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,.....10}
M are all the subsets of S
X={A, B ; A intersection B= null set and A, B 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:

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

Value of P??

Answer: 9

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

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

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

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

Question: Find the length of the chord of the ellipse
$\frac{x^2}{25} + \frac{y^2}{16} = 1$ whose midpoint is $\left(1, \frac{2}{5}\right)$

Answer: $\dfrac{\sqrt{1691}}{10}$

Question:
$\vec{a}.\vec{c} = 3$

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

$\vec{a}.\left(\vec{b} \times \vec{c}\right) - \vec{a}.\vec{b} - \vec{a}.\vec{c}$

Find
Answer: 42

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

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

Question:

$\displaystyle\int_{0}^{1} \dfrac{1}{\sqrt{3+x} + \sqrt{1+x}} dx = a + b\sqrt{2} + c\sqrt{3},$

then 2a- 3b - 4c is equal to
Options:
(a) 10
(b) 0
(c) 12
(d) 20
Answer: 12

Question: AP$_1$: 4, 9, 14 …. Upto 25 terms
AP$_2$: 3, 6, 9 …. Upto 37 terms
No. of common terms
Answer: 7

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

Answer: $\sqrt{5}$

Question: $\displaystyle\lim_{x \to 0} \dfrac{\sqrt{1 + \sqrt{1 + x^4}} - \sqrt{2}}{x^4} = a$

Answer: 32

Question: These least positive integral value of 'a' such that the vectors ai -2j +2k and ai+ 2aj -2k are having acute angle between them
Answer: 5

Question:

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

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

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

Answer: S1 and S2 both are true.

Question: If $f(x) = x^3 + x^2 f'(1) + x f''(2) + f'''(3)$, then find $f'(10)$.
Answer: 202