Exercise 4A

Question 3:
Given: A ΔABC, in which D and E are points on the sides AB and AC respectively.
To prove: DE || BC
Proof:
(i) AD = 5.7 cm, DB = 9.5 cm, AE = 4.8 cm and EC = 8 cm
Since D and E are the points on AB and AC respectively.

$$\therefore \frac{AD}{DB} = \frac{AE}{EC}$$

$$\Rightarrow \frac{5.7}{9.5} = \frac{4.8}{8}$$

$$\Rightarrow 0.6 = 0.6$$

$$\text{Therefore, } \frac{AD}{DB} = \frac{AE}{EC} \text{(each equal to 0.6)}$$

Hence, by the converse of Thales theorem DE || BC

(ii) AB = 11.7 cm, AC = 11.2 cm, BD = 6.5 cm, AE = 4.2 cm
Since D and E are points on AB and AC respectively.

$$\frac{AD}{DB} = \frac{AE}{EC} \Rightarrow \frac{AB - DB}{DB} = \frac{AE}{AC - AE}$$

$$\Rightarrow \frac{11.7 - 6.5}{6.5} = \frac{4.2}{11.2 - 4.2} \Rightarrow \frac{5.2}{6.5} \neq \frac{4.2}{7}$$

$$\text{Hence, } \frac{AD}{DB} \neq \frac{AE}{EC}$$

Hence, by the converse of Thales theorem DE is not parallel to BC.

(iii) AB = 10.8 cm, AD = 6.3 cm, AC = 9.6 cm, EC = 4 cm
Since D and E are the points on AB and AC respectively.

$$\therefore \frac{AD}{DB} = \frac{AE}{EC} \text{[by thales theorem]}$$

$$\Rightarrow \frac{AD}{AB - AD} = \frac{AC - EC}{EC} \Rightarrow \frac{6.3}{(10.8 - 6.3)} = \frac{(9.6 - 4.0)}{4}$$

$$\Rightarrow \frac{6.3}{4.5} = \frac{5.6}{4}$$

$$\Rightarrow 1.4 = 1.4$$

$$\text{Therefore, } \frac{AD}{DB} = \frac{AE}{EC} \text{(each is equal to 1.4)}$$

Hence by the converse of Thales theorem DE || BC

(iv) AD = 7.2 cm, AE = 6.4 cm, AB = 12 cm, AC = 10 cm
Since D and E are points on the side AB and AC respectively.

$$\frac{AD}{DB} = \frac{AE}{EC} \text{ (by thales theorem)}$$

$$\frac{7.2}{AB - AD} = \frac{6.4}{AC - AE}$$

$$\Rightarrow \frac{7.2}{12 - 7.2} = \frac{6.4}{10 - 6.4} \Rightarrow \frac{7.2}{4.8} = \frac{3.4}{3.6}$$

$$\text{but} \quad \frac{3}{2} \neq \frac{16}{9}$$

Hence, by the converse of Thales theorem DB is not parallel to BC

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