



# MATHS

## BOOKS - VGS PUBLICATION-BRILLIANT

### MODEL PAPER - 8

#### Section A Very Short Answer Type Questions

1. Transformation the equation  
 $4x + 3y + 12 = 0$  into  
slope intercept form



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2. Transform the equation  $4x + 3y - 12 = 0$  into intercept form.



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3. Find the perpendicular distance from the point  $(3,4)$  to the straight line:  
 $3x - 4y + 10 = 0$ .



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4. Find the coordinates of the vertex 'C' of  $\Delta ABC$  if its centroid is the origin and the vertices A,B are (1,1,1) and (-2,4,1) respectively.



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5. Reduce the equation  $x + 2y - 3z - 6 = 0$  of the plane to the normal form.



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6. Compute the limit of  $\lim_{x \rightarrow 3} \frac{x^2 - 8x + 15}{x^2 - 9}$



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7. Compute  $\lim_{x \rightarrow \infty} \frac{x^2 - \sin x}{x^2 - 2}$ .



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8. Find the derivative of the function

$f(x) = 2x^2 + 3x - 5$  at  $x = -1$ . Also

prove that  $f'(0) + 3f'(-1) = 0$ .



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9. If  $x = a \cos^3 t$ ,  $y = a \sin^3 t$ , find  $\frac{dy}{dx}$



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10. Find  $(\Delta y)$  and  $dy$  if

$$y = 5x^2 + 6x + 6, x = 2 \text{ and } \Delta x = 0.001$$



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11. Verify the conditions of Lagrange's mean value theorem for the function  $x^2 - 1$  on  $[2,3]$



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## Section B Short Answer Type Questions

1. If the distance from 'P' to the points  $(2,3)$  and  $(2,-3)$  are in the ratio 2:3, then find the equation of the locus of P.



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2. When the origin is shifted to  $(-1,2)$  by the translation of axes, find the transformed equation of  $2x^2 + y^2 - 4x + 4y = 0$



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3. Find the points on the line  $3x - 4y - 1 = 0$  which are at a distance of 5 units from the point  $(3,2)$ .



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4.  $\lim_{x \rightarrow 0} \frac{x \sin a - a \sin x}{x - a}$



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5. If  $f(x) = \sec 3x (x \in R)$ , then find  $f'(x)$  by first principle.



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6. Find the lengths of subtangent and subnormal at a point on the curve



$$y = b \sin\left(\frac{x}{a}\right)$$



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7. The volume of a cube is increasing at a rate of 9 cubic centimetres per second. How fast is the surface area increasing when the length of an edge is 10 centimetres ?



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**Section C Long Answer Type Questions**

1. Find the orthocentre of the triangle whose vertices are  $(-5, -7)$ ,  $(13, 2)$ ,  $(-5, 6)$



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2. If  $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$  represents a pair of lines then prove that

$$\Delta = abc + 2fgh - af^2 - bg^2 - ch^2 = 0.$$



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3. If  $ax^2 + 2kxy + by^2 + 2gx + 2fy + c = 0$

then  $\frac{dy}{dx} =$



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4. Find the angle between the lines joining the origin to the points of intersection of the curve  $x^2 + 2xy + y^2 + 2x + 2y - 5 = 0$  and the line  $3x - y + 1 = 0$ .



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5. Show that the lines whose d.c's are given by  
 $l + m + n = 0, 2mn + 3nl - 5ln = 0$  are  
perpendicular to each other.

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6. If  $y = \tan^{-1} \left( \frac{\sqrt{1+x^2} + \sqrt{1-x^2}}{\sqrt{1+x^2} - \sqrt{1-x^2}} \right)$   
then find  $\frac{dy}{dx}$ .

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7. Find the angle between the curves

$$y^2 = 4x, x^2 + y^2 = 5$$



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8. From a rectangular sheet of dimension  $30\text{cm} \times 80\text{cm}$ , four equal squares of side  $x$  cm. are removed at the corners, and the sides are then turned up so as to form an open rectangular box.

Find the value of  $x$ , so that the volume of the box is the greatest.



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