

Unsolved CBSE Sample Papers Class 12 Maths

General Instructions

1. All questions are compulsory.
2. The question paper consists of 29 questions divided into three sections A, B, C. Section A comprises of 10 questions of one mark each, section B comprises of 12 questions of 4 marks each and section C comprises of 7 questions of six marks each.
3. All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.

Time: 3 Hours

SECTION A (One Mark Questions)

Question-1: Give an example of two nonzero 3×3 matrices A, B such that $AB=O$

Question-2: Find the numerical value of $\tan[2\tan^{-1}(1/6)-\pi/2]$

Question-3: Find the equation of the line parallel to x axis and passing through the origin.

Question-4: Find the value of $\int dx/25-x$

Question-5: Find the angle between vectors \hat{a} and \hat{c} with magnitude 3 and 2 respectively. Given $\hat{a} \cdot \hat{c} = 6$.

Question-6: Find the value of x for which the vector $\hat{a} = 3i + j - 2k$ and $\hat{c} = i + xj - 3k$ are perpendicular to each other.

Question-7: What is the principal value of $\cos\pi/3 + \sin 2\pi/3$.

or, is the degree of the following differential equation? $y \frac{d^2y}{dx^2} + (dY) = x(d^3y) \frac{dx}{dx}$

Question-8: Find a matrix X such that $B - 2A + X = O$

Question-9: Let $E = \{1, 2, 3\}$ and $F = \{1, 2\}$. Then find the number of onto functions from E to F.

Question-10: Find the direction cosines of a line, passing through origin and lying in the first octant, making equal angles with the three coordinate axes.

SECTION B(Four Mark Questions)

Question-11: Let $f: \mathbb{N} \rightarrow \mathbb{N}$ be a function defined as $f(x) = 4x^2 + 12x + 15$. Show that $f: \mathbb{N} \rightarrow \mathbb{N}$ where \mathbb{N} is the range of f , is invertible. Find the inverse of f .

Question-12: Find the image of the point $P(6,5,9)$ on the plane determined by the points $A(3,-1,2)$, $B(5,2,4)$ and $C(-1,-1,6)$

Question-13: The probability of a shooter hitting a target is $3/4$. How many minimum number of times must he/she fire so that the probability of hitting the target at least once is more than 0.99

Question-14: The dot products of a vector with the vectors $i-3k$, $i-2k$ and $i+j+4k$ are 0, 5 and 8 respectively. Find the vector.

Question-15: Find all the points of discontinuity of the function $f(x) = (x^J)$ on $[1, 2)$, where $[.J]$ denotes the greatest integer function.

or, Solve for x . $\tan^{-1}(x+1) + \tan^{-1}(x) + \tan^{-1}(x-1) = \tan^{-1}3$

Question-16: If f is continuous at $x = \pi/2$ Find a and b

$$f(x) = \begin{cases} 1 - \sin 3x & \text{if } x < \pi/2 \\ 3\cos 2x & \text{if } x = \pi/2 \end{cases}$$

$$= a \quad \text{if } x = \pi/2$$

$$= b(1 - \sin x) \quad \text{if } x > \pi/2$$

Question-17: Using Rolle's theorem find the points on the curve $y = x^2$, $x \in [-2, 2]$, where the tangent is parallel to the x axis.

Question-18: If $a = 5i - j - 3k$, $b = i + 3j - 5k$, then show that the vectors $a+b$ and $a-b$ are orthogonal.

Question-19: Differentiate $\tan^{-1}[\sqrt{1-\cos x}/1+\cos x]$ with respect to $\tan^{-1}x$

Question-20: Form the differential equation representing the family of curves $y^2 - 2ay + x^2 = a^2$ (or) Prove that the differential equation is homogeneous and solve it $2xydx + (x^2 + 2y^2)dy = 0$

Question-21: The radius of the balloon is increasing at the rate of 10 cm/sec. At what rate is the surface area of the balloon is increasing when its radius is 15 cm.

SECTION C(Six mark Questions)

Question-22: Find the area enclosed by the region in the first quadrant enclosed by the ellipse $x^2/4 + y^2/36 = 1$ and the line $3x + y = 6$.

Question-23: Suppose a girl throws a die. If she gets 5 or 6 she tosses the coin 3 times and notes the number of heads. If she gets 1,2,3 or 4 she tosses a coin once and notes whether a head or a tail is obtained. If she obtained exactly one head, what is the probability that she threw 1,2,3 or 4 with a die.

or, A dealer wishes to purchase a number of fans and sewing machines. He has only Rs 5760 to invest and has space for at the most 20 items. A fan costs him Rs 360 and a sewing machine Rs 240. He expects to sell a fan at a profit of Rs 22 and a sewing machine for a profit of Rs 18. Assuming that he can sell all the items he buys, how should he invest his money to maximize his profit. Solve it graphically.

Question-24: Show that the volume of the greatest cylinder which can be inscribed in a cone of height h and semi-vertical angle α , is $\frac{8}{27} \pi r^2 h \tan^2 \alpha$.

Question-25: Show that the rectangle of maximum area that can be inscribed in a circle is a square.

or, Find the equation of the plane passing through the point $(-1, -1, 2)$ and perpendicular to each of the following planes:

Question-26: Two bags A and B contain 4 white and 3 black balls and 2 white and 2 black balls respectively. From bag A, two balls are drawn at random and then transferred to bag B. A ball is then drawn from bag B and is found to be a black ball. What is the probability that the transferred balls were 1 white and 1 black.

Question-27: Show that the normal at any point e to the curve $x = a \cos e + a e \sin e$ and $y = a \sin e - a e \cos e$ is at a constant distance from the origin.

Question-28: Find the area bounded by the curve $y^2 = 4a(x-1)$ and the lines $x=1$ and $y=4a$.

Question-29: Find the equation of a plane parallel to x axis and has intercepts 5 and 7 on y and z axis respectively.

Question-30: Solve the differential equation: $(\tan^{-1}y - x)dy = (1 + y^2) dx$.