

**JEE-Advanced-27-01-2024 (Memory Based)**  
**[Morning Shift]**

**Maths**

**Question:** The points on the line in the first quadrant  $4x+5y=20$  which trisect the section of the line in the first quadrant, what is the tan of the angle between them?

**Options:**

- (a) 25/41
- (b) 3/5
- (c) 4/5
- (d) 30/41

**Answer:** (d)

**Question:**  $S=\{1, 2, \dots, 10\}$

M are all the subsets of S

$X=\{A, B ; A \cap B = \text{null set and } A, B \text{ belongs to } X\}$

**Options:**

- (a) X is symmetric
- (b) X is transitive and symmetric
- (c) X is reflexive
- (d) X is symmetric and reflexive

**Answer:** (a)

**Question:**

$$8 = \frac{1}{4}(3+P) + \frac{1}{4^2}(3+2P) + \frac{1}{4^3}(3+3P) + \dots$$

Value of P??

**Answer: 9**

$$8 = 3 + \frac{1}{4}(3+P) + \frac{1}{4^2}(3+2P) + \frac{1}{4^3}(3+3P) + \dots$$

$$8 \times 4 = \frac{1}{4} \times 3 + \frac{1}{4^2} \times (3+P) + \frac{1}{4^3} \times (3+2P) + \dots$$

$$6 = 3 + \frac{1}{4}(P) + \frac{1}{4^2}(P) + \frac{1}{4^3}(P) + \dots$$

$$3 = \frac{P/4}{1 - \frac{1}{4}} = \frac{P}{3} \rightarrow P = 9$$

**Question:** Find the length of the chord of the ellipse

$$\frac{x^2}{25} + \frac{y^2}{16} = 1 \text{ whose midpoint is } \left(1, \frac{2}{5}\right)$$

**Answer:**  $\frac{\sqrt{1691}}{10}$

**Question:**

$$\vec{a} \cdot \vec{c} = 3$$

$$\vec{a} = \hat{i} - 2\hat{j} + \hat{k} \quad \vec{b} = 3(\hat{i} - \hat{j} + \hat{k}) \quad \vec{a} \times \vec{c} = \vec{b}$$

$$\vec{a} \cdot (\vec{b} \times \vec{c}) - \vec{a} \cdot \vec{b} - \vec{a} \cdot \vec{c}$$

Find

**Answer:** 42

**Question:** Circle passing through (0,0), (0,1), (1,0) and (2k, 3k). Find the value of k

**Answer:**

$$\Rightarrow K = \frac{5}{13} \text{ as } K \neq 0$$

**Question:**

$$\int_0^1 \frac{1}{\sqrt{3+x} + \sqrt{1+x}} dx = a + b\sqrt{2} + c\sqrt{3},$$

then  $2a - 3b - 4c$  is equal to

**Options:**

- (a) 10
- (b) 0
- (c) 12
- (d) 20

**Answer:** 12

**Question:** AP<sub>1</sub> : 4, 9, 14 .... Upto 25 terms

AP<sub>2</sub> : 3, 6, 9 .... Upto 37 terms

No. of common terms

**Answer:** 7

**Question:**  $a_1, a_2, \dots, a_{10}$   
 $\sum a_i = 50 \quad \sum_{i < j} a_i a_j = 1100$  Find  $S.D$

**Answer:**  $\sqrt{5}$

**Question:**  $\lim_{x \rightarrow 0} \frac{\sqrt{1 + \sqrt{1 + x^4}} - \sqrt{2}}{x^4} = a$

**Answer:** 32

**Question:** These least positive integral value of 'a' such that the vectors  $a\hat{i} - 2\hat{j} + 2\hat{k}$  and  $a\hat{i} + 2a\hat{j} - 2\hat{k}$  are having acute angle between them

**Answer:** 5

**Question:**

$$f(x) = \begin{bmatrix} \cos x & -\sin x & 0 \\ \sin x & \cos x & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

$$S_1 \Rightarrow f(x)f(y) = f(x+y)$$

$$S_2 \Rightarrow f(-x) \text{ is inverse of } f(x)$$

**Answer:** S1 and S2 both are true.

**Question:** If  $f(x) = x^3 + x^2f'(1) + xf''(2) + f'''(3)$ , then find  $f'(10)$ .

**Answer: 202**

