



Perfect solution to all problems

Tips, Tricks, General Knowledge, Current Affairs, Latest Sample,
Previous Year, Practice Papers with solutions.

CBSE 12th Mathematics 2007 Unsolved Paper Delhi Board

Buy Solution: <http://www.4ono.com/cbse-12th-maths-previous-year-solved-papers/>

Note

This pdf file is downloaded from www.4ono.com. Editing the content or publicizing this on any blog or website without the written permission of [Rewire Media](#) is punishable, the suffering will be decided under DMCA

CBSE 12th Mathematics 2007 Unsolved Paper

Delhi Board

TIME - 3HR. | QUESTIONS - 29

THE MARKS ARE MENTIONED ON EACH QUESTION

SECTION - A

Question number 1 to 10 carry 1 mark each.

Q.1. Write the number of vectors of unit length perpendicular to both the vectors of unit length perpendicular to both the vectors $\vec{a} = 2\hat{i} + \hat{j} + 2\hat{k}$ and $\vec{b} = \hat{j} + \hat{k}$. *1 mark*

Q.2. Write the integrating factor of the following differential equation: *1 mark*

$$(1 + y^2) + (2xy - \cot y) \frac{dy}{dx} = 0$$

Q.3. The equation of a line are $5x - 3 = 15y + 7 = 3 - 10z$. Write the direction cosines of the line. *1 mark*

Q.4. If $(R) = \{(x, y): x + 2y = 8\}$ is a relation on N , write the range of R . *1 mark*

Q.5. if A_{ij} is the cofactor of the a_{ij} of the determinant. *1 mark*

$$\begin{vmatrix} 2 & -3 & 5 \\ 6 & 0 & 4 \\ 1 & 5 & -7 \end{vmatrix} \text{ the value of } a_{32} \cdot A_{32}.$$

Q.6. Find the principle value of *1 mark*

$$\tan^{-1}\sqrt{3} - \sec^{-1}(-2).$$

Q.7. Write the projection of the vector $\hat{i} - \hat{j}$ on the vector $\hat{i} + \hat{j}$. *1 mark*

Q.8. Write a vector of magnitude 9 units in the direction of vector $-2\hat{i} + \hat{j} + \hat{k}$. *1 mark*

Q.9. Write the direction cosines of a line equally inclined to the three coordinate axes. *1 mark*

Q.10. The money to be spent for the welfare of the employees of a firm is proportional to the rate of change of its total revenue (marginal revenue). If the total revenue (in rupees) received from the sale of x units of a product is given by

$R(x) = 3x^2 + 36x + 5$, find the marginal revenue, when $x = 5$, and write which value does the question indicate. *1 mark*

SECTION – B

Question numbers 11 to 22 carry 4 marks each.

Q.11. If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 4\hat{i} - 2\hat{j} + 3\hat{k}$ and $\vec{c} = \hat{i} - 2\hat{j} + \hat{k}$, find a vector of magnitude 6 units which is parallel to the vector $2\vec{a} - \vec{b} + 3\vec{c}$. 4 marks

OR

Let $\vec{a} = \hat{i} + 4\hat{j} + 2\hat{k}$, $\vec{b} = 3\hat{i} - 2\hat{j} + 7\hat{k}$ and $\vec{c} = 2\hat{i} - \hat{j} + 4\hat{k}$. Find a vector \vec{d} which is perpendicular to both \vec{a} and \vec{b} and $\vec{c} \cdot \vec{d} = 18$.

Q.12. Show that the differential equation $(x - y) \frac{dy}{dx} = x + 2y$, is homogeneous and solve it. 4 marks

Q.13. Prove that: 4 marks

$$\tan^{-1} \left[\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right] = \frac{\pi}{4} - \frac{1}{2} \cos^{-1} x, -\frac{1}{\sqrt{2}} \leq x \leq 1.$$

Q.14. Let $f : R \rightarrow R$ be defined as $f(x) = 10x + 7$. Find the function $g : R \rightarrow R$ such that $g \circ f = f \circ g = I_R$. 4 marks

OR

A binary operation $*$ on the set $\{0, 1, 2, 3, 4, 5\}$ is defined as

$$a * b = \begin{cases} a + b, & \text{if } a + b < 6 \\ a + b - 6 & \text{if } a + b \geq 6 \end{cases}$$

Show that zero is the identify for this operation and each element ' a ' of the set is invertible with $6 - a$, being the inverse of ' a '.

Q.15. Evaluate: 4 marks

$$\int_{-1}^2 |x^3 - x| dx$$

OR

Evaluate:

$$\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$$

Q. 16. Let $\vec{a} = \hat{i} + 4\hat{j} + 2\hat{k}$, $\vec{b} = 3\hat{i} - 2\hat{j} + 7\hat{k}$ and $\vec{c} = 2\hat{i} - \hat{j} + 4\hat{k}$.

Find a vector \vec{p} which is perpendicular to both \vec{a} and \vec{b} and $\vec{p} \cdot \vec{c} = 18$. 4 marks

Q.17. Evaluate: 4 marks

$$\int \frac{dx}{x(x^5 + 3)}$$

Q.18. If $\vec{a} = \hat{i} - \hat{j} + 2\hat{k}$ and $\vec{b} = 5\hat{i} - \hat{j} + \lambda\hat{k}$, then find the value of λ so that $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ are perpendicular vectors. 4 marks

Q.19. Find the value of p for which the curves $x^2 = 9p(9 - y)$ and $x^2 = p(y + 1)$ cut each other at right angles. 4 mark

Q.20. Find the equation of a line passing through the point (1, 2, -4) and perpendicular to two lines. 4 marks

$$\vec{r} = (8\hat{i} - 19\hat{j} + 10\hat{k}) + \lambda(3\hat{i} - 16\hat{j} + 7\hat{k}) \text{ and } \vec{r} = (15\hat{i} + 29\hat{j} + 5\hat{k}) + \mu(3\hat{i} + 8\hat{j} - 5\hat{k}).$$

OR

Find the equation of the plane passing through the points (-1, 2, 0), (2, 2, -1) and parallel to the line $\frac{x-1}{1} = \frac{2y+1}{2} = \frac{z+1}{-1}$

Q. 21. A line passes through (2, -1, 3) and is perpendicular to the lines

$$\vec{r} = (\hat{i} + \hat{j} - \hat{k}) + \lambda(2\hat{i} + 2\hat{j} - \hat{k}) \text{ and}$$

$$\vec{r} = (2\hat{i} - \hat{j} - 3\hat{k}) + \mu(\hat{i} + 2\hat{j} - 2\hat{k}).$$

Obtain its equation in vector and Cartesian form. 4 marks

Q. 22. An experiment succeeds thrice as often as it fails. Find the probability that in the next five trials, there will be at least 3 successes.

SECTION- C

Question numbers 23 to 29 carry 6 marks each.

Q.23. using properties or determinants, show that ΔABC is isosceles if: 6 marks

$$\begin{vmatrix} 1 & 1 & 1 \\ 1 + \cos A & 1 + \cos B & 1 + \cos C \\ \cos^2 A + \cos A & \cos^2 B + \cos B & \cos^2 C + \cos C \end{vmatrix} = 0$$

OR

A shopkeeper has 3 varieties of pens 'A', 'B' and 'C'. Meenu purchased 1 pen of each variety for a total of Rs 21. Jeevan purchased 4 pens of 'A' variety, 3 pens of 'B' variety and 2 pens of 'C' variety for Rs 60. While Shikha purchased 6 pens of 'A' variety, 2 pens of 'B' variety and 3 pens of 'C' variety for Rs 70. Using matrix method, find cost of each variety of pen.

Q.24. Evaluate: 6 marks

$$\int \frac{1}{\cos^4 x + \sin^4 x} dx.$$

Q. 25. The management committee of a residential colony decided to award some of its members (say x) for honesty, some (say y) for helping other (say z) for supervising the workers to keep the colony neat and clean. The sum of all the awardees is 12. Three times the sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. If the sum of the number of awardees for honesty and supervision is twice the number of awardees for helping others, using matrix method, find the number of awardees of each category. Apart from these values, namely, honesty, cooperation and supervision, suggest one more value which the management of the colony must include for awards. 6 marks

Q. 26. If the line

$$\frac{x-1}{-3} = \frac{y-2}{-2k} = \frac{z-3}{2} \text{ and } \frac{x-1}{k} = \frac{y-2}{1} = \frac{z-3}{5} \text{ are perpendicular,}$$

Find the value of k and hence find the equation of plane containing these lines. 6 marks

Q.27. A window has the shape of a rectangle surmounted by an equilateral triangle if the perimeter of the window is 12 m, find the dimensions of the rectangle that will produce the largest area of the window. 6 marks

Q.28. Find the coordinates of the foot of the perpendicular and the perpendicular distance of the point P (3, 2, 1) from the plane $2x - y + z + 1 = 0$. Find also, the image of the point in the plane. 6 marks

Q. 29. If the sum of the lengths of the hypotenuse and a side of a right- angled triangles is given, show that the area of the triangle is given, show that the area of the triangle is maximum when the angle between them is $\frac{\pi}{3}$. 6 marks

OR

A manufacturer can sell x items at a price of Rs $(5 - \frac{x}{100})$ each. The cost price of x item is Rs $(\frac{x}{5} + 500)$. Find the number of items he should sell to earn maximum profit.



Buy Solution: <http://www.4ono.com/cbse-12th-maths-previous-year-solved-papers/>