PARALLELOGRAM AND TRIANGLES

Student Learning Outcomes (SLOs)

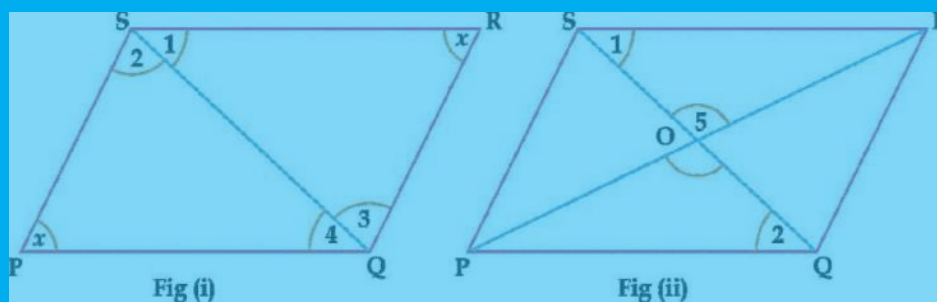### After completing this unit, students will be able to:

◆ Understand the following theorems along with their corollaries and apply them to solve allied problems.

    a) In a parallelogram:

- ◆ The opposite sides are congruent,
- ◆ The opposites angles are congruent,
- ◆ The diagonals bisect each other.

    b) If two opposite sides of a quadrilateral are congruent and parallel, it is a parallelogram.

    c) The line segments joining the midpoints of two sides of a triangle, is parallel to the third side and it is equal to one half of its length.

    d) The medians of a triangle are concurrent and their point of concurrency is the point of trisection of each median.

    e) If three or more parallel lines make congruent intercepts on the transversal, they also intercept congruent segments on any other line that cuts them.

Introduction

In the previous classes students learned and construct many kinds of polygons like triangles, parallelogram, square, rectangle, rhombus, trapezium etc. Also observe the congruency related to their sides and angles. In this unit, we will discuss and understand the theorems related to parallelograms and Triangles.

Parallelograms and Triangles

Theorem 10.1.1

Fig (i)   Fig (ii)

Given:

$\parallel^{m}$ PQRS

To Prove:

1. $\overline{PQ} \cong \overline{RS};$ $\overline{PS} \cong \overline{QR}$
2. $\angle P \cong \angle R;$ $\angle S \cong \angle Q$
3. Diagonals $\overline{PR}$ and $\overline{SQ}$ bisect each other at point O. [fig (ii)]

Construction:

In figure (i) join points S and Q.