

Mathematics

Full Syllabus Test

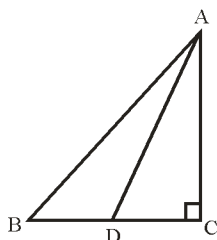
IX (ICSE)

Full Marks : 80

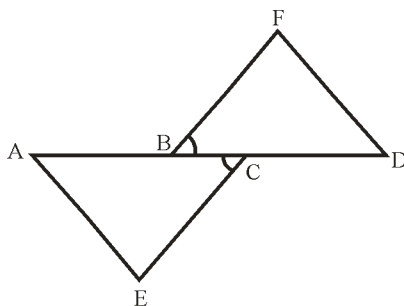
Time : 2 hr. 30 min

SECTION – A (Compulsory)

1. (a) Find four rational numbers between $\frac{1}{2}$ and $\frac{2}{3}$. (3 + 4 + 3)
 (b) Solve: $\frac{1}{x+y} - \frac{1}{2x} = \frac{1}{30}$; $\frac{5}{x+y} + \frac{1}{x} = \frac{4}{3}$
 Hence find the value of $2x^2 - y^2$.
 (c) The diagonals AC and BD of a parallelogram ABCD intersect at O. If P is the midpoint of AD, prove that (i) $PO \parallel AB$; (ii) $PO = \frac{1}{2}CD$.
2. (a) What sum of money will amount to Rs. 9261 in 3 years at 5% per annum compound interest?
 (b) If $a - b = 7$ and $a^3 - b^3 = 133$, find (i) ab ; (ii) $a^2 + b^2$ (3 + 3 + 4)
 (c) In the figure, ABC is a right triangle, right angled at C. If D is the mid point of BC, prove that $AB^2 = 4AD^2 - 3AC^2$



3. (a) Given that $\log_{10} y + 2 \log_{10} x = 2$, express y in terms of x. (3 + 3 + 4)
 (b) In the figure, $AB = CD$, $CE = BF$ and $\angle ACE = \angle DBF$. Prove that (i) $\triangle ACE \cong \triangle DBF$; (ii) $AE = DF$.

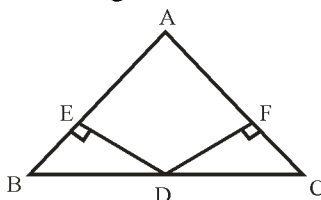


- (c) Find the area of a quadrilateral ABCD in which $\angle B = 90^\circ$, $AB = 6$ cm, $BC = 8$ cm and $CD = AD = 13$ cm.
4. (a) Simplify: $\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2} \cdot \left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2} \cdot \left(\frac{x^c}{x^a}\right)^{c^2+ca+a^2}$ (3 + 3 + 4)
 (b) If 1 is added to the numerator of a fraction, it becomes $\frac{1}{5}$, if 1 is taken from the denominator, it becomes $\frac{1}{7}$. Find the fraction.
 (c) If the length of each side of a rhombus is 8 cm and its one angle is 60° , then find the lengths of the diagonals of the rhombus.

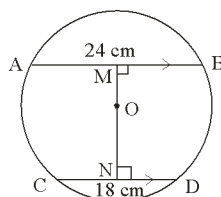
SECTION – B

(Answer any four)

5. (a) Afzal purchased an old motorbike for Rs. 16000. If the value of the motorbike after 2 years is 14440, find the rate of depreciation. (3 + 3 + 4)
- (b) Find the value of $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\operatorname{cosec} 40^\circ}{\sec 50^\circ} - 4 \cos 50^\circ \operatorname{cosec} 40^\circ + 2$
- (c) Draw the graph of $5x + 6y - 30 = 0$ and use it to find the area of the triangle formed by the line and the co-ordinate axes.
6. (a) Without performing actual division, state whether the following rational numbers will have a terminating decimal expansion or a non-terminating repeating decimal expansion: (3 + 4 + 3)
- (i) $\frac{13}{3125}$
- (ii) $\frac{23}{75}$
- (iii) $\frac{60}{150}$
- (b) Using suitable identity, find the value of
- (i) $(-28)^3 + (15)^3 + (13)^3$
- (ii) $\frac{86 \times 86 \times 86 + 14 \times 14 \times 14}{86 \times 86 - 86 \times 14 + 14 \times 14}$
- (c) If P and Q are points of trisection of the diagonal BD of a parallelogram ABCD. Prove that $CQ \parallel AP$.
7. (a) Solve the following system of equations (using cross multiplication method). (4 + 3 + 3)
- $$ax + by = 1; bx + ay = \frac{2ab}{a^2 + b^2}$$
- (b) D is the mid-point of BC. DE and DF are perpendicular to AB and AC respectively, such that $DE = DF$. Show that ABC is an isosceles triangle.



- (c) The result of dividing a number of two digits by the number with digits reverse is $1\frac{3}{4}$. If the sum of digits is 12, find the number.
8. (a) In the figure AB and CD are two parallel chords and O is the centre. If the radius of the circle is 15 cm, find the distance MN between the two chords of length 24 cm and 18 cm respectively. (3 + 3 + 4)



- (b) Two cubes, each with 12 cm edge, are joined end to end. Find the surface area of the resulting cuboid.
- (c) The points scored by a kabaddi team in a series of matches are as follows:
7, 17, 2, 5, 27, 15, 8, 14, 10, 48, 10, 7, 24, 8, 28, 18
Find the mean and the median of the points scored by the kabaddi team.

9. (a) Factorize: $a^3 - \frac{1}{a^3} - 2a + \frac{2}{a}$ (3 + 4 + 3)
- (b) ABCD is a square. A is joined to a point P on BC and D is joined to a point Q on AB. If $AP = DQ$, prove that AP and DQ are perpendicular to each other.
- (c) If $\sec 4\theta = \operatorname{cosec}(\theta - 20^\circ)$, find the value of θ . (4θ and $\theta - 20^\circ$ are acute angles).
10. (a) The simple interest on a sum of money for 2 years at 12% per annum is Rs. 1380. Find the sum of money and the compound interest on this sum for year payable half yearly at the same rate. (4 + 3 + 3)
- (b) Out of any two chords of a circle, show that the one which is nearer to the centre is larger.
- (c) Two circles touch externally. The sum of their areas is $130\pi \text{ cm}^2$ and the distance between their centres is 14 cm. Find the radii of the circles.
11. (a) If $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$, prove that $a^2 + b^2 = 7ab$. (3 + 3 + 4)
- (b) If $\sin 2x = \sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$. Find the value of x .
- (c) ABCD is a square. E, F, G and H are points on the sides AB, BC, CD and DA respectively such that $AE = BF = CG = DH$. Prove that EFGH is a square.
-