

CLASS XII MATHEMATICS IMPORTANT QUESTIONS

AREA BOUNDED BY TWO CURVES (LA)

1. Find the area of the region $\{(x, y): y \geq x^2 \text{ and } y = |x|\}$
2. Find area enclosed between $x^2 + y^2 = 4$ and $(x-2)^2 + y^2 = 4$.
3. Area of a triangle using integration.
4. Area bounded between two parabolas

Differential Equations (SA)

1. Form a differential equation of the family of circles having centre on y-axis and given radius.
2. Solving a homogeneous diff. equation, like:

(i) $x \cos\left(\frac{y}{x}\right) \frac{dy}{dx} = y \cos\left(\frac{y}{x}\right) + x.$

(ii) $x^2 dy + (xy + y^2) dx = 0$, given that $y = 1$ when $x = 1$.

3. (i) $\cos^2 x \frac{dy}{dx} + y = \tan x$

(ii) $(1+x^2) \frac{dy}{dx} + 2xy = \frac{1}{1+x^2} \cdot y = 0$, when $x = 1$

VSA

1. Find a unit vector in the direction of the vector $3\hat{i} - 4\hat{j} - 5\hat{k}$.
2. If $\vec{a} \cdot \vec{b} = 5$, $|\vec{a}| = 3$ and $|\vec{b}| = 2$, then find the projection of \vec{b} on \vec{a} .
3. Write a unit vector perpendicular to two given vectors.
4. A vector makes angles $\pi/3$ with \hat{i} , $\pi/4$ with \hat{j} and an acute angle θ with \hat{k} , find θ .
5. Let $\vec{a} = 2\hat{i} + 6\hat{j} - 4\hat{k}$ and $\vec{b} = 3\hat{i} - \lambda\hat{j} - 6\hat{k}$. Find λ if \vec{a} and \vec{b} are collinear.
6. Find the direction cosines of the line $\frac{x-1}{2} = \frac{3-y}{2} = \frac{2z-5}{2}$.

SA

1. Show that $|\vec{a}|\vec{b} + |\vec{b}|\vec{a}$ is perpendicular to $|\vec{a}|\vec{b} - |\vec{b}|\vec{a}$, for any $\vec{a}, \vec{b} \neq \vec{0}$.
2. Show that $2\hat{i} - \hat{j} + \hat{k}$, $\hat{i} - 3\hat{j} - 5\hat{k}$ and $3\hat{i} - 4\hat{j} - 4\hat{k}$ are vertices of a right triangle.
3. Finding shortest distance between two skew lines.
4. Find a unit vector perpendicular to $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$, where $\vec{a} = \dots$, $\vec{b} = \dots$
5. Equation of plane through three points / through the intersection of two planes and perpendicular to a given plane.