MID TERM EXAM - 2024
Subject- Mathematics (SET 2)
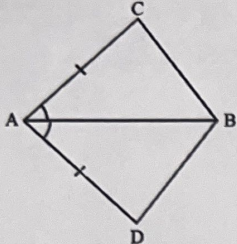
**Time Duration: 3 Hrs.**

Maximum Marks : 80

General Instructions:

1. This Question Paper has 5 Sections A-E.
2. Section A has 20 objective questions carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case study based questions (04 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 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 questions of Section E.
8. Draw neat figures wherever required. Take π =22/7 wherever required if not stated.

S.NO	SECTION-A (20 questions of 1 mark each)
1	Find the coordinates of a point which is a reflection of $(4, -7)$ in the x- axis.
2	If x and y are a pair of angles on a straight line. Find y if $x = 69°$.
3	Find the area of an equilateral triangle if each side is 3 cms.
4	Without actual division find if $\frac{51}{85}$ represents a terminating or a non terminating repeating decimal. (show working)
5	In an isosceles triangle the measure of each of the equal angles is half the measure of the vertex angle .Find the measure of each of the equal angles.
6	An exterior angle of a triangle is 110° and one of its interior opposite angle is 30° ,Find the measure of the other two angles.
7	Ordinate of a point is negative in _____ and _____ quadrants.
8	It is given that $\triangle ABC \cong \triangle FDE$ and AB = 5cm, $\angle B = 40°$, $\angle A = 80°$. Then what is the measure of $\angle E$?

9	In triangles ABC and DEF, AB=DF and ∠A=∠D. What is the additional condition is required to prove triangles congruent by SAS ?
10	Two sides of a triangle are 13 cm and 14 cm. Its semiperimeter is 18 cm. Find the third side?
11	Insert an irrational number between 0.1319 and 0.131.
12

In the given figure △ ABC ≅ △ ABD and AB bisects angle A. What can you say about BC and DB? (Justify) |
13	If A=B ,then A+C=B+C. state the axiom used.
14	Is $(\sqrt{3} + \frac{1}{\sqrt{3}})^2$ rational ? Justify.
15	The perpendicular distance of $(-5, -7)$ from the x axis will be _____.
16	Two supplementary angles are in the ratio of 5: 7. Find the measure of the smaller angle?
17	Find the semi perimeter of a triangle of sides 8 cm, 10 cm and 12 cm.
18	Can $\angle A = 45, \angle B = 70 \ and \ \angle C = 60(all \ in \ degrees)$ be the angles of a triangle.(justify).
	DIRECTION: In question number 19 and 20, a statement of **assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option
19	*Statement A (Assertion):* $7\sqrt{5}$ is an irrational number. *Statement R(Reason):* product of rational number and an irrational number is always an irrational number. 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.

| 20 |
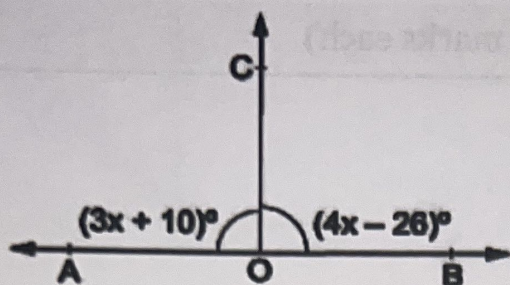
Statement A (Assertion): In the given figure AOB is a straight line.

If $\angle AOC = (3x + 10)^\circ$ and $\angle BOC = (4x - 26)^\circ$ then $\angle BOC = 86^\circ$.

Statement R(Reason): The sum of angles on a straight line is 180°.

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

b) Both assertion (A) and reasoning on (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 (5 questions of 2 marks each)

| 21 | Express $0.3\overline{4}$ in the form of $\frac{p}{q}$, where p and q are integers and $q \neq 0$. (Show working) |
| 22 |
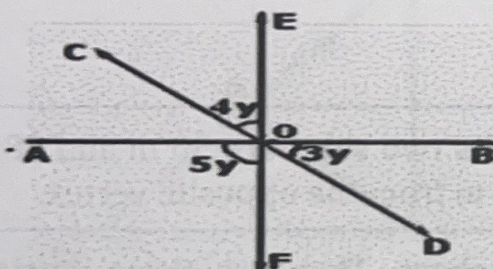
In the given figure, find the value of y. |
| 23 | Find the area of a triangle whose two sides are 18cm and 10cm and the perimeter is 42 cm.

OR

The area of an equilateral triangle is $25\sqrt{3}$ sq.cm. Find its perimeter. |
| 24 | If point C lies between line segment AB such that AC=CB, then prove that $AC = \frac{1}{2}AB$. Also draw a figure.
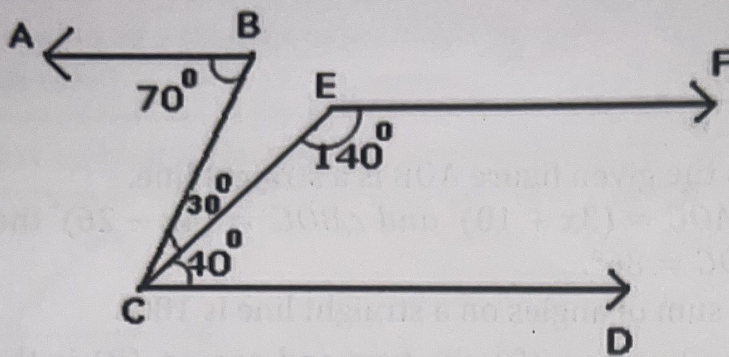
OR
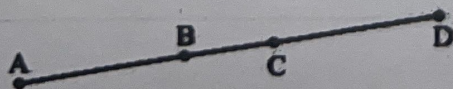
In the given figure if AB=CD, then check if AC=BD. Explain. |
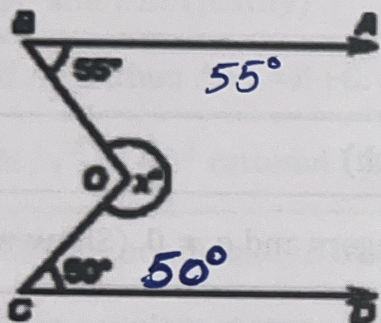| 25 | Plot $\sqrt{5}$ on the number line. |

	SECTION-C (6 questions of 3 marks each)
26

In the given figure, prove that AB ∥ EF.

OR

In the given figure if AB∥ CD, find $x°$. |
| 27 | The perimeter of a triangular field is 240 m. Its two sides are 50 m and 78 m. Find the length of the perpendicular on the side 50 m from the opposite vertex. |
| 28 | Plot A(3,6),B(3,2) and C(8,2) on a graph sheet. They are three vertices of a rectangle. Find the coordinates of vertex D which is the fourth vertex of rectangle. Also find the area of rectangle.
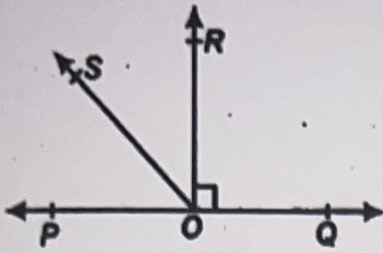
OR

Plot the point $P(3,-4)$ on a graph paper and from it draw PM and PN perpendiculars to $x - axis$ and $y - axis$ respectively. Write the coordinates of the points M and N. |
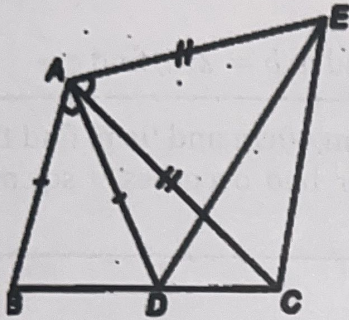| 29 | If x is positive real number and the exponents are rational numbers ,then simplify

$$\left(\frac{x^b}{x^c}\right)^{b+c-a} \times \left(\frac{x^c}{x^a}\right)^{c+a-b} \times \left(\frac{x^a}{x^b}\right)^{a+b-c}$$ |

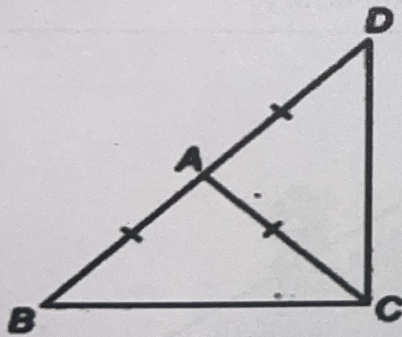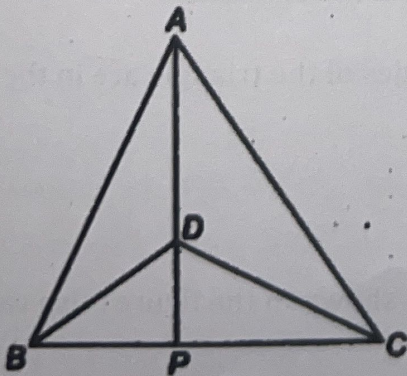| 30 | |
	In the given figure POQ is a line .Ray OR is perpendicular to line PQ. OS is another ray lying between OP and OR. Prove that $\angle ROS = \frac{1}{2}(\angle QOS - \angle POS)$
31	
	In the given figure AC=AE, AB=AD and $\angle BAD = \angle EAC$. Show that BC=DE.

SECTION D

| 32 | |
| | ABC is an isosceles triangle with AB = AC. Side BA is produced to point D such that AD=AB. Prove that $\angle BCD$ is a right angle. |

<div align="center">OR</div>

ABC and DBC are two isosceles triangles on the same base BC and vertices A and D are on the same side of BC. If AD is extended to intersect BC at P.

Prove $\triangle ABP \cong \triangle ACP$
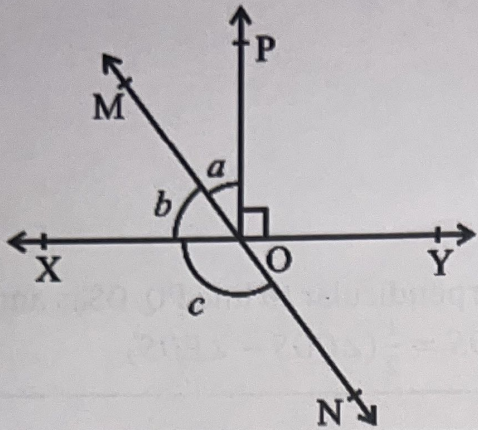
| 33 | |
	In the given figure XY and MN intersect at O. If $\angle POY = 90°$ and $a:b = 2:3$, find c.
34	The sides of a given triangular field in a board game are 41cm, 40cm and 9cm, find the total number of flower beds that can be prepared if each flower bed occupies 9 sq.cm space.
35	If $x = 7 + 4\sqrt{3}$ and $xy = 1$ find the value of $\frac{1}{x^2} + \frac{1}{y^2}$. Or If $x = \frac{\sqrt{2}+1}{\sqrt{2}-1}$ and $y = \frac{\sqrt{2}-1}{\sqrt{2}+1}$ then find the value of $x^2 + xy + y^2$.

SECTION-E (Case study based questions are compulsory)
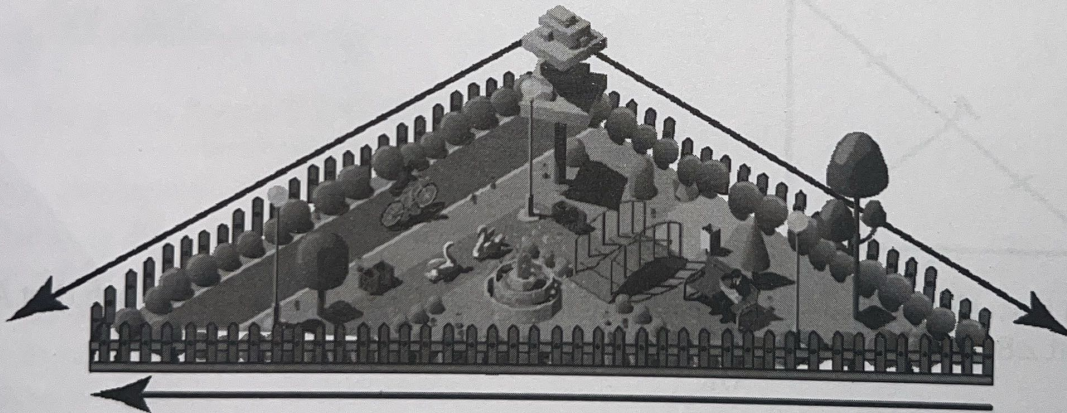
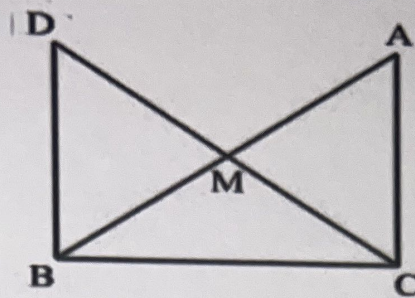| 36 | |
	The figure shows a garden in a nearby locality .The sides of the triangle are in the ratio of 3:5:7 and the perimeter is 300m. Find
	1) The length of the shortest side. (1)
	2) The length of the longest side. (1)
	3) Find the length of the wooden fence required as shown in the figure .Also calculate the cost of fencing if 1 m of fence cost Rs 20. (2)
	OR
	Find the area of the garden. (2)

37

A play was organized by some students of class 9. A crown was made for a girl who played the role of queen.

In right angled triangle ABC, right angled at C .M is the mid point of hypotenuse AB.C is joined to M and produced to point D such that DM=CM. Point D is joined to point B. Observe and answer the following questions.

1) Which congruence can be used to prove ΔAMC and ΔBMD congruent.   (1)

2) What will be the measure of ∠DBC   (1)

3) Find the area of triangle ABC if the length of side BC=8 cm and AC=6 cm.   (2)

OR

Find the length of CD if DB = 6 cm and BC=8 cm.   (2)

38
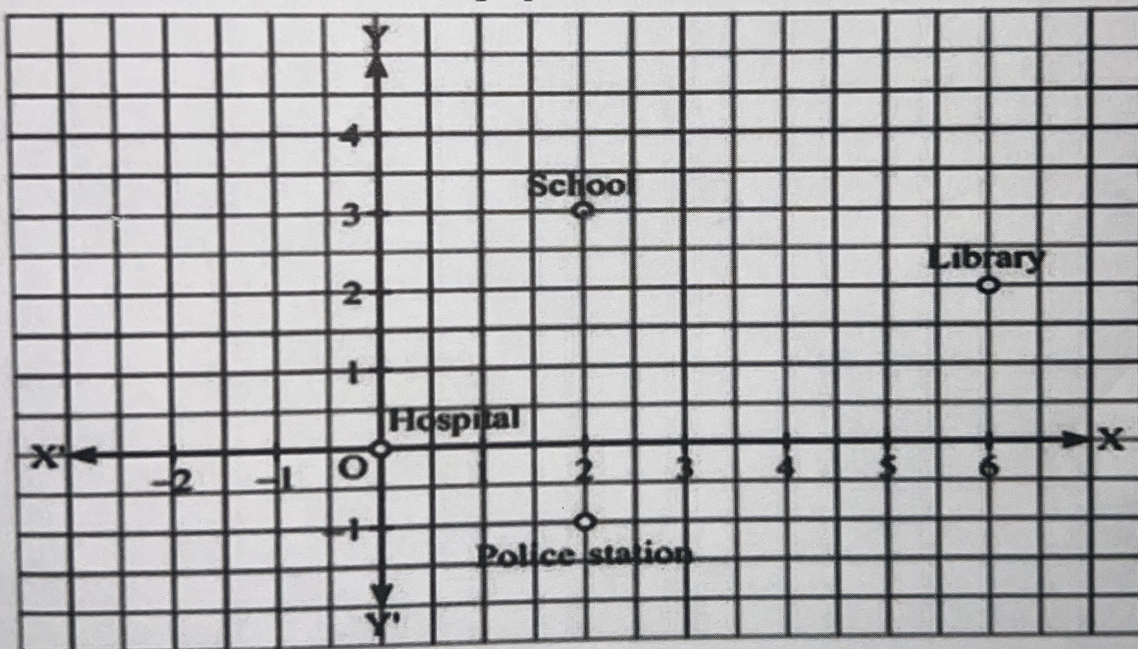
Above is the location of various places in a city on a graph sheet .Using the above information answer the following questions.

1) What are the coordinates of the school?   (1)

2) What are the coordinates of the library ?   (1)

3) Write the coordinates of a point which is a mirror image of the coordinates of the police station in Y axis.   (2)

OR

Write the coordinates of a point which is a mirror image of the coordinates of the library in the X axis.   (2)