Chapter 9

Areas of Parallelograms and Triangles

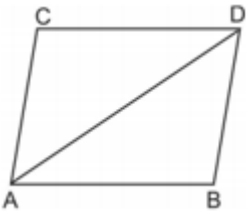
1. Figures on the same Base and Between the same Parallels

2. Parallelograms on the same Base and between the same Parallels

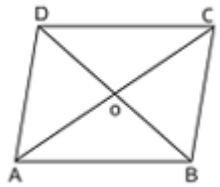
3. Triangles on the same Base and between the same Parallels

- Area of a figure is a number (in square unit) associated with the part of the plane enclosed by that figure.
- Two congruent figures have equal areas but the converse is not true.
- Area of a parallelogram = $(base\ X\ height)$
- Area of a triangle = $\frac{1}{2} \times base \times height$
- Area of a trapezium = $\frac{1}{2} \times (\text{sum of parallel sides}) \times \text{distance between them}$
- Area of rhombus = $\frac{1}{2} \times \text{product of diagonals}$
- Parallelogram on the same base and between the same parallels are equal in area.
- A parallelogram and a rectangle on the same base and between the same parallels are equal in area.
- Triangles on the same base and between the same parallels are equal in area.
- If a triangle and parallelogram are on the same base and between the same parallels, then.

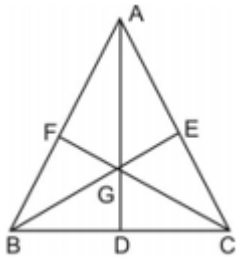
  $(Area\ of\ triangle) = \frac{1}{2}(\text{area of the parallelogram}$
- A diagonal of parallelogram divides it into two triangles of equal areas.
  In parallelogram ABCD, we have Area of $\Delta ABD = \text{area of } \Delta ACD$



- The diagonals of a parallelogram divide it into four triangles of equal areas therefore
  $ar(\Delta AOB)=ar(\Delta COD)=ar(\Delta AOD)=ar(\Delta BOC)$



- If a parallelogram and a triangle are on the same base and between the same parallel, then area of the triangle is equal to one half area of the parallelogram.
- A median AD of a ΔABC divides it into two triangles of equal areas. Therefore $ar(\Delta ABD)=ar(\Delta CD)$
- If the medians of a intersect at G, then $ar(\Delta AGB)=ar(\Delta AGC)=ar(\Delta BGC)=\frac{1}{3}ar(\Delta ABC)$



- Triangles with equal bases and equal areas have equal corresponding altitude.