



## MATHS

### BOOKS - VGS PUBLICATION-BRILLIANT

#### MODEL PAPER 8

##### Section A Very Short Answer Type Questions

1. If  $A = \left\{0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}\right\}$  and  $f: A \rightarrow B$  is a surjection defined by  $f(x) = \cos x$  then find B.

 [Watch Video Solution](#)

2. If  $f: Q \rightarrow Q$  is defined by  $f(x) = 5x + 4$ , find  $f^{-1}$ .

 [Watch Video Solution](#)

3. if  $A = [(I, 0)(0, -i)]$  then show that  $A^2 = -1(i^2 = -1)$ .

 [Watch Video Solution](#)

4. If  $A = \begin{bmatrix} -1 & 2 & 3 \\ 2 & 5 & 6 \\ 3 & x & 7 \end{bmatrix}$  is a symmetric matrix then find x.

 [Watch Video Solution](#)

5. If  $\vec{a} = 2\vec{i} + 5\vec{j} + \vec{k}$  and  $\vec{b} = 4\vec{i} + m\vec{j} + n\vec{k}$  are collinear vectors, then find the m and n

 [Watch Video Solution](#)

6. Find the vector equation of the line joining the points  $2\vec{i} + 4\vec{j} + 3\vec{k}$  and  $-4\vec{i} + 3\vec{j} - \vec{k}$ .

 [Watch Video Solution](#)

7. Find the area of the parallelogram having  $\vec{a} = 2\vec{j} - \vec{k}$  and  $\vec{b} = -\vec{i} + \vec{k}$  as adjacent sides.

 [Watch Video Solution](#)

8. If  $\tan 20^\circ = \lambda$  then show that  $\frac{\tan 160^\circ - \tan 110^\circ}{1 + \tan 160^\circ \cdot \tan 110^\circ} = \frac{1 - \lambda^2}{2\lambda}$ .

 [Watch Video Solution](#)

9. Find a sine function whose period is  $2/3$ .

 [Watch Video Solution](#)

10. If  $\cosh x = 5/2$ , then find the values of  $\cosh(2x)$

 [Watch Video Solution](#)

## Section B Short Answer Type Questions

1. If  $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$  then show that  $A^2 - 4A - 5I = O$ .

 [Watch Video Solution](#)

2. If ABCDEF is a regular hexagon with centre O , then P.T  
 $\overline{AB} + \overline{AC} + \overline{AD} + \overline{AE} + \overline{AF} = 3\overline{AD} = 6\overline{AO}$

 [Watch Video Solution](#)

3. Find the volume of the tetrahedron having the edges

$$\bar{i} + \bar{j} + \bar{k}, \bar{i} - \bar{j}, \bar{i} + 2\bar{j} + \bar{k}.$$

 [Watch Video Solution](#)

4. Show that  $\frac{1}{\sin 10^\circ} - \frac{\sqrt{3}}{\cos 10^\circ} = 4$ .



Watch Video Solution

5. Solve  $\sqrt{2}(\sin x + \cos x) = \sqrt{3}$



Watch Video Solution

6. Prove that  $\sin^{-1} \frac{3}{5} + \cos^{-1} \frac{12}{13} = \cos^{-1} \frac{33}{65}$ .



Watch Video Solution

7. If  $\sin \theta = \frac{a}{b+c}$  then show that  $\cos \theta = \frac{2\sqrt{bc}}{b+c} \cos\left(\frac{A}{2}\right)$



Watch Video Solution

Section C Long Answer Type Questions

1. If  $f: A \rightarrow B$  and  $g: B \rightarrow C$  are two bijective functions then prove that  $gof: A \rightarrow C$  is also a bijection.

 [Watch Video Solution](#)

2. Using the principle of finite Mathematical Induction prove that

$$1^2 + (1^2 + 2^2) + (1^2 + 2^2 + 3^2) + \dots + n \text{ terms} = \frac{n(n+1)^2(n+2)}{12}, \forall n \in \mathbb{N}$$

 [Watch Video Solution](#)

3. Show that

$$\begin{vmatrix} a+b+2c & a & b \\ c & b+c+2a & b \\ c & a & c+a+2b \end{vmatrix} = 2(a+b+c)^3.$$

 [Watch Video Solution](#)

4. Solve the following system of equations by using Cramer's rule.

$$2x - y + 3z = 9, x + y + z = 6, x - y + z = 2.$$

 [Watch Video Solution](#)

5. If  $\vec{a} = \vec{i} - 2\vec{j} + 3\vec{k}$ ,  $\vec{b} = 2\vec{i} + \vec{j} + \vec{k}$ ,  $\vec{c} = \vec{i} + \vec{j} + 2\vec{k}$

then find  $\left| \left( \vec{a} \times \vec{b} \right) \times \vec{c} \right|$  and  $\left| \vec{a} \times \left( \vec{b} \times \vec{c} \right) \right|$ .

 [Watch Video Solution](#)

6. If A, B, C are angles of a triangle, then prove that

$$\sin^2 \frac{A}{2} + \sin^2 \frac{B}{2} - \sin^2 \frac{C}{2} = 1 - 2 \cos \frac{A}{2} \cos \frac{B}{2} \sin \frac{C}{2}.$$

 [Watch Video Solution](#)

7.

In

a

$\triangle ABC$  if  $a = 13, b = 14, c = 15$  then show that  $R = \frac{65}{8}, r = 4, r_1 =$



[Watch Video Solution](#)