MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER - 7

Section A Very Short Answer Type Questions

1. Find the equation of the straight line perpendicular to the line $5x - 3y + 1 = 0$ and passing through the point $(4, \ -3)$.

2. Find the equation of the straight line passing through (-4,5) and cutting off equal and non-zero intercepts on the co-ordinate axes.
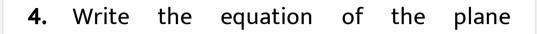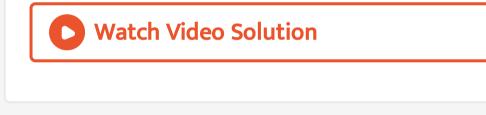
3. Show that the points (1, 2, 3), (2, 3, 1) and (3, 2, 1) form an equilateral triangle.

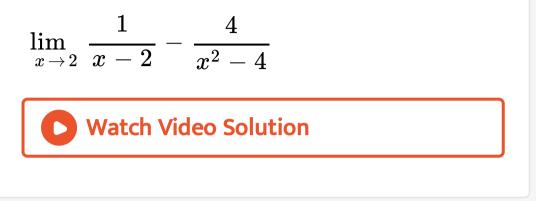**4.** Write the equation of the plane $4x - 4y + 2z + 5 = 0$ in the intercept form.

5. Compute $\lim_{x \to 0} \left(\dfrac{e^x - 1}{\sqrt{1 + x} - 1} \right)$

6. Evaluate the following limits.

$$\lim_{x \to 2} \ \frac{1}{x - 2} - \frac{4}{x^2 - 4}$$

7. Find the derivative of the function

$$e^{2x} \log x \, (x > 0)$$

8. If $y = ax^{n+1} + bx^{-n}$ then show that

$x^2 y'' = n(n+1)y.$

9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square.

10. Verify Rolle's theorem for the function $f(x) = x^2 - 5x + 6$ in the interval [-3,8]

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Section B Short Answer Type Questions

1. Find the equation of locus of a point P such that the distance of P from the origin is twice the distance of P from A(1,2).

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2. When the axes are rotated through an angle $45°$, the transformed equation of a curve is $17x^2 - 16xy + 17y^2 = 225$. Find the original equation of the curve.

3. Find the value of k if the angle between the straight   lines $4x - y + 7 = 0, kx - 5y - 9 - 0$ is $45°$

4. If f is given by

$$f(x) = \begin{cases} k^2x - k & \text{if } x \geq 1 \\ 2 & \text{if } x < 1 \end{cases}$$

is a continuous function on R, then find k .

5. Find the derivative of sin2x from the first principles .

6. The radius of a circle is increasing at the rate of 0.7 cm/s. What is the rate of increase of its circumference?

7. Find the value of k, so that the length of the subnormal at any point on the curve $y = a^{1-k}x^k$ is a constant

1. Find the circumcentre of the triangle whose vertices are (1,3) (0,-2) and (-3,1).

2. Prove that the equation

$$3x^2 + 7xy + 2y^2 + 5x + 5y + 2 = 0$$

represents a pair of straight lines and find the co-ordinates of the point of intersection.

3. The equation of the bisectors of the angles between the lines joining the origin to the points of intersection of the curve

$x^2 + xy + y^2 + x + 3y + 1 = 0$ and the line

x + y + 2 = 0 is

4. Find the direction cosines of the two lines which are connected by the relations

$$l - 5m + 3n = 0, \ 7l^2 + 5m^2 - 3n^2 = 0$$

5. If $\sqrt{1 - x^2} + \sqrt{1 - y^2} = a(x - y)$, then

prove that $\dfrac{dy}{dx} = \sqrt{\dfrac{1 - y^2}{1 - x^2}}$.

6. IF the tangent at a point on the curve

$x^{2/3} + y^{2/3} = a^{2/3}$ intersects the coordinate

axes in A and B then show that the length AB is a constant.

7. Find the maximum area of the rectangle that can be formed with fixed perimeter 20.