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VIVEK HIGH SCHOOL, CHANDIGARH
HALF-YEARLY EXAMINATION
2024-25
CLASS-9
MATHEMATICS (041)
SET: A

TIME: 3 Hours **MAX. MARKS: 80**

General instructions:

- **All the questions are compulsory.**
- **This question paper has 5 Sections A, B, C, D and E.**
- **Section A has 20 MCQs carrying 01 mark each.**
- **Section B has 5 questions carrying 02 marks each.**
- **Section C has 6 questions carrying 03 marks each.**
- **Section D has 4 questions carrying 05 marks each.**
- **Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of values of 1, 2 and 1 mark each respectively.**
- **All the questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks question of Section E. You must attempt only one of the alternatives in all such questions.**

Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

SECTION A

This section comprises 20 multiple choice questions of 1 mark each.

1. Evaluate $\sqrt{6} \times \sqrt{27}$
   a) $9\sqrt{2}$ b) $3\sqrt{3}$ c) $2\sqrt{2}$ d) $9\sqrt{3}$

2. Which of the following is irrational?
   a) 0.14 b) 0.1416 c) $0.0\overline{41}$ d) 0. 041042043044045.....

3. $\frac{8^3 \times 16^3}{32^3}$ is equal to:
   a) 48 b) 16 c) 64 d) 46

4. The solution of the linear equation $x + 2y = 8$ which represents a point on x-axis, is:
   a) (4,0) b) (0,4) c) (8,0) d) (4,2)

5. The equation $y = -4$, in two variables x and y can be written as:
   a) $1x + 1y = -4$ b) $0x + 1y = -0.4$
   c) $0x + 1y - 4 = 0$ d) $0x + 1y + 4 = 0$

6. 'Things which are equal to the same thing are equal to one another' is in the form of
   a) An axiom b) definition c) a postulate d) a proof

7. Heron's formula to find the area of an equilateral triangle of side 'a' and 's' as semi-perimeter is given by:
   a) $\sqrt{a^2s^2}$ c) $[s(s-a)]^2$
   b) $\sqrt{s(s-a)(s-a)}$ d) $\sqrt{s(s-a)^3}$

8. The area of a right-angled triangle is $240cm^2$ and side other than hypotenuse is 30 cm, the hypotenuse of the triangle is:
   a) 20 cm b) 34 cm c) 80 cm d) 100 cm

9. In fig 1, if AB is a line, then the measure of ∠BOC, ∠COD and ∠DOA respectively are:

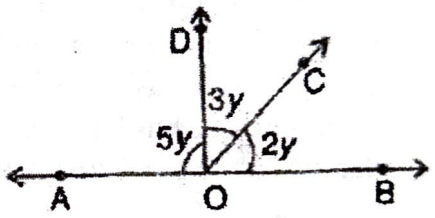


Fig 1

   a) $36^0, 54^0, 90^0$ c) $90^0, 56^0, 34^0$
   b) $56^0, 34^0, 90^0$ d) $90^0, 54^0, 36^0$

10. An angle is equal to three times its supplement. The measure of the angle is:
    a) 135^0 b) 130^0 c) 45^0 d) 36^0

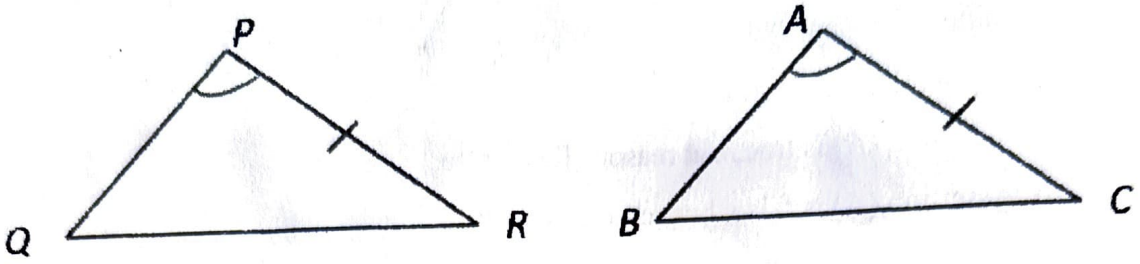
11. In Δ PQR, ∠R = ∠P and QR = 4 cm and PR = 5 cm. Then the length of PQ is:
    a) 2 cm b) 2.5 cm c) 4cm d) 5cm

12. If the coordinates of a point A are (0, −4), then point A lies in/on:
    a) I-Quadrant b) Y-axis c) X-axis d) IV Quadrant

13. 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:

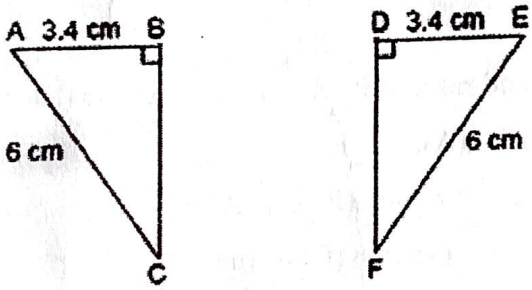
a) 6 b) 7 c) 8 d) 12

14. Given that $\angle P = \angle A$ and PR= AC. Then, which of the following conditions are true for ΔPQR and ΔABC to be congruent?



a) BC = QR by ASS criteria
b) BC = QR by SSA criteria
c) AB = PQ by SAS criteria
d) AB = PQ by SSA criteria

15. The following two triangles are congruent using congruence condition:



a) SAS b) ASS c) SSS d) RHS

16. The coordinates of vertices B and C are (3,−5) & (−15,8) respectively, then the value of $\frac{3}{5}$ abscissa of C −7 ordinate of B:

a) −26 b) −46 c) 26 d) 22

17. In the class intervals 10-20, 20-30, 30-40… the number 30 is included in:

a) 30-40 b) 20-30 c) in both intervals d) insufficient data

18. Let 'm' be the midpoint and 'l' the upper-class limit of a class in a continuous frequency distribution. The lower limit of the class is:

(a) 2m + l b) 2m − l c) m − l d) m − 2l

19. **Statement A(Assertion):** $\sqrt{5}$ is an irrational number.
Statement R(Reason): A number is called irrational, if it cannot be written in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

a) Both assertion (A) and reason (R) are true, and reason (R) is 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.

20. **Statement A(Assertion):** Point (-3,-3) lies on the angle bisectors of first and third quadrant angles.
Statement R(Reason): The numeric value of ordinate and abscissa of every point on the bisector of first and third quadrant angles are equal.

a) Both assertion (A) and reason (R) are true, and reason (R) is 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

This section comprises 5 questions of 2 marks each.

21. Express $4.\overline{12}$ in $\frac{p}{q}$ form.

OR

Represent $\sqrt{5}$ on the number line using compass and ruler.

22. Find the value of k, if x= $-k$ and y = $\frac{5}{2}$ is a solution of the equation $x + 4y - 7 = 0$.

23. Solve the equation $a - 15 = 25$. Also state the axiom used.

OR

Write the statement of Euclid's fifth postulate. Also draw the labelled figure.

24. The perimeter of an isosceles triangle is 32cm. The ratio of the equal sides to base is 3:2. Find the area of the triangle using Heron's formula.

25. In Fig 2, lines XY and MN intersect at O. If $\angle POY = 90°$ and a: b = 2:3, find c. Give reasons

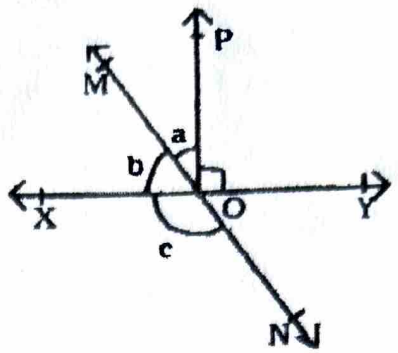


Fig 2

SECTION C

This section comprises 6 questions of 3 marks each.

26. Evaluate using laws of exponents: $\frac{(y^{a+b})^2 (y^{b+c})^2 (y^{c+a})^2}{(y^a y^b y^c)^4}$

27. In fig 3, AD and BC are equal perpendiculars to a line segment AB. Prove that CD bisects AB.

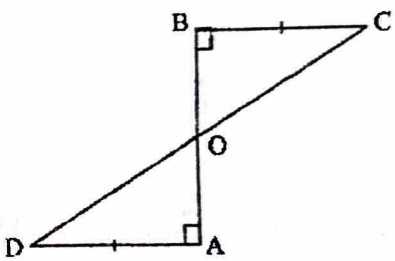


Fig 3

OR

In fig 4, OA = OB and OD = OC. Prove that
i) $\Delta AOD \cong \Delta BOC$
ii) AD || BC

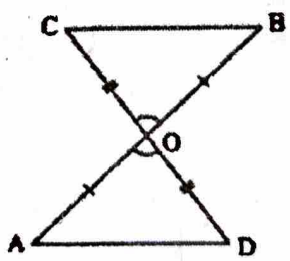


Fig 4

28. Plot points A (1,1), B (3,4), C (8,4) and D (6,1) on the Cartesian plane using graph paper. Find the area of the figure so obtained.

29. QE and RF are two equal altitudes of a triangle PQR. Using RHS congruence rule, prove that the triangle PQR is isosceles.

30. In the fig 5, ABCD is a rectangle and DEC is an equilateral triangle with dimensions as AB= 6cm, BC= 8cm. Find the area of shaded region.

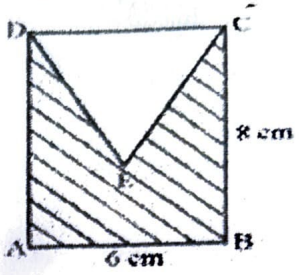


Fig 5

31. In fig 6, if AB||*CD*, find the value of x, giving reasons.

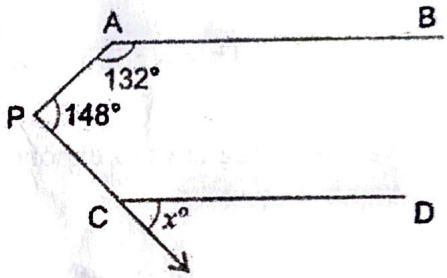


Fig 6

OR

In the fig 7, if $l_1||l_2$ find the value of x, giving reasons.

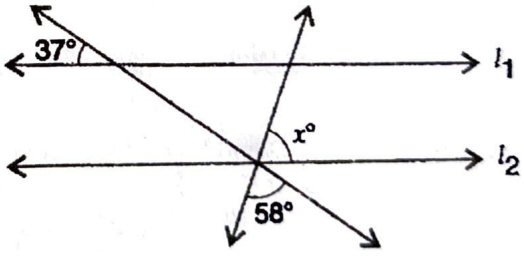


Fig 7

SECTION D

This section comprises 4 questions of 5 marks each.

32. If $\frac{7+\sqrt{5}}{7-\sqrt{5}} - \frac{4-\sqrt{5}}{4+\sqrt{5}} = a + \frac{7}{11}\sqrt{5}b$, find the values of a and b.

OR

If $a = 5 + 2\sqrt{6}$ and $b = \frac{1}{a}$, then find the value of $a^2 + b^2 - 8ab$.

33. In fig. 8, if ΔABC is a 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.

Prove that:

(i) $\Delta AMC \cong \Delta BMD$

(ii) $\angle DBC$ is a right angle.

(iii) $\Delta DBC \cong \Delta ACB$

(iv) $2\,CM = AB$

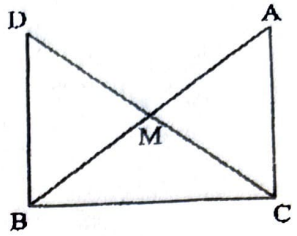


Fig 8

34. A hording on a highway is used for advertisement. The company has to pay Rs 400 for first 1 m and for subsequent length it is Rs 250/m. Take x as the length hired by company and y as total cost paid. Write a linear equation in two variables for this information and find its three solutions.

35. The following tables present the marks obtained by girls and boys in a school during their class assessments.

Marks	Number of girls	Marks	Number of boys
0-15	15	0-15	32
15-30	32	15-30	54
30-45	49	30-45	60
45-60	68	45-60	20
60-75	52	60-75	45
75-90	50	75-90	25

Represents the marks of the girls and boys on the same graph by using two frequency polygons.

OR

Represent a well labelled histogram for the following grouped frequency distribution.

Age	Number of visitors
1-5	10
5-8	8
8-12	16
12-18	10
18-25	21

SECTION E

This section comprises 3 questions of 4 marks each.

36. Manish is planning to shift, to his newly constructed two-storey house. He surveyed and used all the latest technologies in his house. Now it's time to work on garden area. He has a quadrilateral piece of land for garden as shown in the fig 9. He divided the garden into two different types of triangles.

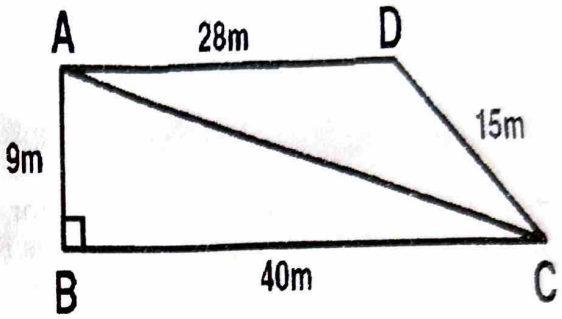


Fig 9

Based on this information answer the following questions:

i) Find the length of side AC.

ii) Find the area of △ ABC. Also find the cost of planting grass on it @ Rs 15 per sq. m.

OR

Find the total area of the garden Manish has.

iii) Find the cost of putting fence @ Rs 20 per meter around the garden.

37. Ishita loves doing crafts as her hobby. Recently she has decorated her main hall wall with some hangings using parallel and intersecting lines.

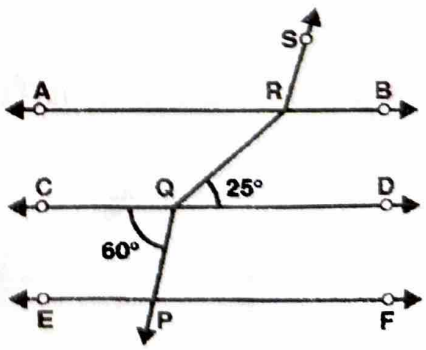


Fig 10

In fig 10, if AB || CD, CD||EF, PQ || RS, $\angle RQD = 25°$ and $\angle CQP = 60°$.
Based on this information answer the following questions giving reasons:

i) Find the measure of $\angle ARQ$.

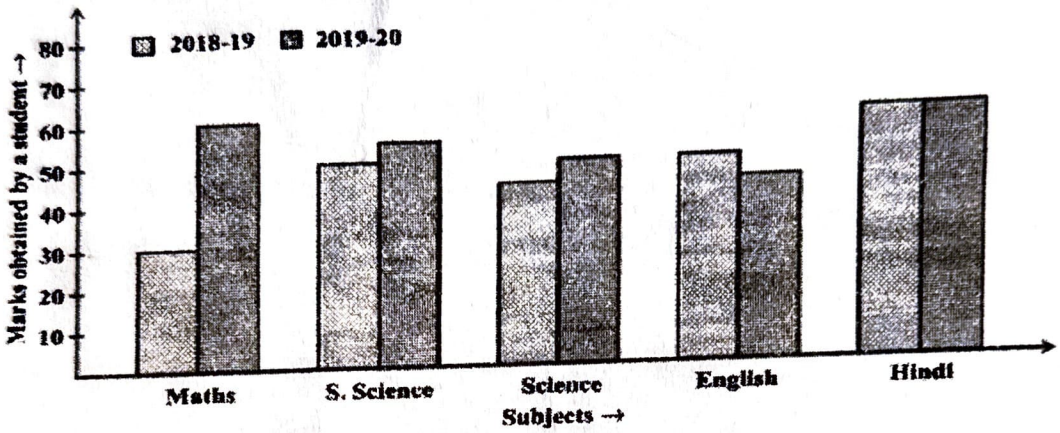
ii) Prove AB//EF. Also, if we extend SR to meet EF at T, find measure $\angle RTP$.

OR

Prove AB//EF. Also, if we extend SR to meet EF at T, find measure $\angle RTF$.

iii) Find the measure of $\angle ARS$.

38. The Class teacher of Class IX prepares the result analysis of a student. She compares the marks of a student obtained in Class VIII (2018-19) and Class IX (2019-20) using the double bar graphs as shown below



Based on this information answer the following questions:

i) In which subject has the performance improved the most?

ii) Find the ratio of sum of marks in Science and English in 2018-19 to the sum of marks in these subjects in 2019-20.

OR

Find the ratio of sum of marks in Hindi and English in 2018-19 to the sum of marks in these subjects in 2019-20.

iii) Calculate the total marks obtained by the student in 2018-19.