

JEE Main 2024 Mathematics Question Paper

Jan 30 Shift 2 (B.E./B.Tech)

JEE Main Mathematics Questions

Ques 1. Bag A contains 7 white balls & 3 red balls. Bag B contains 3 white balls & 2 red balls. A ball is chosen randomly & found to be red then find the probability that it is taken from bag A.

- A. $7/20$
- B. $\frac{1}{2}$
- C. $3/7$
- D. $\frac{1}{5}$

Ans. C

Ques 2. Given $|\vec{b}| = 2$, $|\vec{b} \times \vec{a}| = 2$, then the value of $|\vec{b} \times \vec{a} - \vec{b}|^2$ is

- A. 0
- B. 8
- C. 1
- D. 10

Ans. B

Ques 3. If $f(x) = \ln(2x/(4x^2 - x - 3)) + \cos^{-1}((2x+1)/(x+2))$ if domain of $f(x)$ is $[\alpha, \beta]$, then $5\alpha - 4\beta$ is:

- A. -2
- B. 3
- C. -4

D. 1

Ans. A

Ques 4. If $f(x) = (x - 2)^2 (x - 3)^3$ and $x \in [1, 4]$ If M and m denotes maximum and minimum values respectively, then $M - m$ is

Ans. 12

Ques 5. $f * (y - 2)^2 = (x - 1)$ and $x - 2y + 4 = 0$ then find the area bounded by the curves between the coordinate axis in first quadra (in sq. units)

Ans. 3

Ques 6. If 1st term of a GP is 'a' and 3rd term is 'b' and in 2nd GP 1st term is 'a' and 5th term is 'b' and 11th term of 1st GP common to which term of 2nd GP

- A. 24
- B. 25
- C. 21
- D. 18

Ans. C

$$z^{1985} + z^{100} + 1 = 0 \text{ and}$$

Ques 7. $z^3 + 2z^2 + 2z + 1 = 0$ then number of common roots of equation is

- A. 1
- B. 2
- C. 3
- D. 4

Ans. B

Ques 8. If $x^2 - y^2 + 2hxy + 2gx + 2fy + c = 0$ is the locus of points such that it is equidistant from the lines $x + 2y - 8 = 0$ and $2x + y + 7 = 0$ then value of $h + g + f + c$ is

- A. 15
- B. -15
- C. 20
- D. -20

Ans. C

$$A = \begin{bmatrix} x & 0 & 0 \\ 0 & y & 0 \\ 0 & 0 & z \end{bmatrix}$$

$$\frac{x}{\sin \theta} = \frac{y}{\sin\left(\theta + \frac{2\pi}{3}\right)} = \frac{z}{\sin\left(\theta + \frac{4\pi}{3}\right)}$$

Ques 9.

Then

Statement 1: $\text{Tr}(A) = 0$

Statement 2: $\text{Tr}(\text{adj}(\text{adj } A))$

- A. Statement 1 & 2 are true
- B. Statement 1 is true
- C. Statement 2 is true
- D. None of these

Ans. A

Ques 10. If $S_n = 3 + 7 + 11 + \dots$ upto n terms And $40 < \frac{6}{n(n+1)} \sum_{k=1}^n S_k < 45$, then n is

- A. 9
- B. 10
- C. 11
- D. 12

Ans. A

Ques 11. In a paper there are 3 sections A, B and C which have 8, 6 and 6 questions each. A student have to attempt 15 questions such that they have to attempt at least 4 questions out of each sections, then number of ways of attempting these questions are

- A. 11,300
- B. 11,376
- C. 12,576
- D. 13,372

Ans. B