Roll No. 9279

No. of Printed Pages : 12

MG-325

HALF YEARLY EXAMINATION 2024-25

MATHEMATICS

Time : 3 hrs.] Class IX [M.M. : 80

General Instructions—

(i) The question paper has 5 sections A, B, C, D and E.

(ii) Section A has 20 MCQs carrying 1 mark each.

(iii) Section B has 5 questions carrying 2 marks each.

(iv) Section C has 6 questions carrying 3 marks each.

(v) Section D has 4 questions carrying 5 marks each.

(vi) Section E has 3 case based integrated units of assessment of 4 marks each with sub parts of values of 1, 1 and 2 marks.

(vii) Draw neat figures wherever necessary.

(viii) Write the serial number of the question paper before attempting it.

SECTION-A

1. Which of the following is an irrational number ?

(a) $\frac{3}{5}$ (b) $\sqrt{81}$

(c) $\sqrt{11}$ (d) $\frac{\sqrt{12}}{\sqrt{3}}$

2. The product of $\sqrt{10} \times \sqrt{15}$:

(a) $5\sqrt{6}$ (b) $6\sqrt{5}$

(c) $10\sqrt{5}$ (d) None of these

3. $4x^2+8x+3$ can be factorised as :

(a) $(2x+1)(2x+3)$ (b) $(x+1)(2x+3)$

(c) $(x+2)(x+3)$ (d) None of these

P. T. O.

4. In ΔPQR, $PQ = PR$; if $\angle Q = 40°$, then measure of $\angle P$ is :

(a) $40°$ (b) $140°$

(c) $100°$ (d) $80°$

5. If $AB = QR$, $BC = RP$ and $CA = PQ$, then identify the correct statement :

(a) $\Delta ABC \cong \Delta PQR$ (b) $\Delta ABC \cong \Delta RPQ$

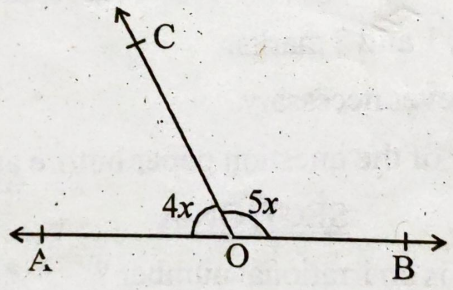
(c) $\Delta ABC \cong \Delta QRP$ (d) None of these

6. If two interior angles on the same side of a transversal intersecting two parallel lines are in the ratio 2 : 3, then measure of the greater angle is :

(a) $72°$ (b) $108°$

(c) $180°$ (d) $120°$

7. AOB is a straight line. Using the property of angles, find the measure of $\angle AOC$.



(a) $180°$ (b) $100°$

(c) $80°$ (d) $90°$

8. If $p(x) = x^2 - 2\sqrt{2}x + 1$, then $p(\sqrt{2})$ is equal to :

(a) (-1) (b) 1

(c) 3 (d) 7

9. The value of $(64)^{1/2} \times (2)^3$

(a) 48 (b) 64

(c) 32 (d) None of these

10. If $(x+1)$ is a factor of the polynomial $p(x) = 2x^2 + kx$, then the value of k is :

(a) 2 (b) (–2)

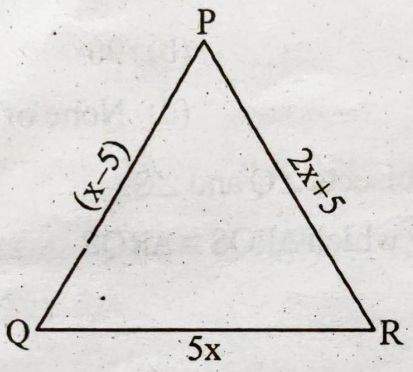
(c) 1 (d) (–1)

11. In which quadrant do the points (–3, 4) and (3, –4) lie ?

(a) same quadrant (b) quadrants II & IV

(c) quadrants I & II (d) quadrants II & III

12. Semi perimeter of the given triangle PQR is :



(a) 4x (b) 8x–4

(c) 8x (d) None of these

13. The sides of a triangle are 6 cm, 8 cm and 10 cm. Area of the triangle is :

(a) 48 cm^2 (b) 24 cm^2

(c) 40 cm^2 (d) 80 cm^2

14. Name the quadrants where the abscissa of a point is positive :

(a) I & IV (b) II & III

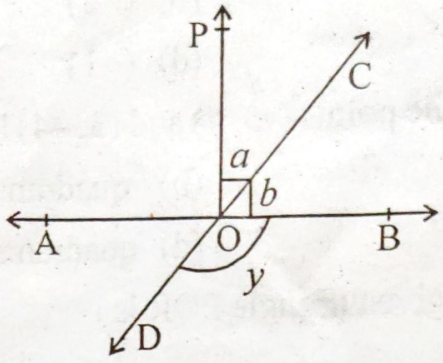
(c) I & III (d) II & IV

15. Coordinates of 2 points are M (2, 3) and N (4, –5). Then the (abscissa of M) – (ordinate of N) is :

(a) (–7) (b) 7

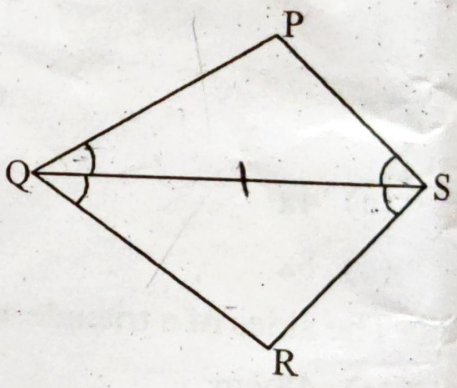
(c) 3 (d) 8

16. In the given figure, AB and CD are 2 intersecting lines and $\angle POB$ is a right angle. If a : b = 2 : 3 then find the measure of angle y.



(a) 126°
(b) 90°
(c) 54°
(d) None of these

17. In the given figure, QS bisects ∠Q and ∠S.
Identify the criterion by which ΔPQS ≅ ΔRQS



(a) SAS
(b) ASA
(c) RHS
(d) SSS

18. Area of an equilateral triangle whose side is 4 cm :
(a) $4\sqrt{3}$ cm²
(b) $16\sqrt{3}$ cm²
(c) 48 cm²
(d) 16 cm²

Assertion & Reason :

Direction : In each of the following questions (Q. 19 and Q. 20), a statement of Assertion is given followed by a corresponding statement of Reason just below it. Of the statements, mark the correct answer as :

(a) Both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are true but Reason is not the correct explanation of Assertion.

(c) Assertion is true but Reason is false.

(d) Assertion is false but Reason is true.

19. **Assertion :** $\sqrt{5}$ is an irrational number.

Reason : A number whose decimal expansion is non terminating non repeating is irrational.

20. **Assertion :** Factorised form of $a^3-27b^3 = (a-3b)(a^2+3ab+9b^2)$

Reason : $a^3 - b^3 = (a-b)(a^2+2ab+b^2)$

SECTION-B

21. Express $0.\overline{324}$ in the form of $\frac{p}{q}$ where p & q are integers and $q \neq 0$.

22. Factorise using identity (mention the identify) :

$x^2+4y^2+9z^2-4xy+12yz-6xz$

23. Identify the quadrant where the following points lie.

(a) Point A with abscissa (7) and ordinate (–2).

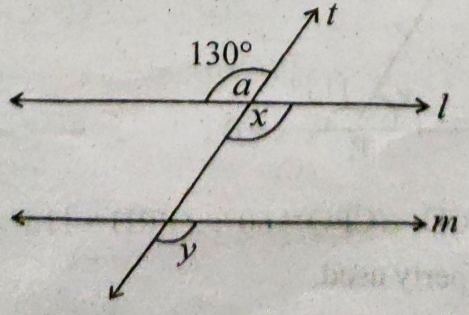
(b) Point B with ordinate (–3) and abscissa (–1).

24. The dimensions of a triangular shaped wall are 15 cm, 6 cm & 11 cm. Find its area.

OR

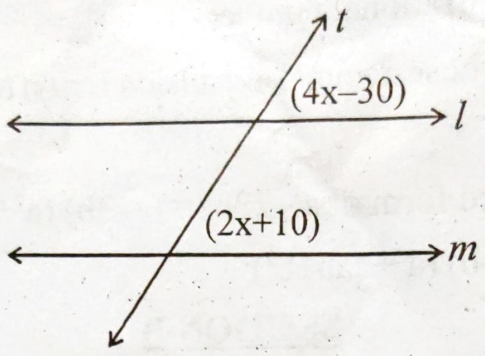
The angles of a triangle are in the ratio 1 : 2 : 3. Find the measure of the smallest angle of the triangle.

25. l and m are 2 parallel lines and 't' is a transversal. If $\angle a = 130°$ then find the measures of x and y. Mention the property used.



OR

For what value of x will the lines l and m be parallel to each other ?



SECTION-C

26. If $\frac{(3+2\sqrt{2})}{(3-2\sqrt{2})} = x + y\sqrt{2}$ then find the values of x and y where x and y are rational number.

27. Factorise the following—

(a) $6x^2+5x-6$ (by splitting the middle term)

(b) $125x^3+27y^3+8z^3-90xyz$ (Mention the identity)

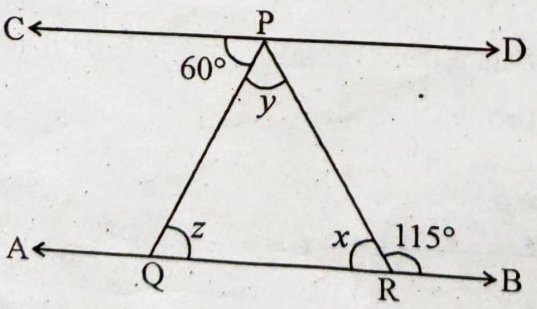
OR

Evaluate using algebraic identity—

(a) 104×96

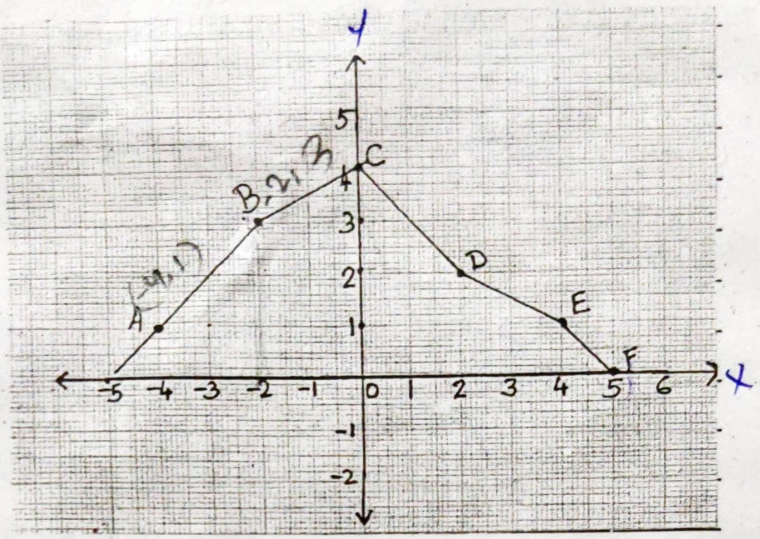
(b) $(101)^3$

28.



In the given figure AB || CD. $\angle CPQ = 60°$; $\angle PRB = 115°$. Find the measures of x, y and z. Mention the property used.

29. Based on the given graph answer the following questions—



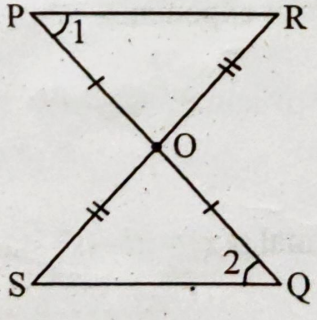
(a) Write the coordinates of the point F.

(b) What is the abscissa of point A ?

(c) What is the ordinate of the point B ?

30. The sides of a triangular ground are 30 m, 40 m and 50 m. Find the cost of levelling the ground at the rate of Rs. 100 per m^2.

31. Lines PQ and RS bisect each other at the point O.



(i) Prove that : $\Delta POR \cong \Delta QOS$

Give reason for all statements.

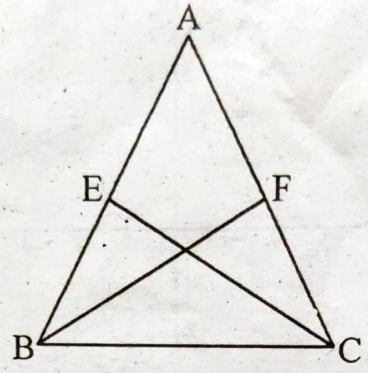
(ii) Give reasons :

(a) $\angle 1 = \angle 2$

(b) PR || QS

OR

In the given figure E & F are the mid point of the equal sides of AB and AC of ΔABC, prove that—



(i) $\Delta ABF \cong \Delta ACE$ (ii) Is $BF = CE$

Give reason for all statements.

SECTION-D

32. (a) Simplify and find the value— (3+2)

$$\frac{\sqrt{162}+\sqrt{108}}{\sqrt{72}+\sqrt{48}}$$

(b) Simplify using the laws of exponents—

(i) $(49)^{1/3} \times (7)^{1/3}$

(ii) $(16)^{3/4} \div (16)^{1/4}$

33. Factorise the given polynomial $p(x) = x^3 - 4x^2 - 4x + 16$ using hit and trial method and factor theorum

OR

(a) Verify whether $x = (-2)$ is a zero of the polynomial.

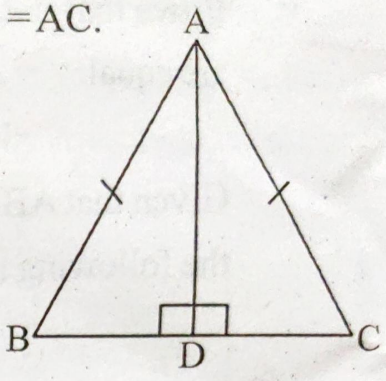
$p(x) = 3x^3 + 2x^2 + 4x + 24$

(b) Without actually calculating the cubes, find the value of

$(-20)^3 + (18)^3 + (2)^3$

Also mention the identity used.

34. AD is an altitude of the isosceles triangle ABC with AB = AC.



Prove that—

(i) $\Delta ABD \cong \Delta ACD$

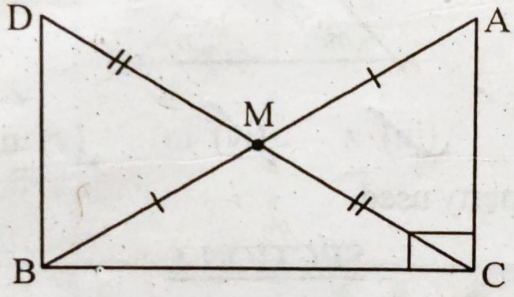
(ii) Is BD = CD

(iii) Is $\angle B = \angle C$

Give reason for all the statements.

OR

ΔABC is 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 point B.

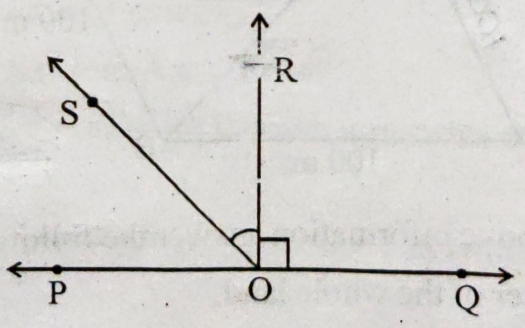


Show that—

(i) $\Delta AMC \cong \Delta BMD$ (ii) $\angle DBC$ is a right angle

(iii) $\overset{\Delta}{DBC} \cong \overset{\Delta}{ACB}$

35. (a) POQ is a line. Ray OR is perpendicular to the line PQ. OS is another ray between the rays OP and OR. (3+2)

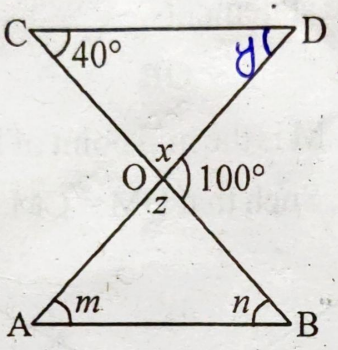


Prove that $\angle ROS = \frac{1}{2}[\angle QOS - \angle POS]$

(b) Prove that if 2 lines intersect each other, then the vertically opposite angles are equal.

OR

Given that AB || CD, $\angle BOD = 100°$ and $\angle DCO = 40°$. Find the measures of the following angles.

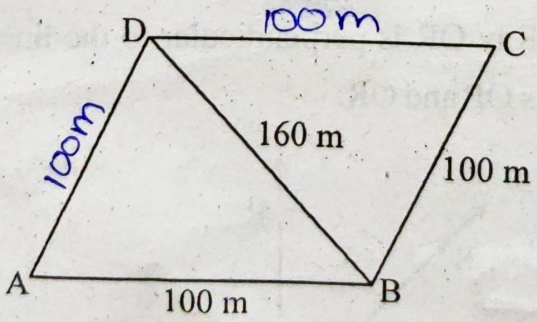


(i) x (ii) y (iii) z (iv) m (v) n

Mention the property used.

SECTION-E

36. Mohan has a piece of land which is in the shape of rhombus. He divided the land in two equal parts to produce different crops. Length of each side of the land is 100 m and one of the diagonals is 160 m.



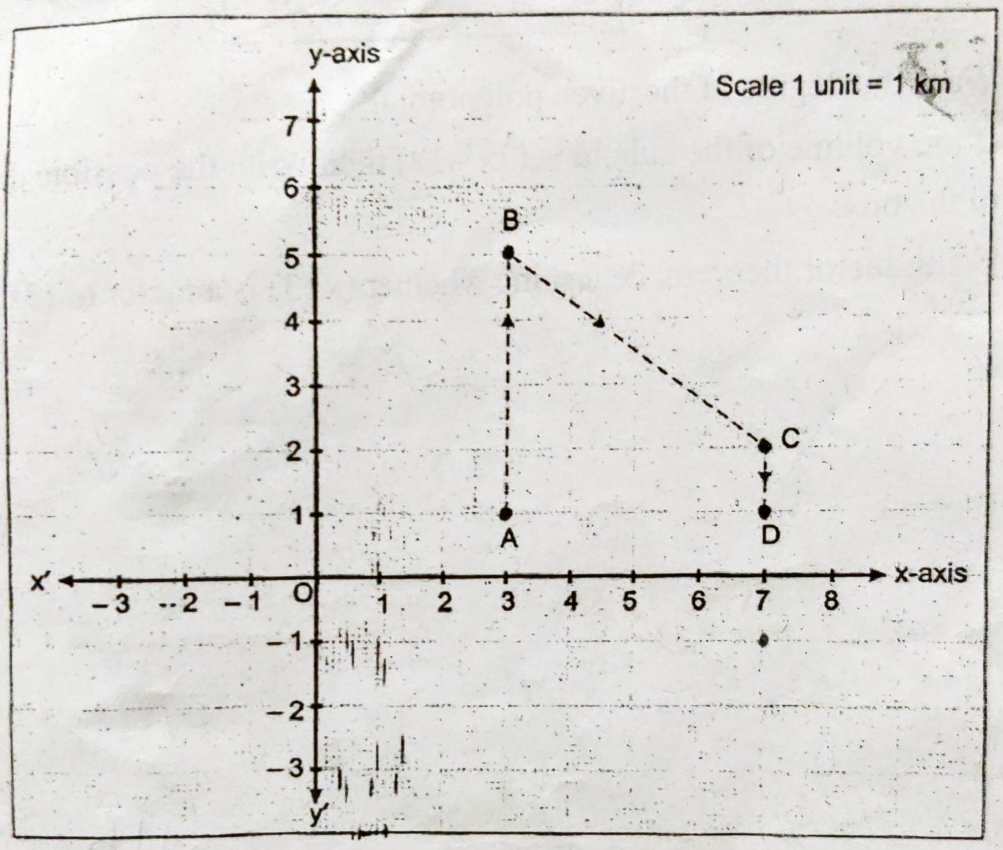
On the basis of the above information answer the following questions— 1+2+1

(i) Find the perimeter of the whole land.

(ii) Area of the land enclosed by ΔABD.

(iii) Find the cost of ploughing the whole land at the rate of Rs. 20 per m^2.

37. Arun is participating in 10 km walk. The organizers showed the coordinates on graph. Arun started from A(3, 1) and at point B(3, 5) there is a water station make people to hydrated. A garden is situated at point C and finally Arun reaches at final destination marked at point D.



Based on the above information, answer the following questions :

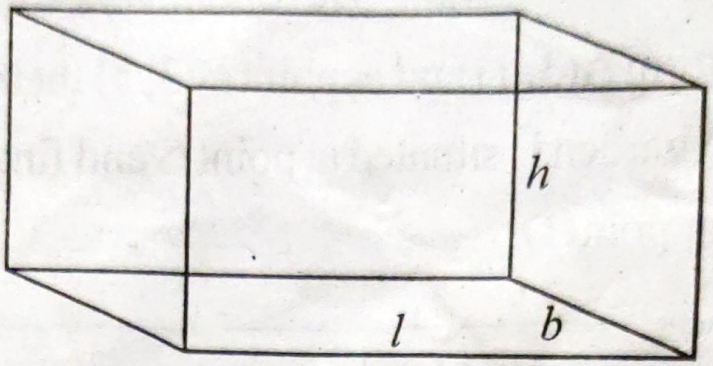
(i) Write the coordinates of point C. 1

(ii) Find the distance between A and B. 1

(iii) Write the coordinates of point D and coordinates of it's mirror image about x-axis. 2

38. Two friends sitting together noticed a cuboidal box lying at a distance from them. One says :

"If I give an expression $(3x^2-12)$ for the volume of this box, then find the solutions of the following questions".



(i) Write the degree of the given polynomial. 1+2+1

(ii) If the volume of the cuboid is $(3x^2-12)$ then write the possible dimensions of the box.

(iii) Using factor theorem, determine whether $(x+3)$ is a factor of $(3x^2-12)$.