

**9 MOST PROBABLE TOPICS
ANALYSIS FOR JEE MAINS 2021
APRIL ATTEMPT**

MATHEMATICS

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Topic-1

Feb-21

March-21

Topic Name

Chapter Name

Topic Name

**DEFINITE INTEGRALS
AND AREA**

AREAS

AREAS

Total Questions

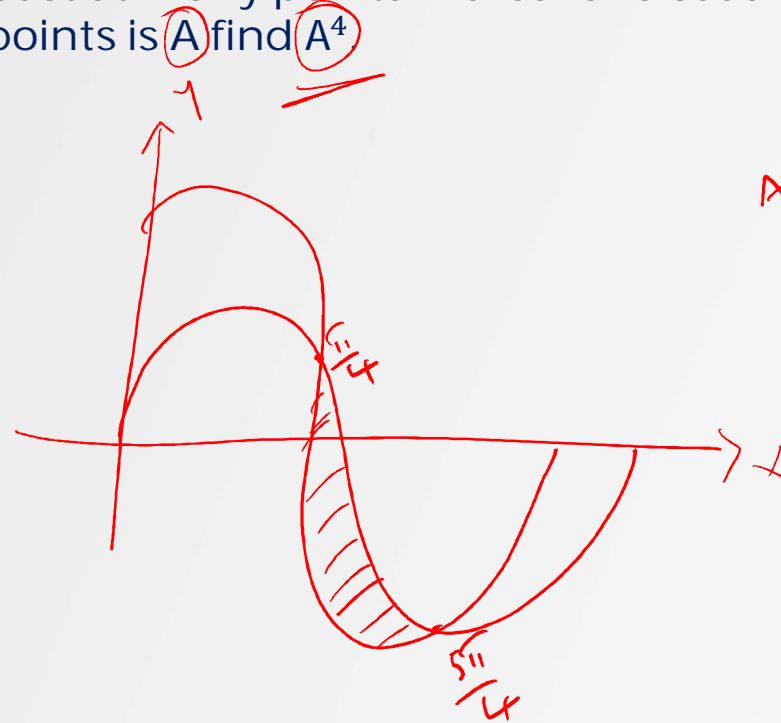
6

Total Questions

5

1. $y = \sin x$ and $y = \cos x$ intersect at many points. If area enclosed by them between two consecutive intersection points is A find A^4

Answer : 64



$$A = \int_{\pi/4}^{5\pi/4} (\cos x - \sin x) dx$$

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Topic Name

Topic Name

LIMIT OF SUM

LIMIT OF SUM

Chapter Name

DEFINITE INTEGRALS
AND AREA

Total Questions

1 ✓

Total Questions

1 ✓

2. $\lim_{n \rightarrow \infty} \left(\frac{1}{n} + \frac{n}{n-1} + \frac{n}{(n+2)^2} + \dots + \frac{n}{(2n-1)^2} \right)$ is equal to

(A) $\frac{1}{2}$

(B) $\frac{1}{3}$

(C) 1

(D) $\frac{2}{3}$

$$\sum_{n=0}^{\infty} \frac{1}{n} \left(\frac{1}{n} \right)$$

Answer : (A)

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Chapter Name

Topic Name

Topic Name

RANK OF MATRICES AND
SOLUTIONS OF LINEAR
SYSTEM OF EQUATIONS

MATRICES

RANK OF MATRICES AND
SOLUTIONS OF LINEAR
SYSTEM OF EQUATIONS

Total Questions
04 ✓

Total Questions
04 ✓

3. The values of k and m such that system of equations $3x + 2y - kz = 10$, $x - 2y + 3z = 3$, $x + 2y - 3z = 5m$ are inconsistent.

(A) $k = 3$ and $m \neq \frac{7}{10}$

(B) $k = 3$ and $m = \frac{7}{10}$

(C) $k \neq 3$ and $m = \frac{7}{10}$

(D) $k = 2$ and $m \neq \frac{7}{10}$

Answer : (A)

$$\Delta = \begin{vmatrix} 3 & 2 & -k \\ 1 & -2 & 3 \\ k & 2 & 3 \end{vmatrix} \neq 0$$

using Cramer's Rule
we can find k and m values

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Chapter Name

VECTOR ALGEBRA

Topic Name

ADDITION, SUBTRACTION,
SCALAR MULTIPLICATION,
POSITION VECTORS,
SECTION FORMULA,
ANGULAR-BISECTORS

Topic Name

ADDITION, SUBTRACTION,
SCALAR MULTIPLICATION,
POSITION VECTORS,
SECTION FORMULA,
ANGULAR-BISECTORS

Total Questions

03 ✓

Total Questions

01 ✓

4. The equation of plane perpendicular to planes $3x + y - 2z + 1 = 0$ and $2x - 5y - z + 3 = 0$ such that it passes through point $(1, 2, -3)$

- (A) $11x + y + 17z + 38 = 0$
- (B) $11x - y - 17z + 40 = 0$
- (C) $11x + y - 17z + 36 = 0$
- (D) $x + 11y + 17z + 3 = 0$

Answer : (A)

Normal vector Equation =

i	j	k
3	1	-2
2	-5	-1

$a(x-x_1) + b(y-y_1) + c(z-z_1) = 0$

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Topic Name

CROSS PRODUCT & ITS APPLICATION

Chapter Name

VECTOR ALGEBRA

Topic Name

CROSS PRODUCT & ITS APPLICATION

Total Questions

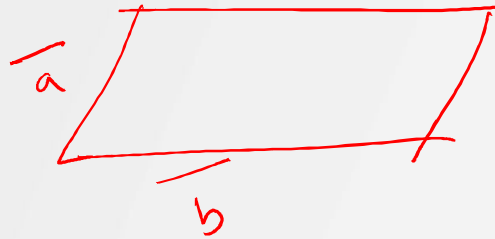
02

Total Questions

05

5. If $\bar{a} = 3\hat{i} + \alpha\hat{j} + k$, $\bar{b} = \hat{i} - \alpha\hat{j} + 3k$ and area of parallelogram made by \bar{a} and \bar{b} are adjacent sides is $8\sqrt{3}$ then $\bar{a} \cdot \bar{b}$ is

Answer : 64



$$\bar{a} \times \bar{b}$$

$$|\bar{a} \times \bar{b}| = 8\sqrt{3}$$

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Topic Name

COLLINEARITY,
COPLANARITY, VECTOR
EQUATION OF STRAIGHT
LINE, VECTOR EQUATION OF
PLANE

Chapter Name

VECTOR ALGEBRA

Topic Name

COLLINEARITY,
COPLANARITY, VECTOR
EQUATION OF STRAIGHT
LINE, VECTOR EQUATION OF
PLANE

Total Questions

03 ✓

Total Questions

03 ✓

6. If $\vec{a} = \alpha\hat{i} + \beta\hat{j} + 3\hat{k}$, $\vec{b} = -\beta\hat{i} - \alpha\hat{j} - \hat{k}$ and $\vec{c} = \hat{i} - 2\hat{j} - \hat{k}$ such that $\vec{a} \cdot \vec{b} = 1$ and $\vec{b} \cdot \vec{c} = -3$ then $\frac{1}{3} ((\vec{a} \times \vec{b}) \cdot \vec{c})$ is equal to _____

Answer : 2

$$\vec{a} \cdot \vec{b} = 1 \quad \text{--- (1)}$$

$$\vec{b} \cdot \vec{c} = -3 \quad \text{--- (2)}$$

Solving (1) & (2) we get (α, β)

$$\frac{1}{3} ((\vec{a} \times \vec{b}) \cdot \vec{c}) \Rightarrow \frac{1}{3} \begin{vmatrix} \vec{a} & \vec{b} & \vec{c} \end{vmatrix} = \begin{vmatrix} \phantom{\vec{a}} & \phantom{\vec{b}} & \phantom{\vec{c}} \end{vmatrix}$$

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Chapter Name

Topic Name

PROPERTIES OF BINOMIAL
CO-EFFICIENT

**BINOMIAL
THEOREM**

Topic Name

PROPERTIES OF
BINOMIAL
CO-EFFICIENT

Total Questions
01 ✓

Total Questions
03 ✓

7. Let $[x]$ denote greatest integer less than or equal to x . If for $n \in \mathbb{N}$, $(1 - x + x^3)^n = \sum_{j=0}^{3n} a_j x^j$,
 then $\sum_{j=0}^{\frac{3n}{2}} a_{2j} + 1$ is equal to

- (A) 2
- (B) 2^{n-1}
- (C) 1
- (D) n

Answer : (C)

$$(1 - x + x^3)^n = a_0 + a_1 x + a_2 x^2 + \dots + a_{3n} x^{3n} \quad \text{--- (1)}$$

$$(1 - x + x^3)^n = \sum_{j=0}^{3n} a_j x^j \quad \text{--- (2)}$$

$$(1 - x + x^3)^n = \sum_{j=0}^{\lfloor \frac{3n}{2} \rfloor} a_{2j} x^{2j} + 1$$

Put $x = 1$
 $x = -1$

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Chapter Name

Topic Name

FINDING REMAINDER,
DOUBLE SUMMATION,
VANDER WAALS THEOREM,
DIVISIBILITY PROBLEMS

**BINOMIAL
THEOREM**

Topic Name

FINDING REMAINDER,
DOUBLE SUMMATION,
VANDER WAALS THEOREM,
DIVISIBILITY PROBLEMS

Total Questions

02 ✓

Total Questions

02 ✓

8. If $(2021)^{3762}$ is divided by 17, then the remainder is _____.

Answer : 4 ✓

$$\begin{aligned}
 (2021)^{3762} &= (2023-2)^{3762} \\
 &= (2023)^{3762} + 2^{3762} \\
 &= (17 \times 17 \times 9)^{3762}
 \end{aligned}$$

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Topic Name

ORDER, DEGREE,
FORMATION OF
DIFFERENTIAL EQUATIONS

Chapter Name

**DIFFERENTIAL
EQUATIONS**

Topic Name

ORDER, DEGREE,
FORMATION OF
DIFFERENTIAL EQUATIONS

Total Questions
04 ✓

Total Questions
02 ✓

9. The differential equation satisfied by the system of parabolas $y^2 = 4a(x + a)$ is

(A) $y \left(\frac{dy}{dx}\right)^2 - 2x \left(\frac{dy}{dx}\right) - y = 0$

(B) $y \left(\frac{dy}{dx}\right)^2 - 2x \left(\frac{dy}{dx}\right) + y = 0$

(C) $y \left(\frac{dy}{dx}\right)^2 + 2x \left(\frac{dy}{dx}\right) - y = 0$

(D) $y \left(\frac{dy}{dx}\right)^2 + 2x \left(\frac{dy}{dx}\right) - y = 0$

Answer : (C)

$y^2 = 4a(x + a)$

Diff w.r.t x