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Mathematics Objective Questions for NET, IAS, State-SET (KSET, WBSET, MPSET, etc.), GATE, CUET, Olympiads etc. Paper 22

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Q-1 The distance of the point (x, y) from y-axis is

- (a) x
- (b) y
- (c) $|x|$
- (d) $|y|$

Q-2. The straight line $3x + y = 9$ divides the segment joining the points $(1,3)$ and $(2,7)$ in the ratio.

- (a) 4: 2
- (b) 3: 4
- (c) 4: 5
- (d) 5: 6

Q-3. If the angles of triangle ABC are in A. P. , then

- (a) $c^2 = a^2 + b^2 + ab$
- (b) $a^2 + c^2 - ac = b^2$
- (c) $c^2 = a^2 + b^2$
- (d) None of these

Q-4. The area of triangle is 80 cm^2 and its perimeter is 8 cm. The radius of its inscribed circle is

- (a) 10 cm
- (b) 20 cm
- (c) 5 cm
- (d) None of these

Q-5. The straight line $3x + 4y = 20$ and the circle $x^2 + y^2 = 16$

- (a) Touch each other
- (b) Intersect in the two distinct point

(c) Neither touch nor intersect in two points

(d) None of these

Q-6. Slope of a line is not defined if the line is

(a) Parallel to x-axis

(b) Parallel to the line $x-y=0$

(c) Parallel to the line $x+y=0$

(d) Parallel to y-axis

Q-7. The number of values of θ which lie between $0 \text{ and } 2\pi$ and satisfy the equation

$\sin^4 \theta - 2 \sin^2 \theta - 1 = 0$ is

(a) 1

(b) 2

(c) 3

(d) None of these

Q-8. If $\cos(2 \sin^{-1} x) = \frac{1}{9}$, then $x =$

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

(b) $-\frac{2}{3}$

(c) $\pm\frac{2}{3}$

(d) None of these

Q-9. The image of the point (α, β) is the line $x + y = 0$ is

(a) $(-\alpha, \beta)$

(b) (β, α)

(c) $(-\beta, -\alpha)$

(d) None of these

Q-10. $\tan^{-1} \frac{1}{7} + 2 \tan^{-1} \frac{1}{3} =$

(a) $\frac{3\pi}{4}$

(b) $\frac{\pi}{4}$

(c) $\frac{\pi}{2}$

(d) None of these

Q-11. If $a = 4$, $b = 3$ and $A = 60^\circ$, then c is a root of the equation

(a) $x^2 - 3x - 7 = 0$

(b) $x^2 + 3x + 7 = 0$

(c) $x^2 - 3x + 7 = 0$

(d) $x^2 + 3x - 7 = 0$

Q-12. The vertex od the parabola $y^2 = 4a(x + a)$ is

(a) (0,0)

(b) (-a, 0)

(c) (a, 0)

(d) (0, a)

Q-13. slope of any line parallel to x-axis is

(a) 1

(b) -1

(c) 0

(d) Not defined

Q-14. bc $\cos^2 \frac{A}{2} + ca \cos^2 \frac{B}{2} + ab \cos^2 \frac{C}{2}$, is equal to

(a) $(s-a)^2$

(b) $(s-b)^2$

(c) $(s-c)^2$

(d) s^2

Q-15. If in a ΔABC , $a \cos A = b \cos B$, then the triangle is a/an

(a) Equilibrium

(b) Right angled

(c) Isosceles

(d) Either isosceles or right angle

Q-16. The period of function $f(x) = \sin^2 x + \tan x$ is

(a) .

(b) 2π

(c) 3π

(d) None of these

Q-17. if $x = \{49(n-1) : n \in N\}$ and $y = \{2^{3n} - 7n : n \in N\}$, then

(a) $x = y$

(b) $x \subset y$

(c) $y \subset x$

(d) None of these

Q-18. If $P = \{n^3 + (n+1)^3 + (n+2)^3 : n \in N\}$, and $Q = \{9N : n \in N\}$, then

(a) $P = Q$

(b) $P \subset Q$

(c) Q C P

(d) None of these

Q-19. If $[\log_4 [\log_2 (x)]] = 1$, then the value of x is

(a) 23

(b) 43

(c) $2 \times 3 \times 4$

(d) None of these

Q-20. Derivative of $\cos (\sin x)$ with respect to $\sin x$ is(a) $-\sin (\sin X) \cos X$ (b) $-\sin (\sin X)$ (c) $-\frac{\sin (\sin X)}{\cos X}$

(d) None of these

Q-21. If $x \sin (a + y) = \sin y$, then dy/dx is equal to(a) $\sin^2 \frac{a + y}{\sin a}$ (b) $\sin^2 \frac{a}{\sin^2 (a + y)}$ (c) $\frac{\sin (a + y)}{\sin a}$ (d) $\sin \frac{a}{\sin (a + y)}$ Q-22. The range of the function $f(x) = \cos [x]$, where $-\frac{\pi}{2} < x < \frac{\pi}{2}$, is(a) $\{-1, 1, 0\}$ (b) $\{\cos 1, 1, \cos 2\}$ (c) $\{\cos 1, -\cos 1, 1\}$

(d) None of these

Q-23. The domain of the function $f(x) = \frac{1}{[x]} + \sqrt{2 - x}$ is(a) $[0, 2]$ (b) $[0, 1]$ (c) $[1, 2]$ (d) $[1, 2]$ Q-24. Let $f(x) = x^3$, then $f(x)$ has a(a) Local maxima at $x = 0$ (b) Local minima at $x = 0$ (c) Point of inflexion at $x = 0$

(d) None of these

Q-25. $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sec x - \sqrt{2}}{X - \frac{\pi}{4}}$

- (a) $\sqrt{2}$
- (b) $-\sqrt{2}$
- (c) 0
- (d) None of these

Q-26. If $I = \int_1^2 \frac{dx}{\sqrt{1+x}}$ and $J = \int_1^2 \frac{dx}{x}$, then

- (a) $I > J$
- (b) $I < J$
- (c) $I = J$
- (d) None of these

Q-27. $\int \frac{\sec x \operatorname{cosec} x}{\log \tan x} dx =$

- (a) $\log(\tan x)$
- (b) $\tan(\log x)$
- (c) $\tan\{\log(\log x)\}$
- (d) $\log_1 \log(\tan x)$

Q-28. If $f(x) = \frac{1}{3}x + 1$, then $f(0)$ is equal to

- (a) Vanishes
- (b) is positive
- (c) is negative
- (d) does not exist

Q-29. If $y = \sin^{-1} a$ and $\cos^{-1} \sqrt{1-x^2}$, then $\frac{dy}{dx}$ is equal to

- (a) $\cos^{-1} x$
- (b) $\frac{1}{\sqrt{1-x^2}} - x^2$
- (c) $\sqrt{1-x^2}$
- (d) 1

Q-30. $\int_{-\pi}^{\pi} (\cos px - \sin qx)^2 dx$ is equal to

- (a) 0
- (b) $\frac{\pi}{2}$
- (c) π
- (d) 2π

Q-31. $\int (e^{a \log a} + e^{x \log a}) dx$ is equal to

- (a) $\frac{x^{a+1}}{a+1} + \frac{a^x}{\log a}$
- (b) $\frac{1}{a} e^{a \log x} + \frac{1}{\log a} e^{x \log a}$
- (c) $\frac{x^a}{\log a} + \frac{a^x}{\log x}$
- (d) None of these

Q-32. The number of vectors of unit length perpendicular to vectors

$$\vec{u} = \vec{i} + \vec{j} \text{ and } \vec{v} = \vec{j} + \vec{k}$$

- (a) one
- (b) Three
- (c) Two
- (d) Infinite

Q-33. Let $\vec{r} = 2\vec{i} + 2\vec{j} + 5\vec{k}$ and A, B be the points (1, 2, 5) and (-1, -2, -3) respectively. If $B \vec{A} \times \vec{r} = 4\vec{i} + 6\vec{j} + 2\lambda\vec{k}$, then $\lambda =$

- (a) 0
- (b) 1
- (c) 2
- (d) -2

Q-34. $\int \frac{1}{a+x^{\left(\frac{1}{2}\right)}} dx =$

- (a) $\left(\frac{x^{\left(\frac{2}{3}\right)}}{2} + x^{\left(\frac{1}{3}\right)} + \log \left(1 + x^{\left(\frac{1}{3}\right)} \right) \right)$
- (b) $\left(\frac{x^{\left(\frac{2}{3}\right)}}{2} - x^{\left(\frac{1}{3}\right)} + \log \left(1 + x^{\left(\frac{1}{3}\right)} \right) \right)$
- (c) $\left(\frac{x^{\left(\frac{2}{3}\right)}}{2} - x^{\left(\frac{1}{3}\right)} - \log \left(1 + x^{\left(\frac{1}{3}\right)} \right) \right)$

- (d) None of these

Q-35. The area $\{(x, y) : x^2 \leq y \leq \sqrt{x}\}$ is equal to

- (a) $\frac{1}{6}$
- (b) $\frac{1}{3}$
- (c) $\frac{2}{3}$
- (d) None of these

Q-36. If $\vec{A} = \vec{i} + 2\vec{j} - 3\vec{k}$, $\vec{B} = -\vec{i} + 2\vec{j} + \vec{k}$, $C = 3\vec{i} + \vec{j}$, then t s. t. $\vec{A} + t\vec{B}$ is right angle to \vec{C} , will be equal to

- (a) 5
- (b) 4
- (c) 6
- (d) 2

Q-37. Area of the parallelogram whose adjacent sides are \vec{a} and \vec{b} is

- (a) $\vec{a} \cdot \vec{b}$
- (b) $\vec{a} \times \vec{b}$
- (c) $|\vec{a} \cdot \vec{b}|$
- (d) $\frac{1}{2} |\vec{a} \times \vec{b}|$

Q-38. $\int (1 - \cos x) \cos ex^2 dx$ is equal to

- (a) $\tan \frac{x}{2} + c$
- (b) $\cot \frac{x}{2} + c$
- (c) $\frac{1}{2} \tan \frac{x}{2} + c$
- (d) $2 \tan \frac{x}{2} + c$

Q-39. $(3\vec{a} \times 2\vec{b}) \cdot \vec{c} + (3\vec{b} \times 2\vec{c}) \cdot \vec{a} + (4\vec{c} \times 3\vec{b}) \cdot \vec{a}$ is equal to

- (a) 0
- (b) $24 [\vec{a} \vec{b} \vec{c}]$
- (c) $24 [\vec{b} \vec{a} \vec{c}]$
- (d) None of these

Q-40. $\vec{a} \times (\vec{b} \times \vec{c})$ is equal to

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

- (d) None of these

Q-41. If $x, y \in \mathbb{R}$, xy rational, y irrational and x rational, then

- (a) $x > 0$
- (b) $x < 0$
- (c) $x = 0$
- (d) $x \neq 0$

Q-42. If α and β are two distinct complex numbers such that

$|\alpha| = |\beta|$ and $\operatorname{Re}(\alpha) > 0, \operatorname{Im}(\beta) < 0$, then $\alpha + \frac{\beta}{\alpha} - \beta$ may be

- (a) Zero
- (b) Purely imaginary
- (c) Real and positive
- (d) Real and Negative

Q-43. If $a > 0$, then the equation $ax^2 + 1 = 0$ has

- (a) Real roots
- (b) Rational roots
- (c) Irrational roots
- (d) Non-real roots

Q-44. The roots of the equation $x^2 - \cos \theta + 1 = 0$ are

- (a) Real for all
- (b) Real when $\theta = n\pi, n \in \mathbb{Z}$
- (c) None-real for all
- (d) Real when $\theta = \frac{(2n+1)\pi}{2}, n \in \mathbb{Z}$

Q-45. The number $\frac{(1+i)^n}{(1-i)^n} - 2$ is equal to

- (a) 4 in -2
- (b) $2i^{n-4}$
- (c) $2i^{n-1}$
- (d) None of these