



HALF-YEARLY - WORKSHEET 1

CLASS: IX

MATHEMATICS

HERON'S FORMULA

SECTION A

1. The perimeter of a triangular plot is 16m. If the measures of its two sides are 5m and 6m, then find the third side.
2. The area of an isosceles triangle is 12 cm^2 . The lengths of its equal sides are 5 cm each. Find its base.
3. The area of an equilateral triangle is $16\sqrt{3} \text{ cm}^2$. Find its perimeter (in m).
4. A square and an equilateral triangle have equal perimeters. If the diagonal of the square is $12\sqrt{2} \text{ cm}$ then find the area of the triangle.
5. Find the area of triangle ABC in which $AB = BC = 4 \text{ cm}$ and $\angle B = 90^\circ$.

SECTION B

1. A regular hexagon has a side 8 cm. Determine its perimeter and area.
2. The base of an isosceles triangle measures 24cm and its area is 60cm^2 . Find its perimeter
3. The unequal side of an isosceles triangle is 6 cm and its perimeter is 24 cm. Find its area.
4. Find the area of a right angled triangle ABC, right angled at B in which $AB = 24 \text{ m}$ and $BC = 10 \text{ m}$.
5. Find the area of a triangle whose sides are 40 cm, 24 cm, and 32 cm.

SECTION C

1. The adjacent sides of a parallelogram ABCD measure 34 cm and 20 cm and the diagonal AC measures 42 cm. Find the area of the parallelogram.
2. Find the area of a rhombus whose perimeter is 200 m and one of the diagonals is 80 m.

3. Sides of a triangle are in the ratio 13 : 14 : 15 and its perimeter is 84 cm. Find its area.
4. The sides of a triangular ground are 5 m, 7 m, 8 m respectively. Find the cost of levelling the ground at the rate of ₹ 10 per m².(Use $\sqrt{3} = 1.73$)
5. The sides of a triangular park are in the ratio 3 : 5 : 7 and its perimeter 600 m. Find the area of the triangle.

SECTION D

1. The perimeter of a triangular field is 300 cm and its sides are in the ratio 5 : 12 : 13. Find the length of the perpendicular from the opposite vertex to the side whose length is 130 cm.
2. The sides of a triangular park are 8 m, 10 m, 6 m respectively. A small circular area of diameter 2m is to be left out and the remaining area is to be used for growing roses. How much area is used for growing roses?
3. The lengths of the sides of a triangle are 10 cm, 24 cm and 26 cm respectively. Find the length of the perpendicular drawn from its opposite vertex to the side whose length is 24 cm.
4. The perimeter of a rhombus is 146 cm. One of its diagonals is 55 cm. Find the length of the other diagonal and area of rhombus.
5. Find the area of the quadrilateral ABCD whose sides are AB = 9 cm, BC = 40 cm, CD = 28 cm, AD = 15 cm and diagonal AC = 41 cm and angle B = 90°.



APEX PON VIDYASHRAM, VELACHERY (2017 - 18)

HALF-YEARLY - WORKSHEET 2

CLASS: IX

MATHEMATICS

PROBABILITY

SECTION A

1. A and B are the two outcomes of an event. Probability $P(A) = 0.72$, then what will be the probability $P(B)$ and why?
2. Out of the past 250 consecutive days, its weather forecasts were correct 175 times. What is the probability that on a given day it was not correct?
3. A coin is tossed 100 times with the following frequencies. Head 75, Tail 25. Find the probability of getting a head.
4. Two coins are tossed simultaneously 1000 times, we get the following outcomes.

Heads	1	2	0
Frequency	600	200	200

Find the i) Probability of getting two heads

ii) Probability of getting one head

5. There are 60 boys and 40 girls in a class. A student is selected at random. Find the probability that the student is a girl.

SECTION B

1. 1500 families with 2 children were selected randomly and the following data was recorded.

No of girls	0	1	2
No of families	211	814	475

If a family is chosen at random, find the probability that it has i) atmost one girl ii) atleast one girl

2. A die is rolled 25 times and the outcomes are recorded and listed below. Find the probability of getting

Out comes	1	2	3	4	5	6
Frequency	9	4	5	6	1	0

i) an even number (ii) a multiple of 3 (iii) a prime number

3. A bag contains 5 red balls, 8 white balls, 4 green balls and 7 black balls. If one ball is drawn at random, find the probability that it is (i) black (ii) not green.
4. On a particular day, the number of vehicles passing through a crossing is given below:

Vehicles	2 wheeler	3 wheeler	4 wheeler
Frequency	57	33	30

A particular vehicle is chosen at random. What is the probability that it is not a four wheeler?

5. The king, queen and jack of clubs are removed from a deck of 52 cards and then well shuffled. One card is selected at random from its remaining cards. Find the probability of getting
a) a heart (ii) a king (iii) the 10 of hearts

SECTION C

1. The ages of workers in a factory are given in the following table.

Age	21-23	23-25	25-27	27-29	29-31	31-33	33-35
No of workers	3	4	5	6	5	4	3

Find the probability that the age of workers selected at random is atleast 25 years.

2. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.
- What is the probability that on a given day it was correct?
 - What is the probability that it was not correct on a given day?
3. The percentage of marks obtained by a student in the monthly unit test are given below

Unit Test	I	II	III	IV	V
% of marks	69	71	73	68	74

Based on this data, find the probability that the student gets more than 70% marks in a unit test.

4. Fifty seeds were selected at random from each of 5 bags of seeds, and were kept under standardised conditions favourable to germination. After 20 days the number of seeds which had germinated in each collection were counted and recorded as follows:

Bag	1	2	3	4	5
No of seeds germinated	40	48	42	39	41

What is the probability of germinating

- more than 40 seeds in a bag
 - 49 seeds in a bag
 - more than 35 seeds in a bag
5. Cards marked with numbers 2, 3, 4, 5, ... 61 are placed in a box and mixed thoroughly. One card is drawn at random. Find the probability that the card drawn is
- an even number
 - a square number?

SECTION D

1. A tyre manufacturing company kept a record of the distance covered before a tyre needed to be replaced. The table shows results of 1000 cases.

Distance(in km)	Less than 400	400-900	900-1400	More than 1400
Frequency	210	325	385	80

If you buy a tyre of this company, what is the probability that

- it will need to be replaced if it has covered 400km?
- it will last more than 900km?
- it will need to be replaced after it has covered somewhere between 400km and 1400km?
- it will not need to be replaced at all?

2. An insurance company selected 2000 drivers at random in a particular city to find a relationship between age and accidents. The data obtained are given in the following table:

Age of drivers (in years)	Accidents in 1 year				
	0	1	2	3	Over 3
18-29	440	160	110	61	35
30-50	505	125	60	22	18
Above 50	360	45	35	50	9

Find the probabilities of the following events for a driver chosen at random from the city

- being 18-29 years of age and having exactly 3 accidents in 1 year
 - being 30-50 years of age and having 1 or more accidents in a year
 - having no accidents in 1 year
3. Consider the following frequency distribution table, which gives the weights of 38 students of a class.

Weights (in kg)	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	71-75
Number of students	9	5	14	3	1	2	2	1	1

- Find the probability that the weight of a student in the class lies in the interval 46 - 50 kg
 - Give two events in this context, one having probability 0 and the other having probability 1.
4. The data regarding the number of children in a house of a colony which has 250 houses was collected and the houses with number of children are recorded below

No of Children	1 child	2 boys	2 girls	1 boy & 1 girl	No child
No of houses	48	72	63	55	10

One house is selected at random. What is the probability that the house has

- 2 boys
 - more than one child
 - no children at all?
5. In a mathematics test, 90 students obtained (out of 100) the marks given below

Marks	1 - 20	21 - 40	41 - 50	51 - 60	61 - 70	71 - 80	81 - 90
No of Students	8	12	15	20	13	17	05

Find the probability that a student obtained

- less than 41 marks
- more than 50 marks
- marks between 41 and 80



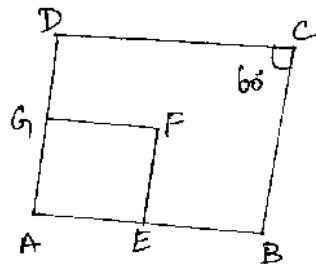
CLASS: IX

MATHEMATICS

QUADRILATERALS

SECTION A

1. ABCD is a parallelogram. If one pair of the opposite angles are given as $(x + 80)^\circ$ and $(3x - 10)^\circ$, then find the value of x .
2. Find the perimeter of $\triangle DEF$, if D, E, F are the midpoints of sides BC, CA and AB of a $\triangle ABC$, also if $AB = 3$ cm, $BC = 4$ cm, $CA = 4$ cm.
3. ABCD is a rhombus with $AC = 8$ cm and $DB = 6$ cm. Find the length of BC.
4. ABCD is a parallelogram. The bisectors of angles A and B intersect at O. Then find $\angle AOB$.
5. ABCD and AEFB are two parallelograms. If $\angle C = 60^\circ$, then find $\angle GFE$.

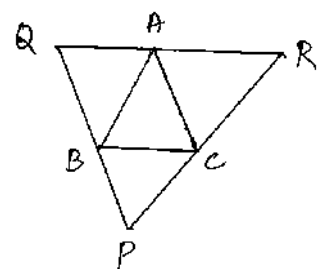


SECTION B

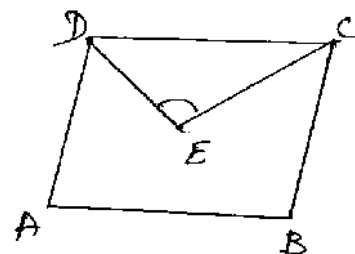
1. The angles of a quadrilateral are in the ratio 3 : 5 : 9 : 13. Find all the angles of the quadrilateral.
2. ABCD is a rectangle with $\angle BAC = 42^\circ$. Determine $\angle DBC$.
3. P and Q are the points of trisection of the diagonal AC of a parallelogram ABCD. Prove that $BQ \parallel DP$ and BD bisects PQ.
4. ABCD is a rhombus. Find $\angle CDB$ where $\angle A = 70^\circ$ and BD is a diagonal.
5. Show that the diagonals of a square are equal and perpendicular to each other.

SECTION C

1. If a diagonal of a parallelogram bisects one of the angles of the parallelogram, it also bisects the second angle and then prove that the two diagonals are perpendicular to each other.
2. Given $\triangle ABC$. Lines are drawn through A, B and C parallel respectively to the sides BC, CA and AB forming $\triangle PQR$. Show that $BC = \frac{1}{2} QR$.



3. In a quadrilateral ABCD, the line segments bisecting $\angle C$ and $\angle D$ meet at E. Prove that $\angle A + \angle B = 2\angle CED$.



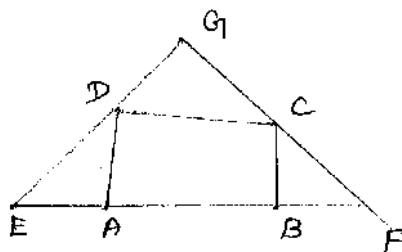
4. ABC is an isosceles triangle in which $AB = AC$. AD bisects $\angle PAC$ and $CD \parallel AB$. Show that

- i) $\angle DAC = \angle BCA$ (ii) ABCD is a parallelogram

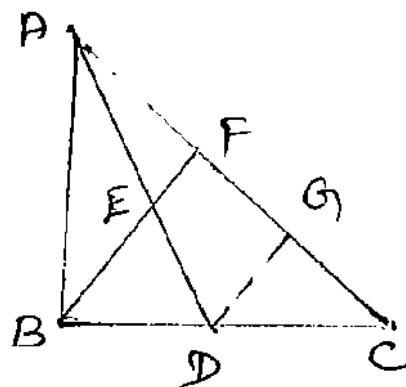
5. In triangle ABC, points M and N on sides AB and AC respectively are taken so that $AM = \frac{1}{4} AB$ and $AN = \frac{1}{4} AC$. Prove that $MN = \frac{1}{4} BC$.

SECTION D

1. ABCD is a rhombus and AB is produced to E and F such that $AE = AB = BF$. Prove that ED and FC are perpendicular to each other.

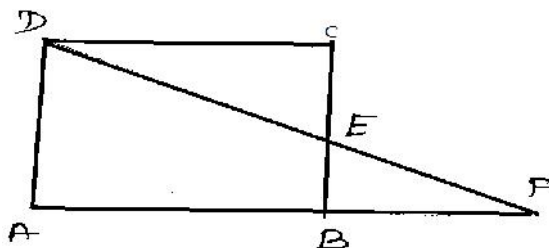


2. ABCD is a trapezium in which $AB \parallel CD$ and $AD = BC$. Show that
 i) $\angle A = \angle B$ (ii) $\angle C = \angle D$ (iii) $\triangle ABC$ congruent to $\triangle BAD$.

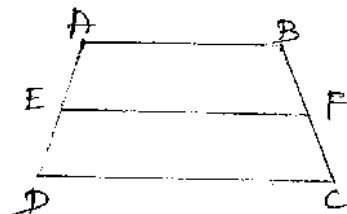


3. In $\triangle ABC$, AD is the median through A and E is the midpoint of AD. BE is produced to meet AC in F. Prove that $AF = \frac{1}{3} AC$.

4. In the figure ABCD is a parallelogram and E is the midpoint of side BC. DE and AB on producing meet a F. Prove that $AF = 2AB$



5. ABCD is a trapezium in which side AB is parallel to the side DC and E is the midpoint of side AD. If F is a point on the side BC such that the segment EF is parallel to the side DC. Prove that F is the midpoint of BC and $EF = \frac{1}{2} (AB + DC)$.





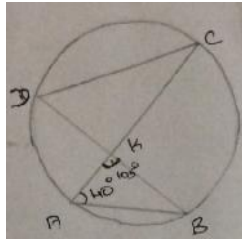
CLASS: IX

MATHEMATICS

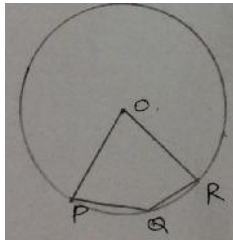
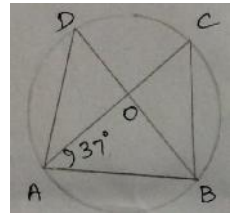
CIRCLES

SECTION A

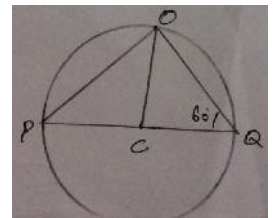
1. In the following figure; $\angle CAB = 40^\circ$, $\angle AKB = 105^\circ$. Find the measure of $\angle KCD$.



2. An equilateral triangle PQR is inscribed in a circle of radius 3 cm. Find the measure of arc PQR.
3. ABCD is a circle whose centre is O, the measure of $\angle CAB = 37^\circ$. Find the measure of $\angle BDA$.
4. O is the centre of the circle, $\angle POR = 60^\circ$, then find $\angle PQR$.

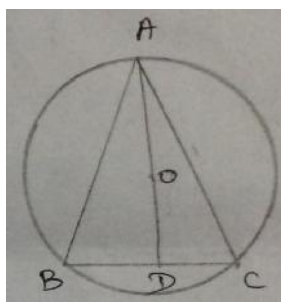
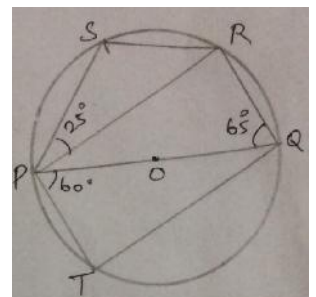


5. PCQ is the diameter of the circle and C is the centre. The point O lies on the circle. If $\angle OQP = 60^\circ$, then find $\angle OCP$.

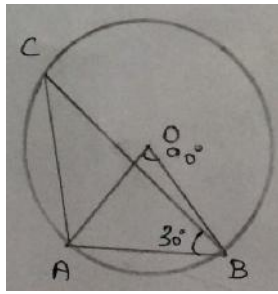


SECTION B

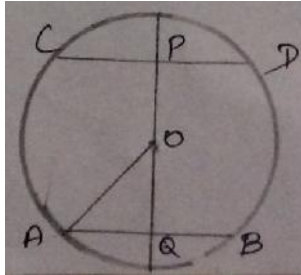
1. Prove that lines of centres of two intersecting circles subtend equal angles at the two points of intersection.
2. PQ is the diameter of the circle. If $\angle PQR = 65^\circ$, $\angle RPS = 25^\circ$ and $\angle QPT = 60^\circ$. Find the measure of $\angle QPR$ and $\angle PRS$.
3. Bisector AD of $\angle BAC$ of triangle ABC passes through the centre O of the circumcircle of triangle ABC. Prove that $AB = AC$.



4. In the figure, $\angle AOB = 90^\circ$ and $\angle ABC = 30^\circ$, then find $\angle CAB$.

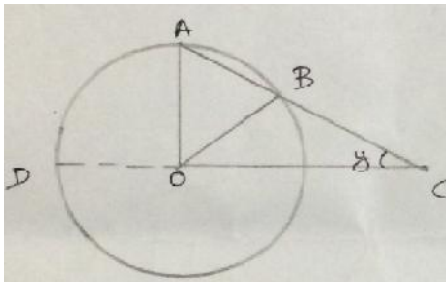
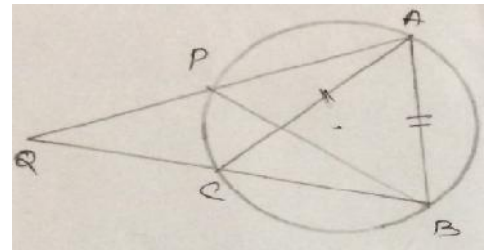


5. In the figure, O is the centre of the circle. Its radius is 5 cm, chord AB = 8 cm and chord CD = 6 cm, then find PQ.

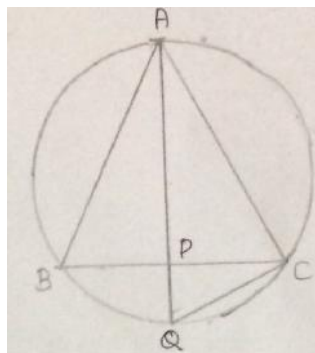
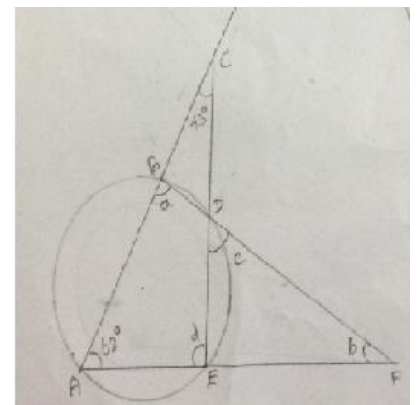


SECTION C

- The bisector of $\angle B$ of an isosceles triangle ABC with $AB = AC$ meets the circumcircle of triangle ABC at P as shown in figure. If AP is produced and meets BC produced at Q. Prove that $CQ = CA$.
- ABCD is a cyclic quadrilateral. If AC bisects both the angles A and C, then prove that $\angle ABC = 90^\circ$.
- Chord AB of circle with centre O, is produced to C such that $BC = OB$. CO is joined and produced to meet the circle in D. If $\angle ACD = y$ and $\angle AOD = x$, show that $x = 3y$.

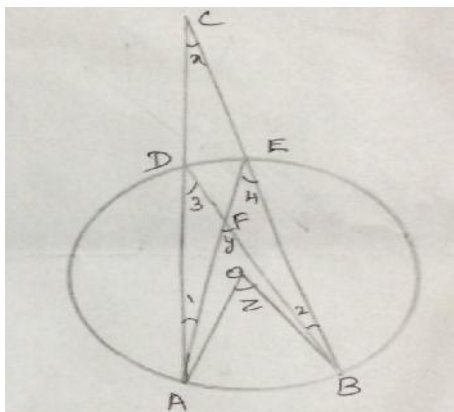


- In the figure, find the values of a, b, c, d . Given that $\angle BCD = 43^\circ$ and $\angle BAE = 62^\circ$
- ABC is triangle and P is point on the side BC such that $AB = AP$. If AP is produced to meet the circumcircle of triangle ABC at Q. Prove that $CP = CQ$.

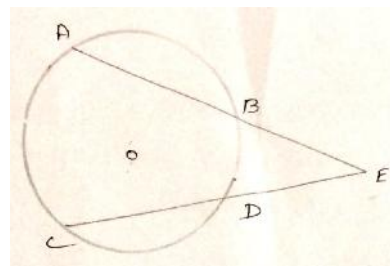


SECTION D

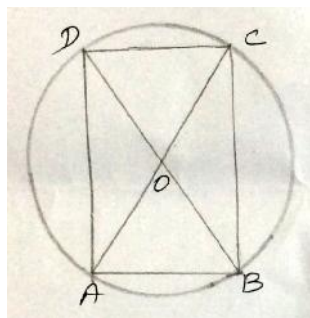
1. If O is the centre of the circle as shown, then prove $x + y = z$.



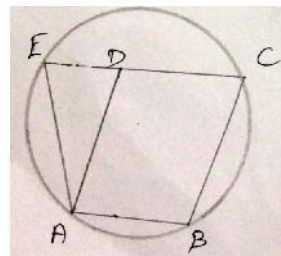
2. AB and CD are equal chords of a circle whose centre is O. When produced, these chords meet at E. Prove that $EB = ED$ and $AE = CE$.



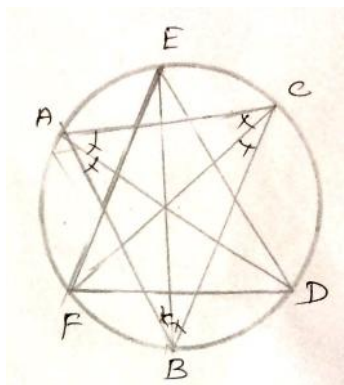
3. AC and BD are chords of a circle which bisect each other. Prove that
 (i) AC and BD are diameters (ii) ABCD is a rectangle.



4. ABCD is a parallelogram. The circle passes through A, B, C intersect CD at E. Prove that $AE = AD$.



5. Bisectors of angles A, B, C of a triangle ABC intersect its circumcircle at D, E and F respectively. Prove that the angles of the triangle DEF are $90^\circ - \frac{1}{2}A$, $90^\circ - \frac{1}{2}B$, $90^\circ - \frac{1}{2}C$.





HALF-YEARLY - WORKSHEET 5

CLASS: IX

MATHEMATICS

STATISTICS

SECTION A

1. Find the median of first 10 prime integers.
2. Find the mean of all possible factors of 10.
3. Find the mode of the data 14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.
4. If the mean of 5, 10, 15, p , 20, 35, 40, is 21. Then find the value of p .
5. The median of the data 6, 8, 11, 12, $2x - 8$, $2x + 10$, 35, 41, 42, 50. Find the value of x .

SECTION B

1. Find the value of $3x + 1$, if median of 2, 3, x , $x + 2$, 11, 17 is 9 (observation are arranged in ascending order).
2. Calculate the mode, median, mean and range of the below data.
0.03, 0.05, 1.04, 0.08, 0.05, 1.03, 0.03, 0.04, 0.07, 0.05, 0.02, 1.00, 0.08
3. The age of teachers is given in the below table.

Age	Less than 20	21 - 25	26 - 30	31 - 35	36 - 40	41 - 45
No of Teachers	11	32	51	49	27	6

- (i) Determine the class limit of the fourth class.
 - (ii) What is class size and class marks?
 - (iii) Construct a cumulative frequency table
4. If the mean of x , $x + 2$, $x + 4$, $x + 6$, $x + 8$ is 24. Find the value of x .
 5. Find the mean for the below data.

x	10	12	20	25	35
f	3	10	15	7	5

SECTION C

1. The distance covered by 30 cars in 2 hours are given below.

125, 107, 120, 90, 84, 100, 56, 140, 93, 149

73, 68, 88, 135, 115, 120, 90, 120, 136, 144

104, 135, 60, 79, 83, 100, 76, 91, 89, 120

Form a frequency distribution table, one of the intervals being 100 - 120 with tally marks.

2. The mean of 5 observations was calculated as 145 but it was later on directed that one observation was misread as 45 in place of 25. Find the correct mean of the observation.

3. Draw a frequency polygon for the data without drawing histogram

Class	150 - 160	160 - 170	170 - 180	180 - 190	190 - 200	200 - 210
Frequency	5	15	20	25	15	5

4. Determine the median of the observations 24, 23, a , $a - 1$, 12, 16 where a is the mean of 10, 20, 30, 40, 50.

5. The distribution of weights of 100 people is given below.

Weight	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75
Frequency	13	25	28	15	12	5	2

Construct a histogram for the above distribution.

SECTION D

1. The runs scored by two teams A and B on the first 74 balls in a cricket match are

No. of balls	0 - 12	12 - 24	24 - 36	36 - 48	48 - 60	60 - 72
Score of Team A	10	12	4	20	10	12
Score of Team B	4	2	16	18	8	10

Construct a frequency polygon for both the teams on the same graph.

2. Marks secured by a group of 10 students are given below.

16, 18, 29, 31, 20, 23, 36, 25, 32, 20

(i) Find the mean of the above data.

(ii) If 32 is replaced by 23 in the data, find the new mean.

(iii) If two students group, securing 16 and 32 left the group, then find the mean of the remaining 8 students.

3. Find the value of p , if the mean of the distribution is 7.5.

x	3	5	7	9	11	13
y	6	8	15	p	8	4

If the given data is arranged in ascending order and the median of the data is 65, find the value of x .

32, 35, 50, 51, x , $x + 2$, 73, 76, 83, 90

4. Draw a histogram for the below data.

Age	0 - 6	6 - 12	12 - 18	18 - 24	24 - 30	30 - 36
No. of persons	8	12	15	18	12	4



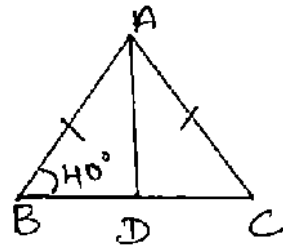
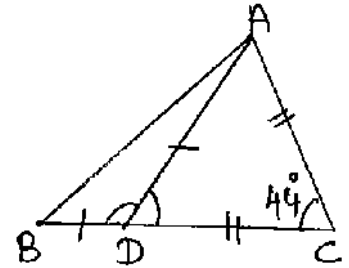
CLASS: IX

MATHEMATICS

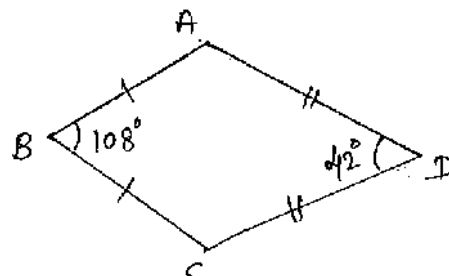
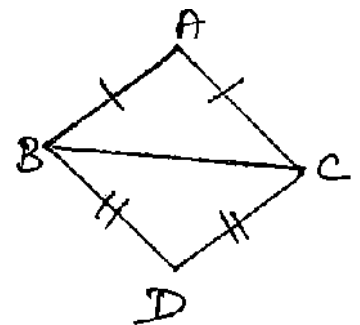
TRIANGLES

SECTION A

1. In the following figure, in $\triangle ABC$, $AD = BD$, and $AC = DC$ and $\angle C = 44^\circ$, then find the measure of $\angle A$.
2. In $\triangle ABC$, if $\angle A = 35^\circ$ and $\angle B = 65^\circ$, then name the longest side of the triangle.
3. In the figure, AD is the median, then find $\angle BAD$.

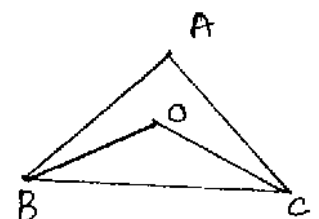


4. Name the criterion of the following figure, if $AB = AC$ and $BD = DC$, $\triangle ABD$ and $\triangle ACD$ are congruent.
5. ABCD is a quadrilateral in which $AB = BC$ and $AD = DC$, find the measure of $\angle BCD$.

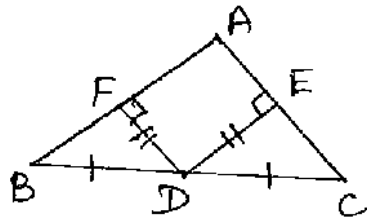


SECTION B

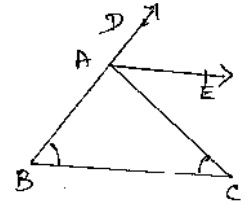
1. Prove that the perimeter of a triangle is greater than the sum of its medians.
2. In figure, $AB > AC$, BO and CO are bisectors of $\angle B$ and $\angle C$ respectively. Show that $OB > OC$.



- If AD is a bisector of $\angle A$ of $\triangle ABC$, show that $AB > DB$.
- In $\triangle ABC$, D is the midpoint of BC . The perpendiculars from D to AB and AC are equal. Prove that $\triangle ABC$ is isosceles.

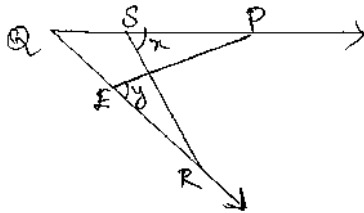
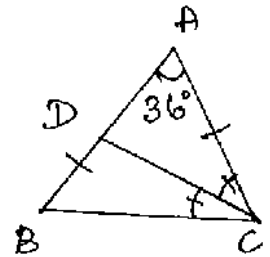


- In the given figure, AE bisects $\angle DAC$ and $\angle B = \angle C$. Prove that $AE \parallel BC$.

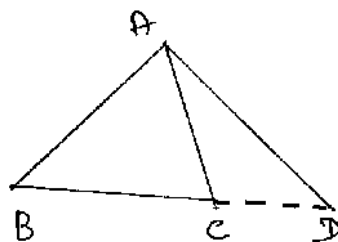


SECTION C

- If the bisector of the vertical angle of a triangle bisects the base of the triangle, then prove that the triangle is isosceles.
- In figure $\triangle ABC$, $AB = AC$, $\angle A = 36^\circ$. If the internal bisector of $\angle C$ meets AB at D , prove that $AD = DC$.
- $\angle x = \angle y$ and $PQ = PR$. Prove that $PE = RS$

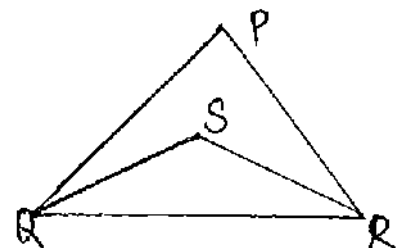


- The perpendicular AD , BE , CF drawn from the vertices A , B and C respectively of $\triangle ABC$ are equal. Prove that the triangle is an equilateral triangle.
- In the figure, D is any point on the base BC produced of an isosceles triangle $\triangle ABC$. Prove that $AD > AB$.

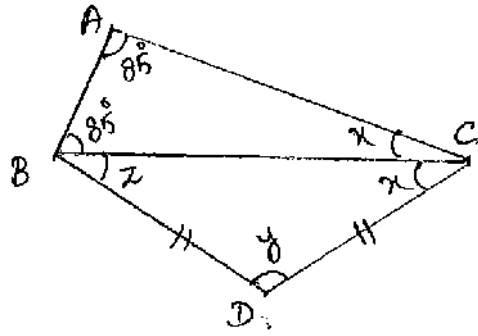


SECTION D

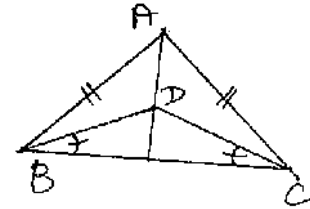
- Prove that the difference of any two sides of a triangle is less than the third side.
- In the figure, S is any point in its interior of $\triangle PQR$. Show that $SQ + SR < PQ + PR$.



3. In the figure, $\angle BAC = 85^\circ$, $\angle A = \angle B$ and $BD = CD$. Find the measure of $\angle x$, $\angle y$ and $\angle z$. Give reason to support your answer.



4. In $\triangle ABC$, $AB = AC$, D is the point in the interior of $\triangle ABC$ such that $\angle DBC = \angle DCB$. Prove that AD bisects $\angle BAC$ of $\triangle ABC$.



5. $ABCD$ is a parallelogram. If the two diagonals are equal, find the measure of $\angle ABC$.
