Assignment
Mid-Point and Intercept Theorems, Polygons, Quadrilaterals and Areas of Rectilinear figures

1. (a) In the given figure, D, E, F are the mid-points of the sides BC, CA and AB respectively. Find AC if DF = 3.8 cm.

  \[ \text{(b) The interior angle of a regular polygon is 156°. Find the number of sides of the polygon.} \]

  \[ \text{(c) Show that the sum of four angles of a quadrilateral is 360°.} \]

2. (a) In a parallelogram ABCD, AB = 10 cm. The altitudes corresponding to the sides AB and AD are respectively 7 cm and 8 cm, find AD.

  \[ \text{(b) Show that a median of a triangle divides it into two triangles of equal area.} \]

  \[ \text{(c) ABCD is a rectangle with } \angle \text{BAC} = 32° \text{ determine } \angle \text{DBC.} \]
3. (a) ABCDE is a regular pentagon (as shown in the figure) the bisector of $\angle A$ of the pentagon meets the side CD in M. Show that $\angle AMC = 90^\circ$.

(b) ABCD is a quadrilateral and BD is one of its diagonals (as shown in the figure). Show that ABCD is a parallelogram and find its area.

(c) In the adjoining figure, ABCD is a trapezium in which AB $\parallel$ DC. Prove that $\text{ar (} \triangle AOD) = \text{ar (} \triangle BOC)$. 

Assignment 2
4. (a) Prove that the figure formed by joining the mid-points of the pairs of consecutive sides of a quadrilateral is a parallelogram.

(b) ABCD is a trapezium in which AB || DC. M and N are the mid-points of AD and BC respectively. If AB = 12 cm and MN = 14 cm, find CD.

(c) The exterior angle of a regular polygon is one-third of its interior angle.

How many sides has the polygon?

5. (a) The side BA and DC of a quadrilateral ABCD are produced (as shown in the figure). Prove that \( a + b = x + y \)

(b) AD is one of the medians of \( \triangle ABC \) (as shown in the figure) \( X \) is any point on AD. Show that \( \text{ar} (\triangle ABX) = \text{ar} (\triangle ACX) \)
(c) Compute the area of trapezium PQRS (as shown in the figure) given below.

![Diagram of trapezium PQRS]

6. (a) The measure of angles of a hexagon are $x^\circ$, $(x - 5)^\circ$, $(x - 5)^\circ$ $(2x - 5)^\circ$, $(2x - 5)^\circ$ $(2x + 20)^\circ$. Find the value of $x$.

(b) ABCD is a parallelogram AB is produced to E so that BE = AB. Prove that ED bisects BC.

(c) ABCD is a rhombus with $\angle ABC = 56^\circ$. Determine $\angle ACD$.

7. (a) In the adjoining figure, AB || CD || EF || GH and AX = XY = YH. If AC = 1.5 cm, find AG.

![Diagram of parallelogram ABCD]

(b) The sum of the interior angles of a polygon is three times the sum of its exterior angles. Determine the number of sides of the polygon.
(c) In the figure given below, ABCD is a parallelogram and X and Y are points on the diagonal BD such that DX = BY. Prove that AXCY is a parallelogram.

8. (a) State and prove mid-point theorem.
   (b) The difference between an exterior angle of a regular polygon of \( n \) sides and an exterior angle of a regular polygon of \( (n + 1) \) sides is 5°. Find the value of \( n \).
   (c) Construct a quadrilateral ABCD in which AB = 5 cm, BC = 4.5 cm CD = 3.7 cm, AD = 4.6 cm and diagonal AC = 6 cm.

9. (a) In the figure given below, AD and BE are medians of \( \triangle ABC \) and BE \( \parallel \) DF. Prove that CF = \( \frac{1}{4} \) AC.
   (b) Prove that the interior angle of a regular pentagon is three times the exterior angle of a regular decagon.
(c) Draw a parallelogram ABCD in which diagonal AC = 5 cm, diagonal 
BD = 6 cm and the angle between them is 60°.

10. (a) E, F are respectively the mid-points of non-parallel sides AD, BC of a 
trapezium ABCD. Prove that EF = $\frac{1}{2} \times (AB + CD)$.

(b) Triangles ABC and DBC are on the same base BC with A, D on 
opposite sides of line BC, such that $\text{ar } \triangle ABC = \text{ar } \triangle DBC$. Show 
that BC bisects AD.

11. (a) In $\triangle ABC$, D is the mid-point of AB. P is any point of BC, CQ $\parallel$ PD 
meets AB in Q. Show that $\text{ar } \triangle BPQ = \frac{1}{2} \times \text{ar } \triangle ABC$.

(b) In a parallelogram prove that the bisectors of any two consecutive 
angles intersect at right angle.

(c) Construct a square one of whose diagonals measures 6 cm.
Answers

1. (a) 7.6 cm  (b) 15
2. (a) 8.75 cm  (c) 58°
3. (b) 12 cm²
4. (b) 16 cm  (c) $n = 8$
5. (c) 180 cm²
6. (a) 80°  (c) 62°
7. (a) 4.5 cm  (b) $n = 8$
8. (b) $n = 8$