. If a ray makes angle $\alpha, \beta, \gamma, \delta$ with the four diagonals of a cube then show that $\cos^2\alpha+\cos^2\beta+\cos^2\gamma+\cos^2\delta$
22. If $x^y+y^x=a^b$ then prove that $\frac{dy}{dx} = -\left[\frac{yx^{y-1}+y^x\log y}{x^y\log x+xy^{x-1}}\right]$
23. Find the lengths of subtangent, subnormal at a point t on the curve $y=a(\cos t+tsint)$, $x=a(\sin t - tcost)$.
24. The profits function p(x) of a company, selling x items per day is given by $p(x)=(150-x)x-1600$. find the number of items that the company should sell to get maximum profit. Also find the maximum profit.
