

General Instructions:

1. This Question paper contains - five sections A, B, C, D and E. Each section is compulsory. However, there are internal choices in some questions.
2. Section A has 18 MCQ's and 02 Assertion-Reason based questions of 1 mark each.
3. Section B has 5 Very Short Answer (VSA)-type questions of 2 marks each.
4. Section C has 6 Short Answer (SA)-type questions of 3 marks each.
5. Section D has 4 Long Answer (LA)-type questions of 5 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

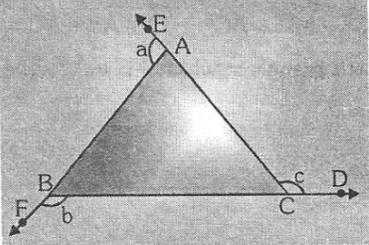
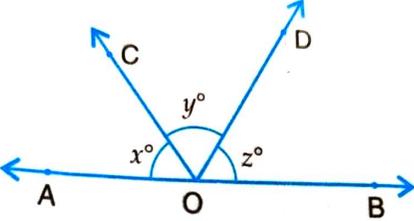
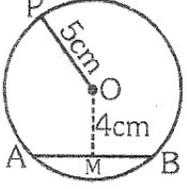
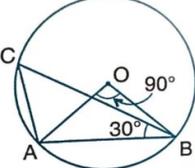
EXAMINATION 2023 -24

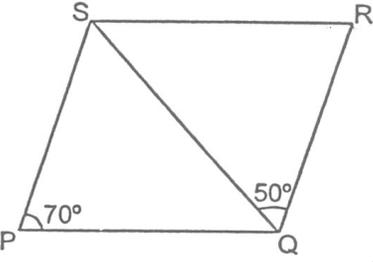
Time : 3 Hours

Maximum Marks : 80

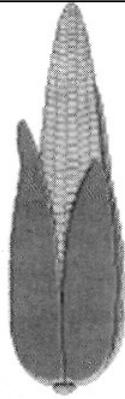
CLASS - IX**MATHEMATICS**

| Sr. No. | SECTION - A | Marks |
|---------|---|-------|
| | This section comprises of very short answer type-questions (VSA) of 1 marks each | |
| Q.1 | The area of an equilateral triangle is $24\sqrt{3}$ sq. m, then its perimeter is : (A) 96 m (B) $12\sqrt{6}$ m (C) $4\sqrt{6}$ m (D) $2\sqrt{6}$ m ANS B | 1 |
| Q.2 | If the sides of triangle are produced, then the sum of the exterior angles i.e. | 1 |

| | | |
|-------------------|--|----------|
| |  <p>$\angle a + \angle b + \angle c$ is equal to :</p> <p>(A) 180^0 (B) 360^0 (C) 90^0 (D) 270^0</p> | |
| <p>Q.3</p> |  <p>In Fig . AOB is straight line. If $x : y : z = 4 : 5 : 6$, then $y =$</p> <p>(a) 60 (b) 80 (c) 48 (d) 72</p> | <p>1</p> |
| <p>Q.4</p> |  <p>O is the Centre of the circle having radius 5 cm. $OM \perp$ on chord AB. If $OM = 4$ cm, then the length of the chord AB =</p> <p>(A) 6 cm (B) 5 cm (C) 8 cm (D) 10 cm</p> | <p>1</p> |
| <p>Q.5</p> | <p>Two irrational numbers between 2 and 2.5 are :-</p> <p>(A) $\sqrt{5}$ and $\sqrt{2 \times \sqrt{5}}$ (B) $\sqrt{5}$ and $\sqrt{2 \times 5}$ (C) $\sqrt{5}$ and $\sqrt{2 \times \sqrt{7}}$ (D) None of these</p> | <p>1</p> |
| <p>Q.6</p> | <p>The graph of the linear equation $4x - 3y - 12 = 0$ cuts x-axis at point</p> <p>(a) (3, 0) (b) (-3, 0) (c) (4, 0) (d) (-4, 0)</p> | <p>1</p> |
| <p>Q.7</p> | <p>Consider the following statements: When two straight lines intersect :</p> <p>(i) adjacent angles are complementary (ii) adjacent angles are supplementary (iii) opposite angles are equal (iv) opposite angles are supplementary</p> <p>Of these statements</p> <p>(a) (i) and (iii) are correct (b) (ii) and (iii) are correct (c) (i) and (iv) are correct (d) (ii) and (iv) are correct</p> | <p>1</p> |
| <p>Q.8</p> |  <p>In Fig . If $\angle AOB = 90^\circ$ and $\angle ABC = 30^\circ$, then $\angle CAO$ is equal to</p> | <p>1</p> |

| | | |
|-------------|--|---|
| | (a) 30° (b) 45° (c) 90° (d) 60° | |
| Q.9 | Yamini and Fatima, two students of Class IX of a school, together contributed Rs 100 towards the Prime Minister's Relief Fund to help the earthquake victims. Then a linear equation which satisfies this data is (You may take their contributions as Rs x and Rs y respectively) (a) $x + y = 100$ (b) $y = x + 100$ (c) $y - x = 100$ (d) none of these | 1 |
| Q.10 | The positive solutions of the equation $ax + by + c = 0$ always lie in the (a) 1st quadrant (b) 2nd quadrant (c) 3rd quadrant (d) 4th quadrant | 1 |
| Q.11 | If the diameter of the base of a cylindrical pillar is 4 m and its height is 21 m, then the cost of construction of the pillar at Rs. 1.50 per cubic metre is : (a) Rs. 396 (b) Rs. 400 (c) Rs. 410 (d) Rs. 420 | 1 |
| Q.12 |  <p>From the figure find the value of $\angle SQP$ and $\angle QSP$ of parallelogram PQRS.</p> <p>(A) $60^\circ, 50^\circ$ (B) $60^\circ, 45^\circ$ (C) $70^\circ, 35^\circ$ (D) $35^\circ, 70^\circ$</p> | 1 |
| Q.13 | The point on the graph of the equation $3x - 2y + 12 = 0$ whose y-coordinates is $\frac{3}{4}$ times the x-coordinate is (a) (8, 6) (b) (8, -6) (c) (-8, -6) (d) (-6, -8) | 1 |
| Q.14 | The edges of a triangular board are 6cm, 8cm and 10cm long. The cost of painting it at the rate of 9 paise per cm^2 (a) rs 2 (b) rs 2.16 (C) rs 2.48 (d) rs 3 | 1 |
| Q.15 | In countries like USA and Canada, temperature is measured in Fahrenheit, whereas in countries like India, it is measured in Celsius. Here is a linear equation that converts Fahrenheit to Celsius: $F = \left(\frac{9}{5}\right)C + 32$. If the temperature is 30°C , what is the temperature in Fahrenheit? (a) 54°F (b) 76°F (c) 86°F (d) None of these | 1 |
| Q.16 | If $x = k + 1$, $y = 2k - 1$ is a solution of the equation $3x - 2y + 7 = 0$, then k = (a) 10 (b) 6 (c) 4 (d) 12 | 1 |
| Q.17 | If $x + y = 3$ and $xy = -18$, find the value of $x^3 + y^3$ (A) 189 (B) 198 (C) -189 (D) none of these | 1 |
| Q.18 | If the mean of the observation $x, x + 3, x + 5, x + 7$ and $x + 10$ is 9, the mean | 1 |

| | | |
|------|---|---|
| | of the last three observation is (a) $10\frac{1}{3}$ (b) $10\frac{2}{3}$ (c) $11\frac{1}{3}$ (d) $11\frac{2}{3}$ | |
| | ASSERTION-REASON BASED QUESTIONS In the following questions, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices. (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true. | |
| Q.19 | Assertion (A): If $p(x) = x^3 - 6x^2 + 11x - 6$ Thus, 1,2 and 3 are called the zeros of polynomial $p(x)$. Reason (R): A real number α is a zero of the polynomial $p(x)$ if $p(\alpha) = 0$. | 1 |
| Q.20 | Statement-1(Assertion): The angles subtended by a chord at any two points of a circle are equal. Statement-2 (Reason): angles in the same segment of a circle are equal. | 1 |
| | SECTION – B This section comprises of very short answer type-questions (VSA) of 2 marks each | |
| Q.21 | If $f(x) = 2x^3 - 13x^2 + 17x + 12$, find (i) $f(2)$ (ii) $f(-3)$ (ii) $f(0)$. | 2 |
| Q.22 | The distance (in km) of 40 engineers from their residence to their place of work were found as follows: 5 , 3 , 10 , 20 , 25 , 11 , 13 , 7 , 12 , 31 , 19 , 10 , 12 , 17 , 18 , 11 , 32 , 17 , 16 , 2 , 7 , 9 , 7 , 8 , 3 , 5 , 12 , 15 , 18 , 3 , 12 , 14 , 2 , 9 , 6 , 15 , 15 , 7 , 6 , 12 . Construct a grouped frequency distribution table with class size 5 for the data given above taking the first interval as 0-5 (5 not included). What main features do you observe from this tabular representation? | 2 |
| Q.23 | Find the area of a triangle whose sides are 13 cm, 14 cm and 15 cm . | 2 |
| Q.24 | Savitri had to make a model of a cylindrical kaleidoscope for her science project. She wanted to use chart paper to make the curved surface of the kaleidoscope, (see ). What would be the area of chart paper required by her, if she wanted to make a kaleidoscope of length 25 cm with a 3.5 cm radius? You may take $\pi = \frac{22}{7}$. OR | 2 |



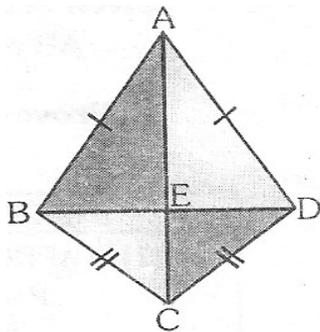
A corn cob (see Fig.), shaped somewhat like a cone, has the radius of its broadest end as 9 cm and length (height) as 12 cm. If each 1 cm^2 of the surface of the cob carries an average of four grains, find how many grains you would find on the entire cob. (Use $\pi = 3.14$).

Q.25 Which is greater is each of the following : $\sqrt[3]{16}$ and $\sqrt[5]{8}$.
 OR
 Prove that $3 - \sqrt{5}$ is an irrational number.

SECTION - C

(This section comprises of short answer type questions (SA) of 3 marks each)

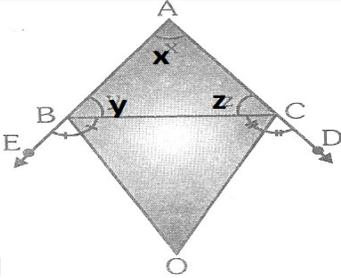
Q.26 Show that if the diagonals of quadrilateral are equal and bisect each other at right angles. then it is a square.
 OR

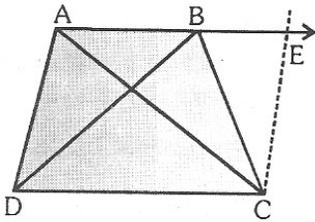


In figure , ABCD is a quadrilateral in which $AB = AD$ and $BC = CD$. Prove that
 (i) AC bisects $\angle A$ and $\angle C$ (ii) $BE = DE$.

Q.27

In fig . $PR > PQ$ and PS bisects $\angle QPR$. Prove that $\angle PSR >$

| | ∠PSQ. | | | | | | | | | | | | | | | | | |
|------------------------|---|---------|-----------------------------------|----------------------|-----|----------------------|-----|-----------|-----|--------------------|-----|------------------------|-----|-------|-----|-------|-----|---|
| Q.28 | The length, breadth and height of a room are 5 m, 4 m and 3 m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of Rs 7.50 per m ² . | 3 | | | | | | | | | | | | | | | | |
| Q.29 | The following data on the number of girls (to the nearest ten) per thousand boys in different sections of Indian society is given below. <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Section</th> <th>Number of girls per thousand boys</th> </tr> </thead> <tbody> <tr> <td>Scheduled Caste (SC)</td> <td>940</td> </tr> <tr> <td>Scheduled Tribe (ST)</td> <td>970</td> </tr> <tr> <td>Non SC/ST</td> <td>920</td> </tr> <tr> <td>Backward districts</td> <td>950</td> </tr> <tr> <td>Non-backward districts</td> <td>920</td> </tr> <tr> <td>Rural</td> <td>930</td> </tr> <tr> <td>Urban</td> <td>910</td> </tr> </tbody> </table> <p>(i) Represent the information above by a bar graph. (ii) In the classroom discuss what conclusions can be arrived at from the graph.</p> | Section | Number of girls per thousand boys | Scheduled Caste (SC) | 940 | Scheduled Tribe (ST) | 970 | Non SC/ST | 920 | Backward districts | 950 | Non-backward districts | 920 | Rural | 930 | Urban | 910 | 3 |
| Section | Number of girls per thousand boys | | | | | | | | | | | | | | | | | |
| Scheduled Caste (SC) | 940 | | | | | | | | | | | | | | | | | |
| Scheduled Tribe (ST) | 970 | | | | | | | | | | | | | | | | | |
| Non SC/ST | 920 | | | | | | | | | | | | | | | | | |
| Backward districts | 950 | | | | | | | | | | | | | | | | | |
| Non-backward districts | 920 | | | | | | | | | | | | | | | | | |
| Rural | 930 | | | | | | | | | | | | | | | | | |
| Urban | 910 | | | | | | | | | | | | | | | | | |
| Q.30 |  <p>In fig _____, the sides AB and AC of $\triangle ABC$ are produced to point E and D respectively. If bisectors BO and CO of $\angle CBE$ and $\angle BCD$ respectively meet at point O, then prove that $\angle BOC = 90^\circ - \frac{1}{2} \angle BAC$.</p> | 3 | | | | | | | | | | | | | | | | |
| Q.31 | <p style="text-align: center;">OR</p> Three equal cubes are placed adjacently in a row. Find the ratio of the total surface area of the new cuboids to that of the sum of the surface areas of three cubes . | 3 | | | | | | | | | | | | | | | | |
| | SECTION – D (This section comprises of long answer-type questions (LA) of 5 marks each) | | | | | | | | | | | | | | | | | |
| Q.32 | ABCD is a trapezium in which $AB \parallel CD$ and $AD = BC$. Show that | 5 | | | | | | | | | | | | | | | | |



(i) $\angle A = \angle B$ (ii) $\angle C = \angle D$ (iii) $\triangle ABC \cong \triangle BAD$ (iv) diagonal $AC =$ diagonal BD .

Q.33

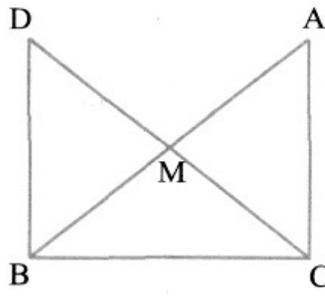
Simplify $\left(\frac{81}{16}\right)^{-3/4} \times \left[\left(\frac{25}{9}\right)^{-3/2} \div \left(\frac{5}{2}\right)^{-3}\right]$.

5

Q.34

In right triangle ABC , right angled at C , M is the mid-point of hypotenuse AB . C is joined to M and produced to a point D such that $DM = CM$. Point D is joined to

5



point B (see Fig. B C). Show that:

(i) $\triangle AMC \cong \triangle BMD$ (ii) $\angle DBC$ is a right angle. (iii) $\triangle DBC \cong \triangle ACB$ (iv) $CM = 1/2AB$.

OR

If the bisector of the vertical angle bisects the base of the triangle, then the triangle is isosceles.

Q.35

A park, in the shape of a quadrilateral $ABCD$, has $\angle C = 90^\circ$, $AB = 9$ m, $BC = 12$ m, $CD = 5$ m and $AD = 8$ m. How much area does it occupy?

5

OR

A traffic signal board, indicating 'SCHOOL AHEAD', is an equilateral triangle with side ' a '. Find the area of the signal board, using Heron's formula. If its perimeter is 180 cm, what will be the area of the signal board?

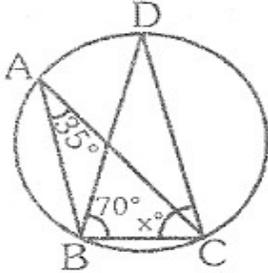
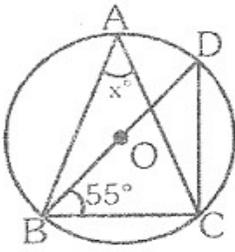
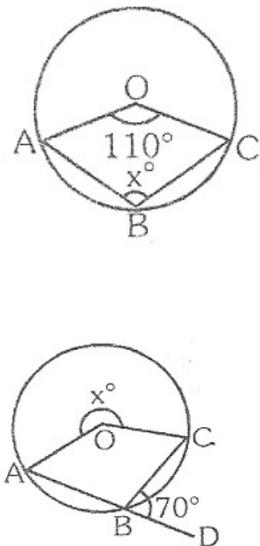
SECTION - E

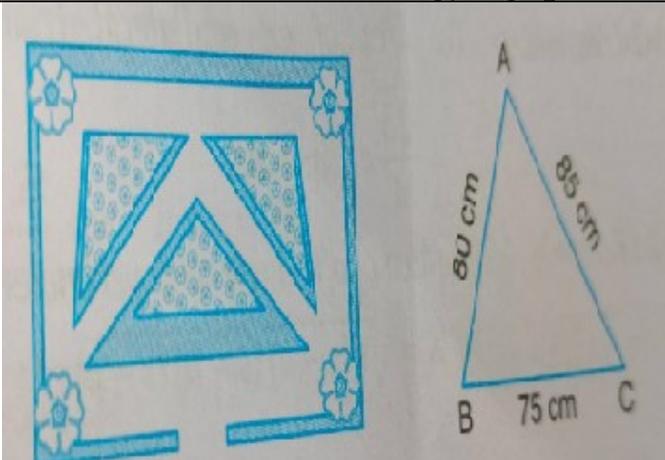
(This section comprises of 3 case study / passage – based questions of 4 marks each with two sub parts (i),(ii),(iii) of marks 1, 1, 2 respectively. The third case study question has two sub – parts of 2 marks each.)

Q.36

CASE STUDY - 1

If O is the center of the circle, find the value of x in each of the following figure

| | | |
|-------------|--|---|
| i. |  | 1 |
| ii. |  | 1 |
| iii. | <p style="text-align: center;">OR</p>  | 2 |
| Q.37 | CASE STUDY – 2 | |
| | Give a ans in one line . | |
| i. | State the conditions for quadrilateral ABCD to be a parallelogram. | 1 |
| ii. | State the condition for a parallelogram to be a rectangle. | 1 |
| iii. | State the type of quadrilateral ABCD if $AB = BC = CD = DA$, $\angle A = \angle C$ and $\angle B = \angle D$. OR What is a trapezium. | 2 |
| Q.38 | To beautify parks in a city , city municipal corporation decided to make triangular flower beds in parks as shown in fig the dimensions of a triangular flower bed are $75m \times 80m \times 85m$ based on this information answer the following questions: | |

| | | |
|------|--|---|
| |  | |
| i. | <p>If each triangular flower bed is to be fenced with two parallel wires one below the other than the length of the wire used is (a) 120m (b) 240m (c) 260m (d) 480m</p> | 1 |
| ii. | <p>The area of a flower bed is (a) $300\sqrt{42} \text{ m}^2$ (b) $300\sqrt{21} \text{ m}^2$ (c) $600\sqrt{21} \text{ m}^2$ (d) $400\sqrt{21} \text{ m}^2$</p> | 2 |
| iii. | <p>If each triangular bed is an equilateral triangle of side 60m, then its area is (a) $900\sqrt{3} \text{ m}^2$ (b) $600\sqrt{3} \text{ m}^2$ (c) $1200\sqrt{3} \text{ m}^2$ (d) $400\sqrt{3} \text{ m}^2$ OR The area of an isosceles triangle with base 'a' and equal sides 'b' is given by (a) $\frac{a}{4}\sqrt{4b^2 - a^2}$ (b) $\frac{b}{4}\sqrt{4a^2 - b^2}$ (c) $\frac{a}{2}\sqrt{2b^2 - a^2}$ (d) $\frac{b}{2}\sqrt{4a^2 - b^2}$</p> | 1 |
| | <p>*****</p> | |
| | <p>“मेहनत करो, सफलता खुद आपके पास आएगी।”</p> | |