## Mid-Point and Intercept Theorems

1. The line segment joining the midpoints of any two sides of a triangle is parallel to the third side and equal to half of it. (Midpoint Theorem)

In the figure below, D and E are midpoints of sides AB and AC of $\triangle A B C$,


Then, by Midpoint Theorem, (i) $D E \| B C$ (ii) $D E=\frac{1}{2} B C$
2. The straight line drawn through the middle point of one side of a triangle parallel to another side bisects the third side. (Converse of Midpoint Theorem)

In the figure given below, in the $\triangle A B C, \mathrm{D}$ is the midpoint of side AB and Line DE through D is parallel to side $B C$ and cuts side $A C$ at $E$,


Then, by converse of midpoint theorem, we have $A E=E C$.
3. If there are three parallel lines, and the intercepts made by them on one transversal are equal, then the intercepts on any other transversal are also equal. (Equal Intercept Theorem).

In the figure given below, three parallel lines $I, m$ and $n$ cut off equal intercepts $A B$ and $B C$ from a transversal $p$ such that $A B=B C$. Another transversal $q$ cuts the parallel lines at $D, E$ and $F$,


Then by equal intercept theorem, $D E=E F$.
4. If three or more parallel straight lines make equal intercepts on a given transversal, they make equal intercepts on any other transversal.

