

NTSE

IX - CLASS

Sample Paper Mathematics



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GENERAL INSTRUCTION

1. All Questions are compulsory.
2. The questions paper consists of 30 questions divided into four sections A, B, C and D.
3. Section A comprises 6 questions of 1 mark each. Section B comprises 6 questions of 2 marks each. Section C comprises 10 questions of 3 marks each. Section D comprises 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark each, two questions of 2 marks each, four questions of 3 marks each and three questions of 4 mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

SYLLABUS & MARKING SCHEME:

Unit No.	Unit	Marks
I	Number system	14
II	Algebra	08
III	Co-ordinate geometry	03
IV	Geometry	36
V	Mensuration	12
VI	Statistics and probability	07
	Total	80

SECTION-A

1. Rationalize the denominator of $\frac{1}{4-\sqrt{2}}$. [1]
2. Check whether (2, 1) is the solution of equation $2x + y = 5$. [1]
3. In $\triangle ABC$ $\angle A = x$, $\angle B = 2x$, $\angle C = 3x$, find the value of $\angle C$. [1]
4. Point $(-2, 3)$ will lie in which quadrant? [1]

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5. If the range of the data is 28 and number of classes is 7, then find the class size of the data? [1]

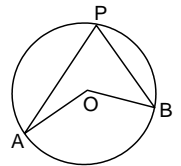
OR

If the mean of 6, 4, 7, p and 10 is 8, find the value of p

6. O is a centre of a circle and $OR \perp PQ$ distance of a chord PQ of a circle from the centre is 12 cm and length of the chord is 10 cm, what is the length of a radius? [1]

OR

A figure, O is the centre of circle. If $\angle APB = 50^\circ$, find $\angle AOB$ and $\angle OAB$



SECTION-B

7. Express $0.23\bar{7}$ in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$. [2]

OR

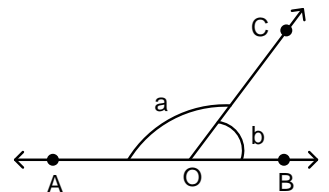
Find two irrational number lying between $\sqrt{2}$ and $\sqrt{3}$

8. Factorise $7\sqrt{2}x^2 - 10x - 4\sqrt{2}$. [2]

9. The perpendicular distance of a point from the x-axis is 2 unit and the perpendicular distance from y – axis is 5 units. Write the coordinates of such a point if it lies in one of the following quadrants.

(i) I quadrant (ii) II quadrant (iii) III Quadrant (iv) IV Quadrant [2]

10. In the figure $\angle AOC$ and $\angle BOC$ form a linear pair if $a - b = 80^\circ$, then find the value of a and b. [2]



11. The inner diameter of circular well is 3.5 m it is 10 m deep. Find [2]

(i) Its inner curved surface area.
(ii) The cost of plastering this C.S at the rate of Rs. 40 per m^2 .

OR

A joker's cap is in the form of a right circular cone of base radius 7 cm and height 24 cm. find the cost of white washing its Curve surface area at the rate of Rs 210 per 100 cm^2 .

12. Find the value of a and b if $y = 1$, and $x = 2$ is solution of linear equation $ax + by = 3$ and $3a - 2b = 1$. [2]

**Success
STORY**

I still wonder how one man has such a deep understanding of an examination. It becomes the truth what ever Vipin Sir says about NTSE.

M. Pareek

An
NTSE Scholar
IIT-JEE (Adv.) AIR-3

Mukesh Pareek



SECTION-C

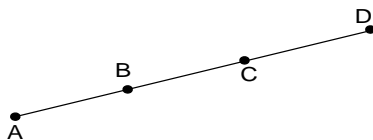
13. Simplify $\frac{(25)^{\frac{3}{2}} \times (343)^{\frac{3}{5}}}{(16)^{\frac{5}{4}} \times (8)^{\frac{4}{3}} \times (7)^{-\frac{1}{5}}}$ [3]

OR

Prove that

$$\frac{a^{-1}}{a^{-1}+b^{-1}} + \frac{a^{-1}}{a^{-1}-b^{-1}} = \frac{2b^2}{b^2-a^2}$$

14. In given fig. $AC = BD$, then prove that $AB = CD$ [3]

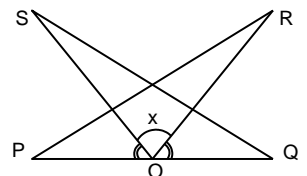


15. Find the value of $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$ [3]

OR

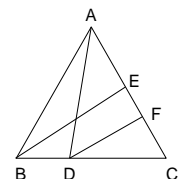
The bus fare in a city is as follows for the first kilometer, the fare is ₹ 8 and for the subsequent distance it is ₹ 5 per kilometer. Taking the distance covered as x km and total fares as ₹ y . write a linear equation for this information and draw its graph.

16. In figure PQ is a line segment and O is the mid-point of PQ. R and S are on the same side of PQ such that $\angle PQS = \angle QPR$ and $\angle POS = \angle QOR$, prove that [3]
(i) $\triangle PQR \cong \triangle QOS$
(ii) $PR = QS$



OR

In fig. AD and BE are medians of $\triangle ABC$ and $BE \parallel DF$, prove that $CF = \frac{1}{4} AC$



17. Show that the line segment joining the mid points of the opposite side of a quadrilateral bisect each other. [3]

OR

Prove that the angle subtended by an arc at the centre is double the angle subtended by it any point on the remaining part of the circle.

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18. A company select 2400 families at random and surveyed them to determine relationship between income level and the number of television sets at home the information gathered is listed in the table below. [3]

Monthly income in (₹)	Television per family			
	0	1	2	Above 2
Less than – 7000	10	160	25	0
7000 – 10000	0	305	27	2
10000 – 13000	1	535	29	1
13000 – 16000	2	469	59	25
16000 or More	1	579	82	88

If one family is chosen at random find probability of choosing.

- (i) A family whose income is 16000 or more and has more than 2 TV set's
(ii) A family whose income is less than 7000 and 2 TV set's
19. A circular park of radius 20 m is situated in a colony. Three boys Ankur, Syed and David are sitting at equal distance on its boundary each having a toy telephone in his hands to talk each other. Find the length of the string of each phone. [3]
20. In a parallelogram ABCD, E and F are the mid-points of side AB and CD respectively show that the line segment AF and EC trisect the diagonals BD. [3]
21. Thirty children were asked about the number of hours they watched TV programs in the previous week. The results were found as follows: [3]
- | | | | | | | | | | |
|----|---|---|----|---|----|----|---|----|----|
| 1 | 6 | 2 | 3 | 5 | 12 | 5 | 8 | 4 | 8 |
| 10 | 3 | 4 | 12 | 2 | 8 | 15 | 1 | 17 | 6 |
| 3 | 2 | 8 | 5 | 9 | 6 | 8 | 7 | 14 | 12 |
- (i) Make a grouped frequency distribution table for this data, taking class width 5 and one of the class intervals as 5 – 10.
(ii) How many children watched television for 15 or more hours a week?
22. The diameter of a metallic ball is 4.2 cm what is the mass of the ball, if the density of the metal is 8.9 g per cm^3 ? [3]

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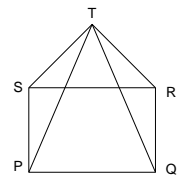


Section-D (Marks – 4)

23. Simplify $\frac{16 \times 2^{n+1} - 8 \times 2^n}{16 \times 2^{n+2} - 2 \times 2^{n+2}}$ [4]

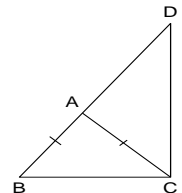
24. Find $x^3 + y^3$ where
 $x = \frac{1}{3-2\sqrt{2}}, y = \frac{1}{3+2\sqrt{2}}$ [4]

25. In the figure, $PQRS$ is a square and SRT is an equilateral triangle prove that
 $\angle PST = \angle QRT$
 $PT = QT$ [4]



OR

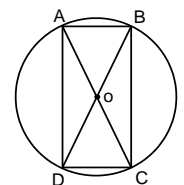
$\triangle ABC$ is an isosceles triangle in which $AB = AC$. Sides BA is produced to D such that $AD = AB$. Show that $\angle BCD$ is a right angle.



26. The cost of painting the complete out side surface of a closed cylindrical oil tank at 60 paisa per sq dm is ₹ 237.60. The height of the tank is 6 times the radius of the base of the tank. Find its volume corrected to two decimal places. [4]

OR

The outer dimensions of a closed wooden box are 10 cm, by 8 cm by 7 cm. Thickness of the wood is 1 cm. Find the total cost of wood required to make box if 1 cm^3 of wood costs Rs. 2.00.



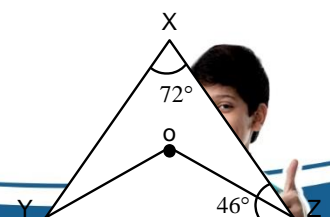
27. AC and BD are chords of a circle which bisect each other at centre. Prove that
 (i) AC and BD are diameters
 (ii) ABCD is a rectangle. [4]

28. Construct $\triangle ABC$ in which $\angle B = 60^\circ$, $\angle C = 45^\circ$ and the perimeter of the triangle is 11 cm. [4]

29. A field is in the shape of a trapezium whose parallel sides are 25 m and 10 m. the non-parallel sides are 14 m and 13 m. find the area of the field. [4]

OR

ABC is a triangle in which D is the mid-point of BC and E is the mid point of AD, Prove that area of $\triangle BED = \frac{1}{4}(\text{area of } \triangle ABC)$

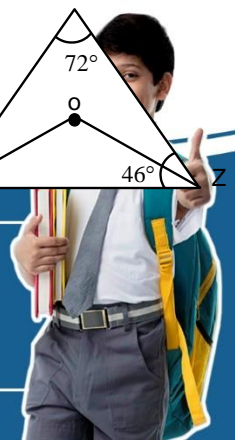


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30. In figure $\angle X = 72^\circ$, $\angle XZY = 46^\circ$ if YO and ZO are bisectors of $\angle XYZ$ and $\angle XZY$ respectively $\triangle XYZ$ find $\angle OYZ$ and $\angle YOZ$. [4]

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