PRATAP PUBLIC SCHOOL, KARNAL
Mid Term Examination (2023-24)
CLASS- IX
SUBJECT: MATHEMATICS

Time : 3 Hours

M.M. : 80

Name _____ Section _____ Roll No. _____

General Instructions: -

1. This Question Paper has 5 Sections A, B, C, D, and E.
2. Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 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 2 marks, 2 Qs of 3 marks and 2 Questions of 5 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

Section: A

Q. No.	Question	Marks

1. The number obtained by rationalisation of $\frac{1}{2-\sqrt{3}}$ is   1

   (A) 5.73   (B) 4.73

   (C) -5   (D) none of these.

2. How many linear equations are satisfied by x = 1 and y = -4?   1

   (A) one   (B) Two

   (C) Three   (D) Infinitely many

3. The equation y = -8, in two variables can be written as   1

   (A) 0 x + 0 y = - 8   (B) 0 x + 1 y = - 8

   (C) 0 x + 1 y = 8   (D) 1 x + 1 y = - 8

4. The points (other than origin) for which abscissa is equal to the ordinate will lie in   1

   (A) I quadrant only   (B) I and II quadrants

   (C) I and III quadrants   (D) II and IV quadrants

5. If two adjacent angles on a straight line are in the ratio 6: 3, then the measure of greater angle is   1

   (A) 100°   (B) 90°

   (C) 120°   (D) 60°

6. Axioms are assumed
   (A) universal truths in all branches of mathematics
   (B) universal truths specific to geometry
   (C) theorems
   (D) definitions

7. Two angles measure $(55° + 3a)$ and $(115° - 2a)$. If each is supplement of each other, then calculate the value of a   1
   (A) 20°   (B) 30°
   (C) 10°   (D) 40°

8. If the sum of two given angles is 90° then the angles are   1
   (A) Complementary angles   (B) Supplementary angles
   (C) Right angles   (D) acute angles

9. If one angle of a triangle is equal to the sum of the other two angles, then the triangle is   1
   (A) an isosceles triangle   (B) an obtuse triangle
   (C) an equilateral triangle   (D) a right triangle

10. In this fig., for what value of x, shall we have l ∥ m?   1
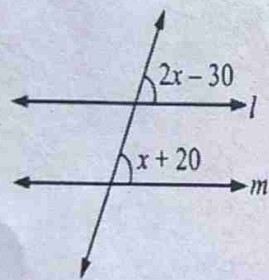
   (A) 45°   (B) 50°
   (C) 70°   (D) 60°

11. In Δ PQR, ∠R = ∠P and QR = 4 cm and PR = 5 cm. Then the length of PQ is   1
    (A) 4 cm   (B) 5 cm
    (C) 2 cm   (D) 2.5 cm

12. In triangles ABC and PQR, AB = AC, ∠C = ∠P and ∠B = ∠Q. The two triangles are   1
    (A) isosceles but not congruent   (B) isosceles and congruent
    (C) congruent but not isosceles   (D) neither congruent nor isosceles

13. $16\sqrt{6} \div 4\sqrt{2} =$ 1
    (A) $4\sqrt{3}$ (B) $3\sqrt{3}$
    (C) $5\sqrt{3}$ (D) $6\sqrt{3}$

14. Which one of the following options is true for the solutions of $y = 3x + 5$?   1
    A) Unique solution   B) Only two solutions
    C) Infinitely many solutions   D) None of these.

15. The decimal expansion of $\sqrt{2}$ is

    (A) finite decimal

    (B) 1.4121

    (C) non-terminating recurring

    (D) non-terminating non-recurring

16. Find the value of $\sqrt[3]{216} - \sqrt[3]{125}$

    (A) 1

    (B) -1

    (C) 11

    (D) 65

17. In a frequency distribution, the mid value of a class is 10 and the width of the class is 6. The lower limit of the class is

    (A) 6

    (B) 7

    (C) 8

    (D) 12

18. The product of any two irrational numbers is

    (A) always an irrational number

    (B) always a rational number

    (C) always an integer

    (D) sometimes rational and sometimes irrational number

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

19. **Statement A (Assertion):** The class representing class mark 30 is 25 - 35

    Statement R(Reason): Class mark $= \dfrac{upperlimit + lowerlimit}{2}$

    (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

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

    (c) Assertion (A) is true but Reason (R) is false.

    (d) Assertion (A) is false but Reason (R) is true.

20. **Statement A (Assertion):** The base of a right-angled triangle is 6 cm and hypotenuse is 10 cm. Its area is 26 cm^2

    Statement R (Reason): Area of right triangle $= \dfrac{1}{2}$ base x height

    (a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

    (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)

    (c) Assertion (A) is true but reason (R) is false.

    (d) Assertion (A) is false but reason (R) is true

SECTION : B

21. Express 1.8181 ...... in the form of $\frac{p}{q}$, where p and q are integers and q ≠ 0
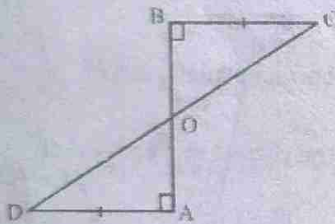
    OR

    Write two rational and two irrational numbers between $\frac{1}{2}$ and $\frac{3}{5}$.

22. In which quadrant or on which axis do each of the points (− 2, 4), (3, − 1), (1, 2) and (− 3, − 5) lie?

23. Find the value of k, if x = 1 and y = 1 is a solution of 9 k x + 11 k y = 20.

24. if AB || CD, ∠APQ = 50° and ∠PRD = 127°, find x and y.
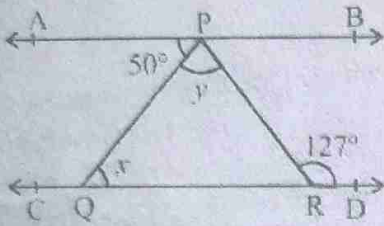
25. AD and BC are equal perpendiculars to a line segment AB. Show that CD bisects AB.

    OR

    Line l is the bisector of an angle ∠A and B is any point on l. BP and BQ are perpendiculars from B to the arms of ∠A. Show that:

    (i) ΔAPB ≅ ΔAQB

    (ii) BP = BQ or B is equidistant from the arms of ∠A.
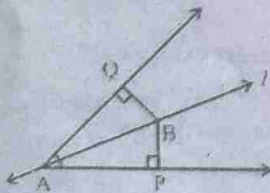
SECTION: C

26. Locate $\sqrt{13}$ on the number line.

27. Write the coordinates of a point
   (i) above x-axis, lying on y -axis and at a distance of 6 units.
   (ii) Lying on x-axis, to the left of the origin and at a distance 3 units.
   (iii) Lying on y – axis below origin at a distance of 4 units.   3

28. Write four solutions for each of the following equations:
 $2x+y = 7$

OR

In countries like USA and Canada, the 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:

$$F= \left(\frac{9}{5}\right)C + 32$$

   (i) If the temperature is 30°C, what is the temperature in Fahrenheit?
   (ii) If the temperature is 0°C, what is the temperature in Fahrenheit, and if the temperature is 0°F, what is the temperature in Celsius?   3
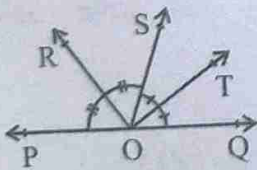
29. If AC = BD, then prove that AB = CD.
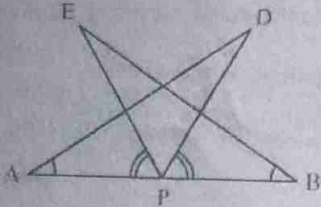

3
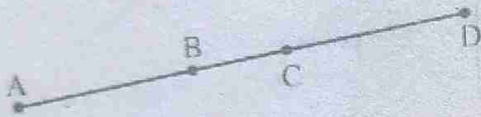
30. If PQ || ST, ∠PQR = 110° and ∠RST = 130°, find ∠QRS.
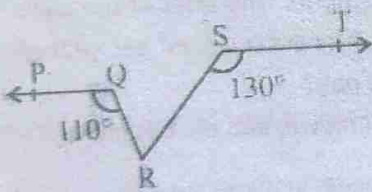
OR

In Fig., ray OS stands on a line POQ. Ray OR and ray OT are angles bisectors of ∠POS and ∠SOQ, respectively. If ∠POS = x, find ∠ROT.

31. AB is a line segment and P is its mid-point. D and E are points on the same side of AB such that   3
∠BAD = ∠ABE and ∠EPA = ∠DPB. Show that
(i) ΔDAP ≅ ΔEBP
(ii) AD = BE

SECTION: D

32. Find the values of a and b.

$$\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{7-\sqrt{5}}{7+\sqrt{5}} = a + \frac{7}{11}\sqrt{5}b$$

5

OR

Prove : $\left(\dfrac{x^a}{x^b}\right)^{a+b} \times \left(\dfrac{x^b}{x^c}\right)^{a+c} \times \left(\dfrac{x^c}{x^a}\right)^{c+a} = 1$

33. The triangular side walls of a flyover have been used for advertisements. The sides of the walls   5
are 122 m, 22 m and 120 m. The advertisements yield earning of Rs 5000 per m² per year. A
company hired one of its walls for 3 months. How much rent did it pay?

34. The length of 40 leaves of a plant are measured correct to one millimetre, and the obtained   5
data is represented in the following table:

Length (in mm)	Number of leaves
118 – 126	3
127 - 135	5
136 – 144	9
145 – 153	12
154 – 162	5
163 - 171	4
172 – 180	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves are 153 mm long? Why?
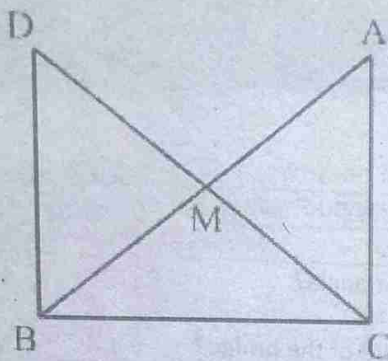
35. In right triangle ABC, right angled at C, M is the mid-point of hypotenuse AB. C is joined to M   5

and produced to a point D such that DM = CM. Point D is joined to point B. Show that:

(i) △AMC ≅ △BMD

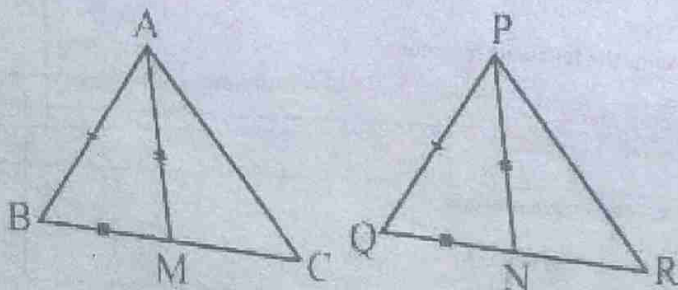(ii) ∠DBC is a right angle.

(iii) △DBC ≅ △ACB

(iv) CM = ½ AB

OR

Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and
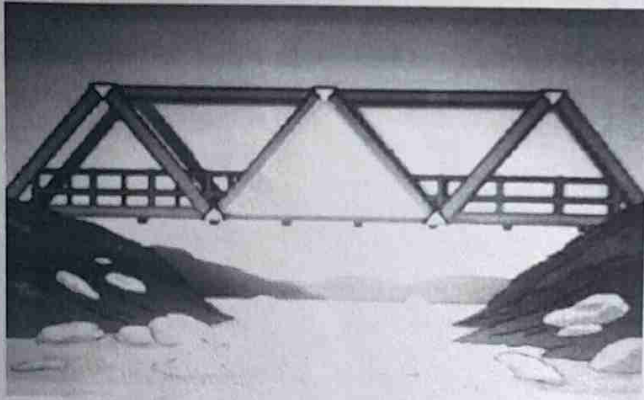
QR and median PN of △PQR. Show that:
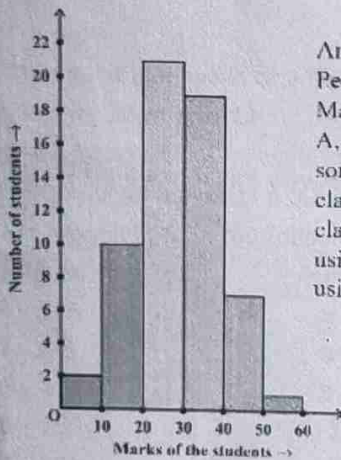
(i) △ABM ≅ △PQN

(ii) △ABC ≅ △PQR

SECTION: E

36. Isosceles triangles were used to construct a bridge in which the base (unequal side) of isosceles triangle is 4 cm and its perimeter is 20 cm

| 1	What is the length of equal sides?	1
2	Write the Heron's formula.	1
3	What is the area of one isosceles triangle?	2
	[OR]	
	What is the perimeter of triangular structure of the bridge?	

37.

4

Anil is a Mathematics teacher in Hyderabad. After Periodic test 3, he asks students to collect the Mathematics marks of all the students of Class IX-A, B and C. A student is able to collect marks from some students. Rekha scored least mark 6 in the class and Ram scored highest marks 59 in the class. He prepares the frequency distribution table using the collected marks and draws Histogram using the table as shown in adjoining figure.

Based on the above information, answer the following questions:

1	What is the range of the collected marks	
2	What is the width of class interval	1
		1
3	How many students scored 40% and above marks?	
	[OR]	2
	How many students scored less than 50% marks?	

BSE stands for a disease called Bovine spongiform Encephalopathy. "Bovine" means that the disease affects cows, "spongiform" refers to the way the brain from a sick cow looks sponge under a microscope, and "encephalopathy" indicated that it is a disease of the brain. This disease is commonly called "mad cow disease."
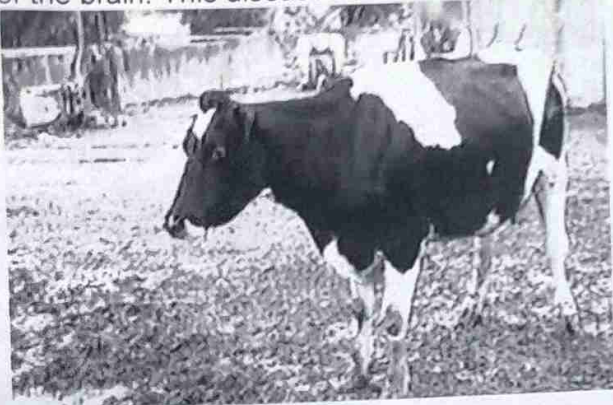
A farmer has a field ABCD formed by two pair of parallel roads as shown below in which $\ell \parallel m$ and $p \parallel q$. His four cows suffering from BSE. Thus, he tied them at four corners of the field ABCD.
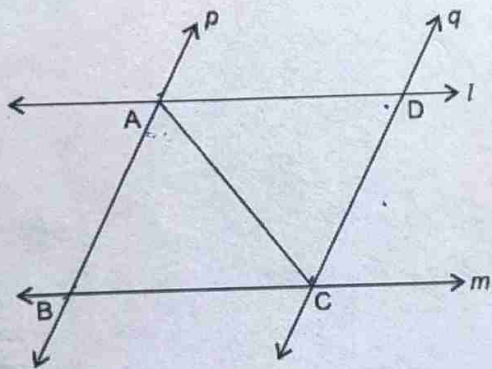
Cannot be found

1	If ∠BAC = 30, then find ∠CAD	(1)
2	∠ABC and ∠BCD are supplementary angles. Mention reason for it.	(1)
3	If we join BD such that BD meet AC at O and ∠BOC = 30°, then what is the measure of ∠AOD. **[OR]** If ∠B = 45° then find ∠C, ∠D, ∠A.	(2)

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