



MATHS

BOOKS - VGS PUBLICATION-BRILLIANT

MODEL PAPER 6

Section A I Very Short Answer Type Questions

1. Transform the equation x + y + 1 = 0 into Normal

form.

2. If (3, 2, -1) (4, 1,-1) and (6,2,5) are three vertices and (4,

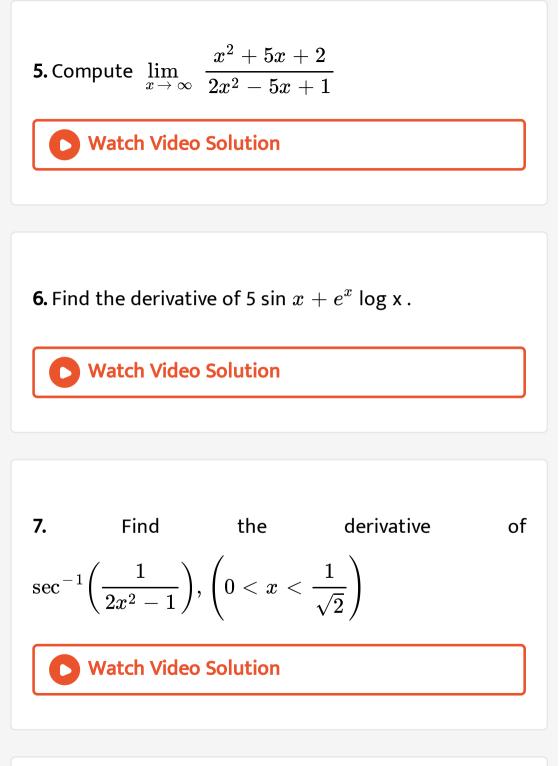
2, 2) is the centroid of a tetrahedron, then find the fourth vertex.

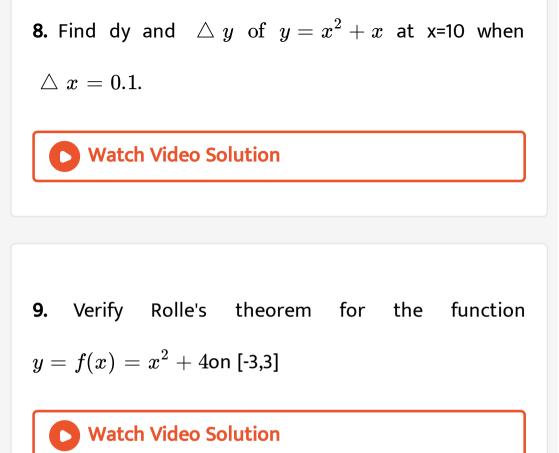
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3. Find the angle between the planes 2x - y + z = 6 and x

+ y + 2 z = 7.

• Watch Video Solution 4. Evaluate $\lim_{x \to 0} \frac{e^{7x} - 1}{x}$ • Watch Video Solution





Section B li Short Answer Type Questions

1. A(1,2), B(2, -3), C(-2,3) are 3 points. A point

P moves such that $PA^2 + PB^2 = 2PC^2$. Show that

the equation to the locus of P is 7 x - 7y + 4 = 0. Watch Video Solution 2. When the axes rotated through an angegle $\frac{\pi}{4}$, find the transformed equation of $3x^2 + 10xy + 3y^2 = 9$. Watch Video Solution

3. Find the value of p, if the lines 3x + 4y = 5, 2x + 3y =

4, px + 4y = 6 are concurrent.



4. Check the continity of the following function at 2.

$$f(x) = \left\{egin{array}{ccc} rac{1}{2}ig(x^2-4ig) & ext{if} \;\; 0 < x < 2 \ 0 & ext{if} \;\; x = 2 \ 2-8x^{-3} & ext{if} \;\; x > 2 \end{array}
ight.$$

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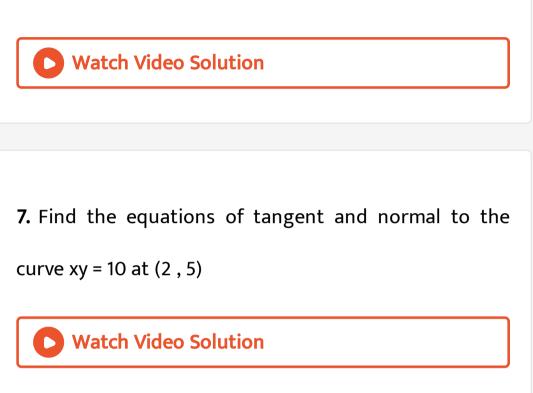
5. Find the derivative of $\cot x$ from the first principle.



6. A particle is moving in a straight line so that after 't' seconds its distance is 'S' (in cms) from a fixed point of the line is given be S=f(t)= $8t + t^3$.

Find (i) the velocity at time t=2 (ii) the initial velocity

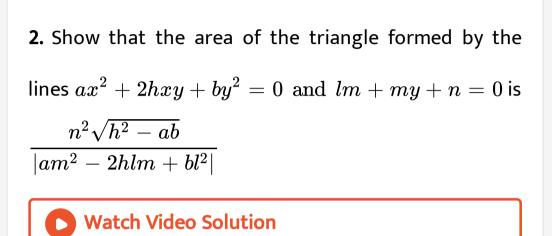
(iii) acceleration at t=2 sec



Section C lii Long Answer Type Questions

1. Find the circumcenter of the triangle whose vertices

are (-2,3) , (2 , -1) , (4 , 0) .



3. Find the value if k , if the lines joining the origin with the points of intersection of the curve $2x^2 - 2xy + 3y^2 + 2x - y - 1 = 0$ and the x + 2y = k are mutually perpendicular .

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4. Find the angle between the lines whose direction

cosines satisfy the equaitons $l+m+n=0, l^2+m^2-n^2=0.$

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5. Find
$$rac{dy}{dx}$$
 , if y $= (\sin x)^{\log x} + x^{\sin x}$

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6. Find the angle between the curves xy=2 and $x^2 + 4y = 0$



7. A wire of length I is cut into two parts which are bent respectively in the form of a square and a circle. What are the lengths of the pieces of the wire respectively so that the sum of the areas is the least.

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Section A

1. If $A=\{-2,\ -1,0,1,2\}$ and $f\colon A o B$ is a surjection defined by $f(x)=x^2+x+1$, then find B.



2. Find the domain of the real valued function $f(x) = \sqrt{9-x^2}.$

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3. Construct a 3 imes 2 matrix whose elements are defined by $a_{ij}=rac{1}{2}|i-3j|$

4. If
$$A = \begin{bmatrix} 2 & 3 \\ -5 & k \end{bmatrix}$$
 and $A^2 = 0$, then find the value of k.



5. If α , β and γ be the angle made by the vector $3\overline{i} - 6\overline{j} + 2\overline{k}$ with the positive direction of the coordinate axes, then find $\cos \alpha$, $\cos \beta$, $\cos \gamma$.

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6. Find the vector equation of the plane passing through the points $\overline{i} - 2\overline{j} + 5\overline{k}, -5\overline{j} - \overline{k} \text{ and } -3\overline{i} + 5\overline{j}.$

7. If $\bar{a} = \bar{i} - \bar{j} - \bar{k}$, $\bar{b} = 2\bar{i} - 3\bar{j} + \bar{k}$ then find the projection vector of \bar{b} on \bar{a} and its magnitude. Watch Video Solution

8. If $\cos heta = t (0 < t < 1)$ and heta does not lies in the

first quadrent , find $\sin\theta$ and $\tan\theta$.

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9. Find the maximum and minimum values of $13\cos x + 3\sqrt{3}\sin x - 4.$

10.
$$\tan h^{-1}\left(\frac{1}{2}\right) =$$

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Section B
1. If A is a non-singular matrix then prove that
 $A^{-1} = \frac{adjA}{|A|}$.

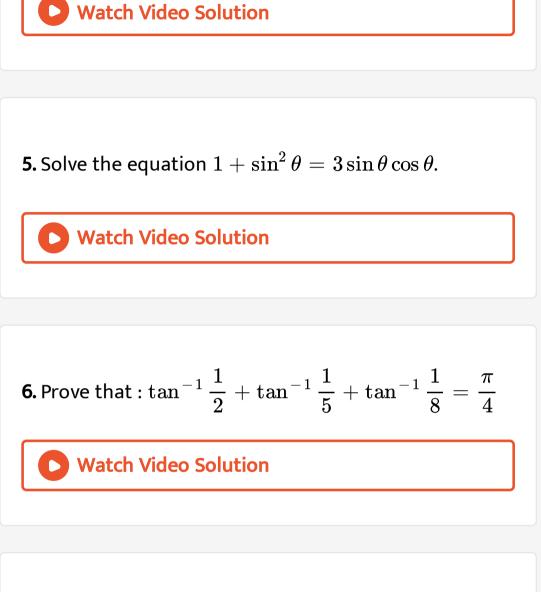
2. \bar{a} , \bar{b} , \bar{c} are non coplanar vectors. Prove that the four points $-\bar{a} + 4\bar{b} - 3\bar{c}$, $3\bar{a} + 2\bar{b} - 5\bar{c}$, $-3\bar{a} + 8\bar{b} - 5\bar{c}$, $-3\bar{a} + 2\bar{b} + \bar{c}$ are co-planar.

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3. Find the unit vector perpendicular to the plane passing through the points (1, 2, 3), (2, -1, 1) and (1, 2, -4).

4. Prove that
$$\sqrt{3} \mathrm{csc}\, 20^\circ\, -\, \mathrm{sec}\, 20^\circ\, =\, 4$$





7. If
$$\frac{\cot A}{2} : \cot \frac{B}{2} : \cot \frac{C}{2} = 3:5:7$$
 then show that $a:b:c = 6:5:4.$

Section C

1. If $f \colon A o B$ is a bijective function then prove that

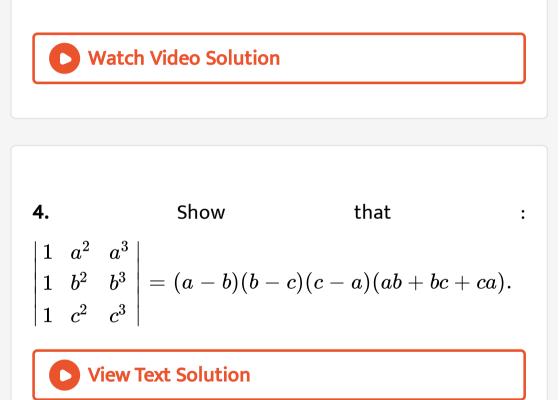
(i) $fof^{-1} = I_B$

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2. If $f \colon A o B$ is a bijective function then prove that

(ii) $f^{-1}of = I_A$.

3. By Mathematical Induction , show that $49^n + 16n - 1$ is divisible by 64 for all positive Integer n .



x + y + z = 9, 2x + 5y + 7z = 52 and 2x + y - z = 0

by using matrix inversion method.



6. If A=(1, -2, -1), B= (4, 0, -3), C = (1, 2, -1), D=(2, -4, -5)`, then

distance between AB and CD is

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7. If $A+B+C=180^{\,\circ}\,,\,\,{
m then}\,\,{
m show}\,\,{
m that}$

 $\cos 2A + \cos 2B + \cos 2C = -1 - 4 \cos A \cdot \cos B \cdot \cos C$





8. In ΔABC , if $r_1=8, r_2=12, r_3=24$ then the

value of $\sin B =$