Series:

Code No. H1M901

Roll No. | | | | | | | |

Candidates must write the Code No on the title page of the answer-book

1. Please check that this question paper contains 6 printed pages
2. Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
3. Please check that this question paper contains 30 questions.
4. Please write down the Serial Number of the question before attempting it.
5. 15 minute time has been allotted to read this question paper. During these time students are not allowed to write answers

General Instruction:

1. All questions are compulsory.
2. This question paper contains 30 questions divided into four Sections A, B, C and D.
3. Section A comprises of 6 questions of 1 mark each. Section B comprises of 6 questions of marks each. Section C comprises of 10 questions of 3 marks each and Section D comprises of 8 questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided.
5. Use of Calculators is not permitted

MATHEMATICS

STD - IX

Maximum Marks: 80
Time allowed: 3 hours

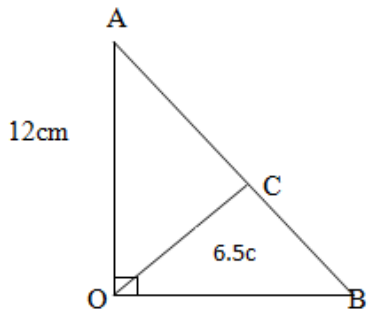
SECTION A

Question numbers 1 to 6 carry 1 mark each

1. Simplify $\left(\sqrt{4}\right)^{-3}$.
2. If a + b = 7 and ab = 12, find the value of $(a^2 - ab + b^2)$.
3. Which of the following points lie on x-axis? Which on y- axis ?

   A(0, 2), B(5, 6), C(–3, 0) , D(0, –3), E(0, 4), F(6, 0) , G(3, 0)
4. In ΔABC, ∠B = 45º , ∠C = 55º and bisector of ∠A meets BC at a point D. Find ∠ADB and ∠ADC.

5. In the figure ∠AOB = 90º, AC = BC , OA = 12cm and OC = 6.5cm. Find the area of ΔAOB.



6. In a ΔABC, ∠A = 50º, ∠B = 60º and ∠C = 70º. Find the measures of the angles of the triangle formed by joining the mid-points of the sides of this triangle.

SECTION B

Question numbers 7 to 12 carry 2 marks each

7. If $x = 1, y = 2$ is a solution of the equation $a^2x + ay = 3$, then find the values of a.

8. Simplify$\left(2\sqrt{5} + 3\sqrt{2}\right)^2$.

9. If the polynomials $ax^3 + 4x^2 + 3x - 4$ and $x^3 - 4x + a$ leave the same remainder when divided by $(x - 3)$, find the value of a.

10. If $\sqrt{2}$ = 1.414 , find the value of $\sqrt{3} \div \sqrt{6}$ upto three places of decimals.

11. What are the co-ordinates of a point that is :
(i) the mirror image of point (0, 4) in x- axis.
(ii) mirror image of point (–3, –5) in y- axis.

12. The sides AB and CD of a parallelogram ABCD are bisected at E and F. Prove that EBFD is a parallelogram.

SECTION C

Question numbers 13 to 22 carry 3 marks each

13. Represent $\sqrt{7.4}$ on the number line.

14. If f(x) = $x^4 - 2x^3 + 3x^2 - ax + b$ is a polynomial such that when it is divided by $x - 1$ and $x + 1$, the remainders are 5 and 19 respectively. Determine the remainder when f(x) is divided by $x - 2$.

OR

Use factor theorem to verify that $x + a$ is a factor of $x^n + a^n$ for any odd positive integer.

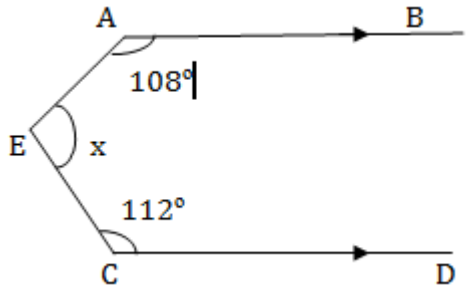
15. If $x = 3 - 2\sqrt{2}$, find $x^2 + \frac{1}{x^2}$.

OR

If $x = \frac{1}{2-\sqrt{3}}$, find the value of $x^3 - 2x^2 - 7x + 5$.

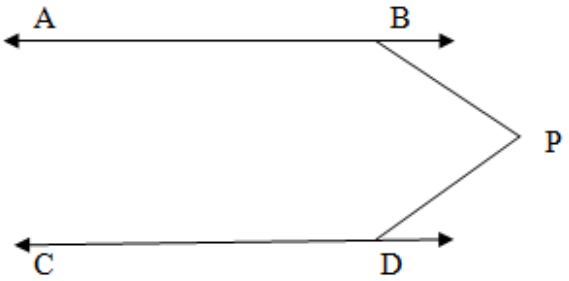
16. If $x = \frac{4}{3}$ is a root of the polynomial $f(x) = 6x^3 - 11x^2 + kx - 20$, find the value of k.

17. In the figure AB ‖ CD. Find the value of x.

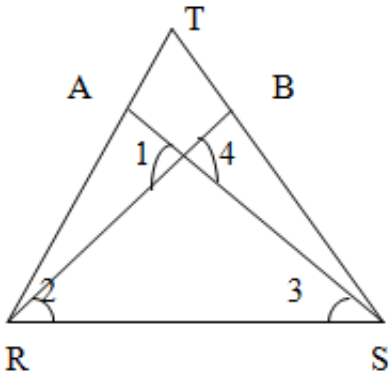


OR

In the figure AB ‖ CD and P is any point shown in the figure. Prove that ∠ABP + ∠BPD + ∠CDP = 360°



18. In the figure, it is given that RT = TS and ∠1 = 2∠2 and ∠4 = 2∠3. Prove that ΔRBT ≅ ΔSAT.



19. ABCD is a rhombus, EABF is a straight line such that EA = AB = BF. Prove that ED and FC when produced meet at right angle.

20. Let ABC be an isosceles triangle in which AB = AC. If D, E, F be the mid-points of the sides BC, CA and AB respectively, show that the segment AD and EF bisect each other at right angles.

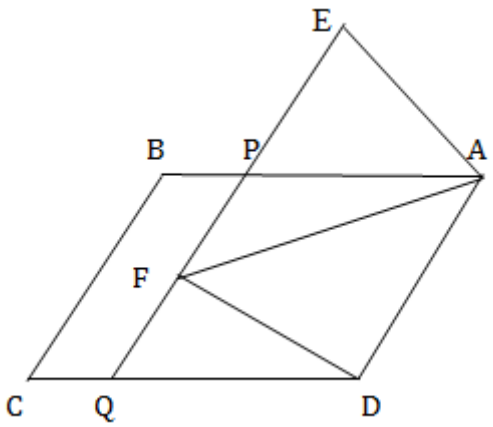
21. If AD is a median of a triangle ABC , then prove that triangles ADB and ADC are equal in area. If G is the mid-point of median AD, prove that ar(ΔBGC) = 2 ar(ΔAGC).

22. In the figure , ABCD and AEFD are two parallelograms. Prove that

(i) PE = FQ

(ii) ar(ΔAPE) : ar(ΔPFA) = ar(ΔQFD) : ar(ΔPFD)

(iii) $\text{ar}(\Delta\text{PEA}) = \text{ar}(\Delta\text{QFD})$



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 $\Delta\text{BED} = \frac{1}{4}$area of ΔABC.

SECTION D

Question numbers 23 to 30 carry 4 marks each

23. If both a and b are rational numbers, find the values of a and b

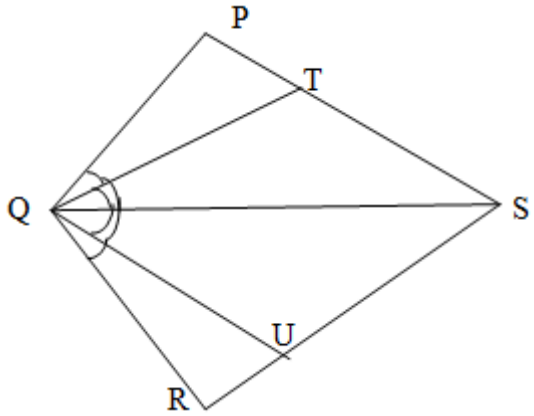
$$\frac{5+2\sqrt{3}}{7+4\sqrt{3}} = a + b\sqrt{3}$$

OR

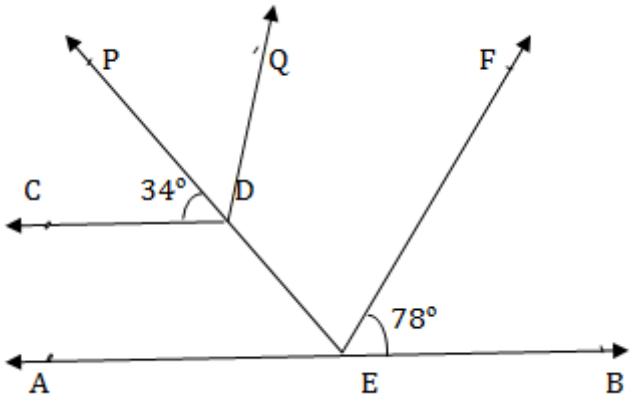
Show that $\frac{1}{3-\sqrt{8}} - \frac{1}{\sqrt{8}-\sqrt{7}} + \frac{1}{\sqrt{7}-\sqrt{6}} - \frac{1}{\sqrt{6}-\sqrt{5}} + \frac{1}{\sqrt{5}-2} = 5$

24. Find the values of a and b so that the polynomial $x^3 + 10x^2 + ax + b$ is exactly divisible by $x - 1$ as well as $x - 2$.

25. In the figure PQRS is a quadrilateral and T and U are respectively points on PS and RS such that PQ = RQ, ∠PQT =∠ RQU and ∠TQS = ∠UQS. Prove that QT = QU.



26. In the figure AB ‖ CD and EF ‖ DQ . Determine ∠ PDQ , ∠ AED and ∠ DEF.

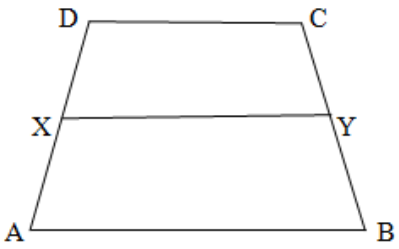


27. In the figure, ABCD is a trapezium in which AB ‖ DC and DC = 40 cm and AB =60 cm. If X and Y are respectively the mid-points of AD and BC, prove that

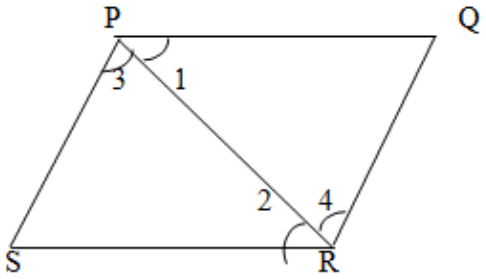
(i) XY = 50cm

(ii) DCYX is a trapezium

(iii) ar(trap. DCYX) = $\frac{9}{11}$ar(trap.XYBA)

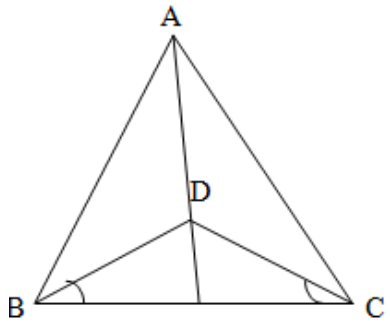


28. (i) In the figure, it is given that ∠1 =∠4 and ∠3 = ∠.By which Euclid's axiom, it can be shown that if ∠2 = ∠4 then ∠1 = ∠3.



(ii) Write Euclid's any three postulates.

29. In the figure , AB = AC, D is the point in the interior of ΔABC such that ∠DBC = ∠DCB. Prove that AD bisects ∠BAC of ΔABC.



OR

In Δ's ABC and PQR, AB = PQ, AC = PR and altitude AM and altitude PN are equal. Show that ΔABC ≅ ΔPQR.

30. ABCD is a trapezium in which AB ‖ CD and AD = BC. Show that

(i) ∠A = ∠B

(ii) ∠C = ∠D

(iii) ΔABC ≅ ΔBAD.

OR

In ΔABC, AD is the median through A and E is the mid-point of AD. BE is produced to meet AC in F. Prove that AF = $\frac{1}{3}$AC.

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