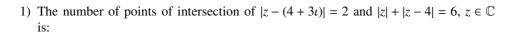
JEE MAINS 2022 June 27 - Shift 2

1

EE24BTECH11061 - Rohith Sai



a) 0

c) 2

b) 1

- d) 3
- 2) Let $f(x) = \begin{vmatrix} a & -1 & 0 \\ ax & a & -1 \\ ax^2 & ax & a \end{vmatrix}$, $a \in \mathbb{R}$. Then the sum of which the squares of all the values of a for 2f'(10) - f'(5) + 100 = 0 is:
 - a) 117

c) 125

b) 106

- d) 136
- 3) Let for some real numbers α and β , $\alpha = \alpha i\beta$. If the system of equations $4ix + \beta$ $(1+\iota)y=0$ and $8\left(\cos\frac{2\pi}{3}+\iota\sin\frac{2\pi}{3}\right)x+\overline{a}y=0$ has more than one solution then $\frac{\alpha}{\beta}$ is equal to:
 - a) $-2 + \sqrt{3}$ b) $2 \sqrt{3}$

- c) $2 + \sqrt{3}$ d) $-2 \sqrt{3}$
- 4) Let A and B be two 3×3 matrices such that AB = I and det $A = \frac{1}{8}$ then $det\{ad j(Bad j(2A))\}\$ is equal to
 - a) 16

c) 64

b) 32

- d) 128
- 5) Let $S = 2 + \frac{6}{7} + \frac{12}{7^2} + \frac{20}{7^3} + \frac{30}{7^4} + \dots$ then 4S is equal to
 - a) $\left(\frac{7}{3}\right)^2$ b) $\left(\frac{7}{3}\right)^3$

c) $\frac{7^3}{3^2}$ d) $\frac{7^2}{3^3}$

- 6) If a_1, a_2, a_3, \ldots and b_1, b_2, b_3, \ldots are in A.P. and $a_1 = 2$, $a_{10} = 3$, $a_1b_1 = 1 = a_{10}b_{10}$ then a_4b_4 is equal to

a) $\frac{35}{27}$ b) 1	c) $\frac{27}{28}$ d) $\frac{28}{27}$
7) If m and n respectively are the number of local maximum and local minimum points of the function $f(x) = \int_0^{x^2} \frac{t^2 - 5t + 4}{2 + e^t}$, dt, then the ordered pair (m,n) is equal to	
a) (3,2) b) (2,3)	c) (2,2) d) (3,4)
8) Let f be a differentiable function in $\left(0, \frac{\pi}{2}\right)$. If $\int_{\cos x}^{1} t^2 f(t), dt = \sin^3 x + \cos x$ then $\frac{1}{\sqrt{3}} f'\left(\frac{1}{\sqrt{3}}\right)$ is equal to:	
a) $6 - 9\sqrt{2}$ b) $6 - \frac{9}{\sqrt{2}}$	c) $\frac{9}{2} - 6\sqrt{2}$ d) $\frac{9}{\sqrt{2}} - 6$
9) The integral $\int_0^1 \frac{1}{7[\frac{1}{x}]}, dx$, is where [.] denotes the greatest integer function is equal to	
a) $1 + 6 \log_e \frac{6}{7}$ b) $1 - 6 \log_e \frac{6}{7}$	c) $\log_e \frac{7}{6}$ d) $1 - 7 \log_e \frac{6}{7}$
10) If the solution curve of the differential equation $((\tan^{-1} y) - x) dy = (1 + y^2) dx$ passes through the point $(1,0)$ then the abscissa of the point on the curve whose ordinate is $\tan 1$ is:	
a) $2e$ b) $\frac{2}{e}$	c) 2 d) $\frac{1}{e}$

11) If the equation of the parabola, whose vertex is at (5,4) and the directrix is 3x+y-29=0, id $x^2+ay^2+bxy+cx+dy+k=0$ then a+b+c+d+k is equal to

a) 575 c) 576 b) -575 d) -576

12) The set of values of k for which the circle $C: 4x^2 + 4y^2 - 12x + 8y + k = 0$ lies inside the fourth quadrant and the point $\left(1, -\frac{1}{3}\right)$ lies on or inside the circle C is:

a) An empty set c) $\left[\frac{80}{9}, 10\right]$ d) $(9, \frac{95}{9}]$

13) Let the foot of the perpendicular from the point (1, 2, 4) on the line $\frac{x+2}{4} = \frac{y-1}{2} = \frac{z+1}{3}$ be P. Then the distance of P from the plane 3x + 4y + 12z + 23 = 0

a)	5
b)	$\frac{50}{13}$

c) 4 d)
$$\frac{63}{13}$$

14) The shortest distance between the lines $\frac{x-3}{2} = \frac{y-2}{3} = \frac{z-1}{-1}$ and $\frac{x+3}{2} = \frac{y-6}{1} = \frac{z-5}{3}$ is:

a)
$$\frac{18}{\sqrt{5}}$$

b) $\frac{22}{3\sqrt{5}}$

c)
$$\frac{46}{3\sqrt{5}}$$

d) $6\sqrt{3}$

15) Let \mathbf{a} and \mathbf{b} be the vectors along the diagonal of a parallelogram having area $2\sqrt{2}$. Let the angle between \mathbf{a} and \mathbf{b} be acute. $|\mathbf{a}|=1$ and $|\mathbf{a}\cdot\mathbf{b}|=|\mathbf{a}\times\mathbf{b}|$. If $\mathbf{c}=2\sqrt{2}$ ($\mathbf{a}\times\mathbf{b}$) – 2b, then an angle between b and c is:

a)
$$\frac{\pi}{4}$$
 b) $-\frac{\pi}{4}$

c)
$$\frac{5a}{6}$$

c)
$$\frac{5\pi}{6}$$
 d) $\frac{3\pi}{4}$