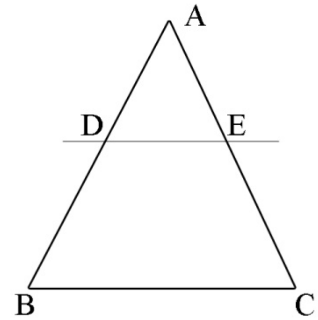
DAY 2

In last section, we have discussed Thales theorem. In this section, we shall discuss applicability of this theorem.

1. If a line intersects sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, prove that $\frac{AD}{AB} = \frac{AE}{AC}$ **[Example 1]**

Sol:- In ΔABC, if $DE \parallel BC$

$\therefore$ By Thales Theorem $\frac{AD}{DB} = \frac{AE}{EC}$……………i)



To Prove: $\frac{AD}{AB} = \frac{AE}{AC}$

LHS: $\frac{AD}{AB} = \frac{AD}{AD+DB}$

$= \frac{\frac{AD}{DB}}{\frac{AD}{DB}+1}$ [Divide numerator and denominator DB]

$= \frac{\frac{AE}{EC}}{\frac{AE}{EC}+1} = \frac{\frac{AE}{EC}}{\frac{AE+EC}{EC}}$ [Using i)]

$= \frac{AE}{AE+EC} = \frac{AE}{AC}$

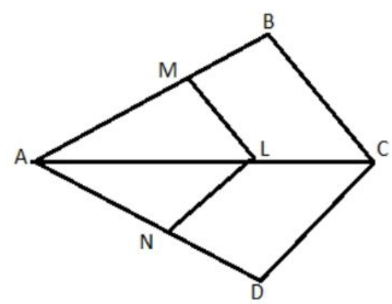
Hence the result.

2. **In given figure, if $LM \parallel CB$ and $LN \parallel CD$, prove that $\frac{AM}{AB} = \frac{AN}{AD}$** **[Ex 6.2, Q3]**

Sol :- Given $LM \parallel CB$ and $LN \parallel CD$

In ΔABC, $LM \parallel CB$

By Thales Theorem $\frac{AM}{AB} = \frac{AL}{AC}$ ………. i)



In ΔADC, $LN \parallel CD$

By Thales Theorem $\frac{AL}{AC} = \frac{AN}{AD}$ ………. ii)

From i) & ii), we get $\frac{AM}{AB} = \frac{AN}{AD}$

Hence the result

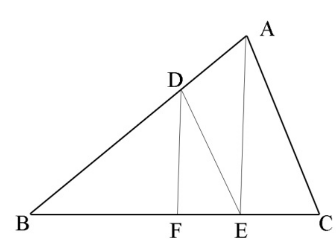
3. In given fig, $DE \parallel AC$ and $DF \parallel AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$ **[Ex 6.2, Q4]**

Sol :- Given $DE \parallel AC$ and $DF \parallel AE$

In ΔABC, $DE \parallel AC$

By Thales Theorem $\frac{BD}{DA} = \frac{BE}{EC}$ ………. i)

In ΔBAE, $DF \parallel AE$



By Thales Theorem $\frac{BD}{DA} = \frac{BF}{FE}$ ………. ii)

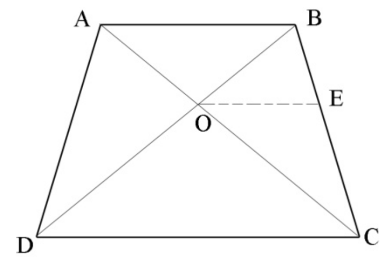
From i) & ii), we get $\frac{BE}{EC} = \frac{BF}{FE}$ Hence the result

4. ABCD is a trapezium in which AB || DC and its diagonals intersect each other at the point O. Show that $\frac{AO}{BO} = \frac{CO}{OD}$ **[Ex 6.2, Q9]**

Sol :- Given AB || DC

Const. Draw OE || AB || DC

Proof: In ΔABC, AB || OE



By Thales Theorem $\frac{AO}{OC} = \frac{BE}{EC}$ ………. i)

In ΔBCD, OE || CD

By Thales Theorem $\frac{BO}{OD} = \frac{BE}{EC}$ ………. ii)

From i) & ii), we get $\frac{AO}{OC} = \frac{BO}{OD}$ or $\frac{AO}{BO} = \frac{CO}{OD}$

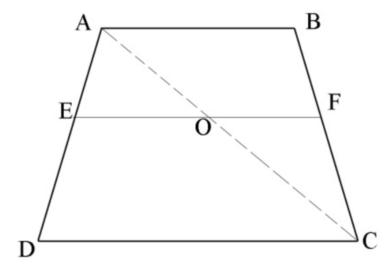
Hence the result

5. ABCD is a trapezium in which AB || DC. E and F are points on non parallel sides AD and BC respectively such that EF || AB. Show that $\frac{AE}{ED} = \frac{BF}{FC}$ **[Example 2]**

Sol :- Given AB || EF || CD

Const. Join diagonal AC Which intersects EF at O.

Proof: In ΔACD, EO || CD {as EF || CD}



By Thales Theorem $\frac{AE}{ED} = \frac{AO}{OC}$ ………. i)

In ΔABC, OF || AB {as AB || EF}

By Thales Theorem $\frac{AO}{OC} = \frac{BF}{FC}$ ………. ii)

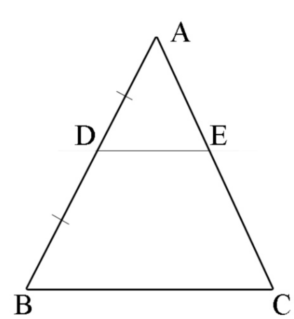
From i) & ii), we get $\frac{AE}{ED} = \frac{BF}{FC}$ Hence the result

6. **Prove that a line drawn through the mid point of one side of a triangle parallel to another side bisects the third side.** **[Ex 6.2, Q7]**

Sol :- Given In ΔABC, DE || BC and D is mid point of AC $i.e.$ AD = DB … … i)

To Prove: DE bisects AC $i.e.$ AE = EC

Proof: In ΔABC, DE || BC



By Thales Theorem $\frac{AD}{DB} = \frac{AE}{EC}$

$\Rightarrow \frac{DB}{DB} = \frac{AE}{EC}$ [by i)]

$\Rightarrow 1 = \frac{AE}{EC} \Rightarrow AE = EC$

Hence the result