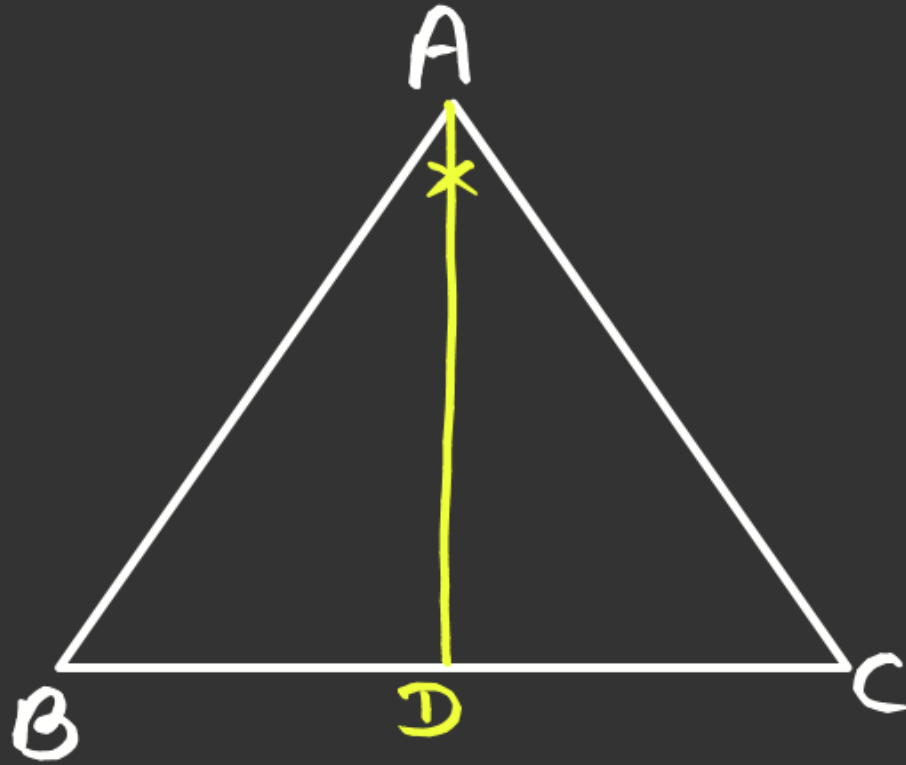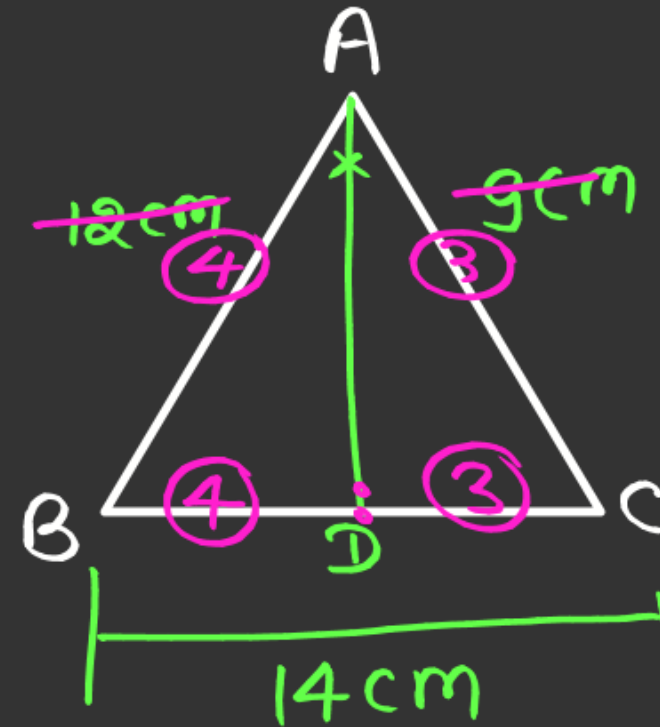# Angle Bisector theorem

$$\frac{AB}{AC} = \frac{BD}{DC}$$

$$BD \rightarrow \frac{4}{7} \times \overset{2}{14} = 8cm$$

BD =

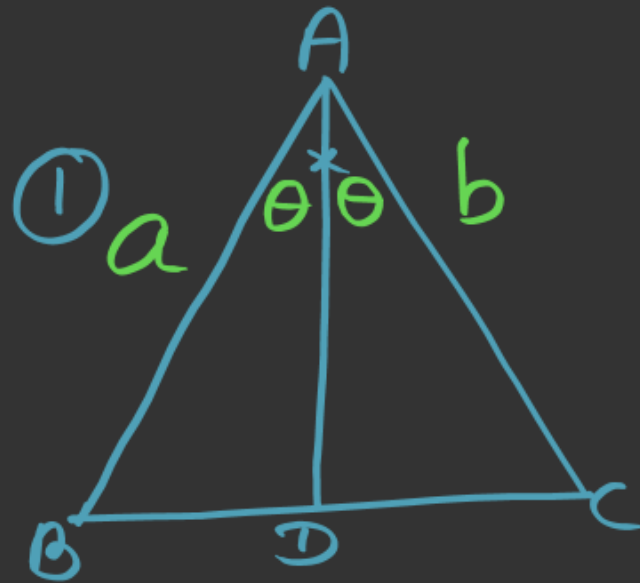# बाह्य कोणका समद्विभाजक
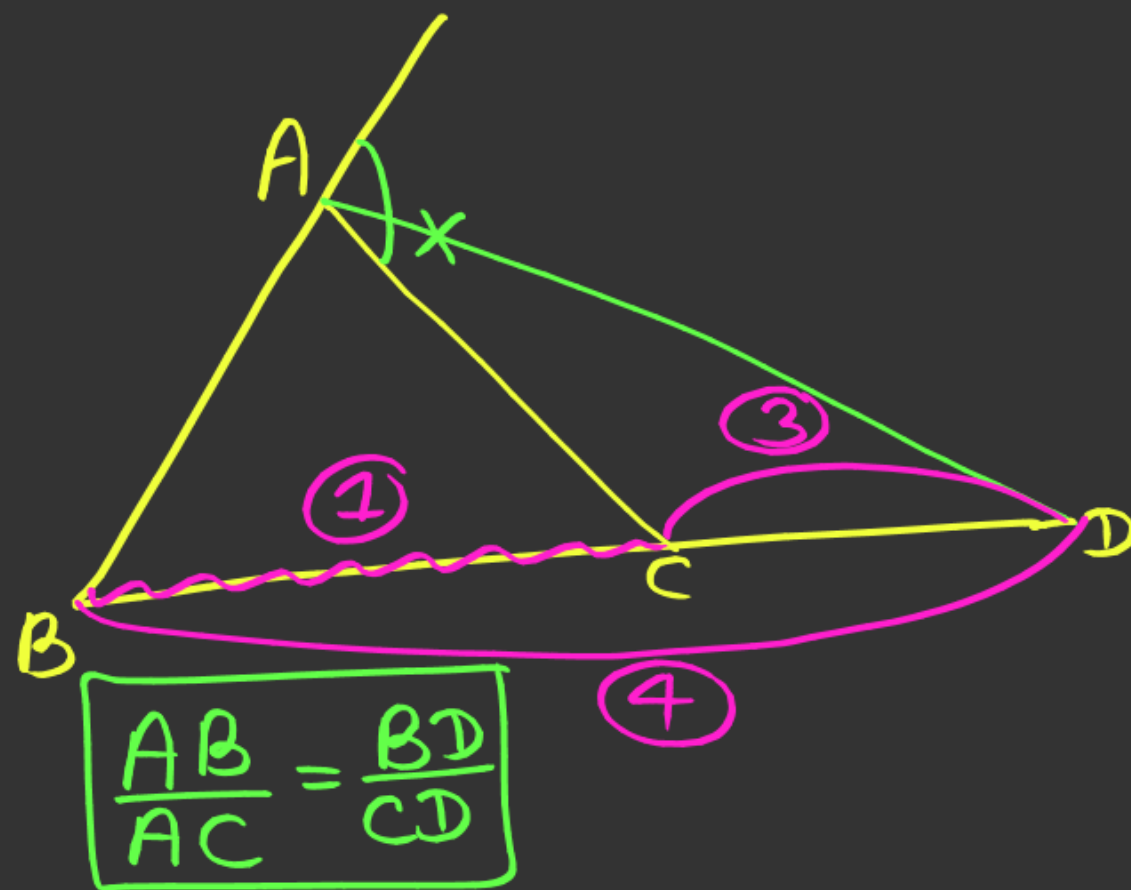
$$\frac{AB}{AC} = \frac{BD}{CD}$$

$AB = 20\,cm$

$AC = 15\,cm$

$BC : CD = 1 : 3$

$$\frac{AB}{AC} = \frac{BD}{DC}$$
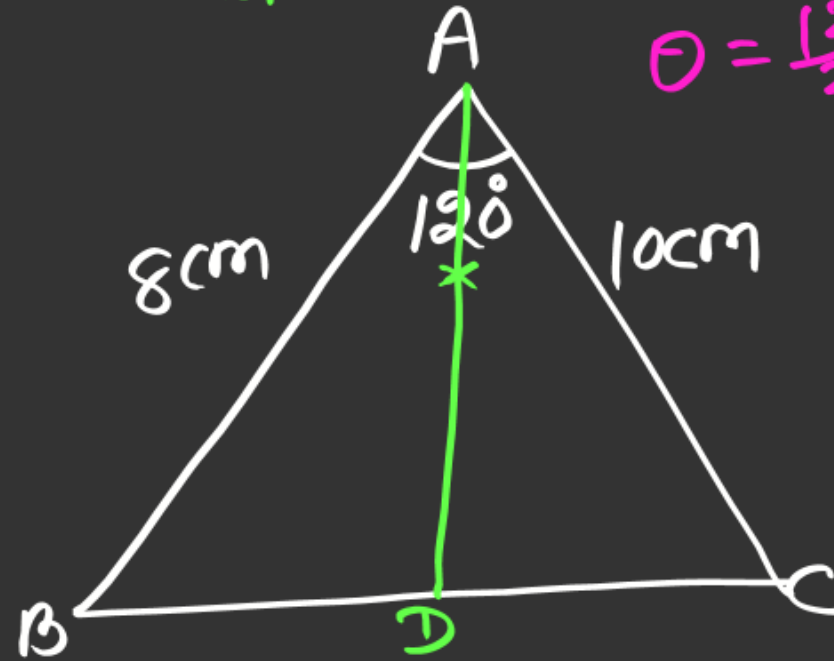
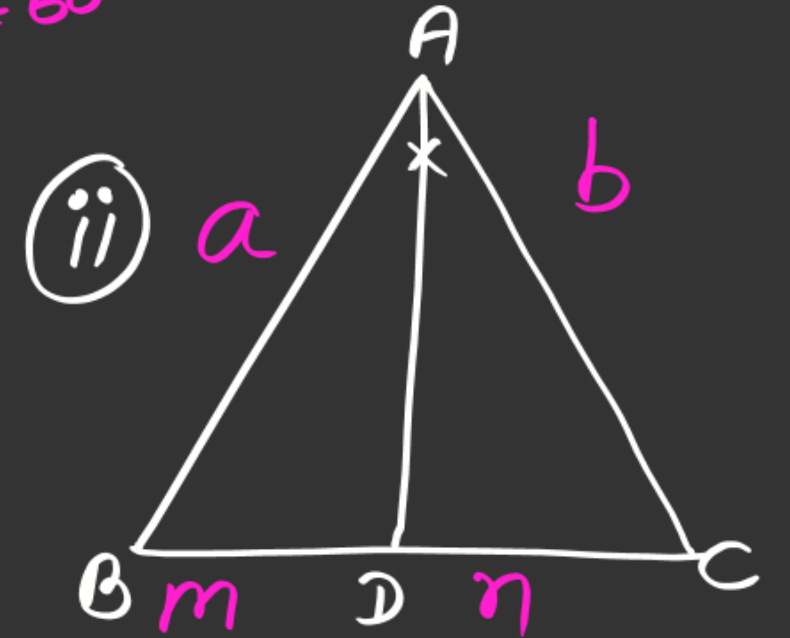$$\frac{4}{3} = \frac{20}{15} = \frac{BD}{DC}$$

↳ कोण समद्विभाजक की लम्बाई

$m+n=BC$

$\theta = \dfrac{\angle A}{2}$

$\theta = \dfrac{120}{2} = 60°$

① $a \quad \theta\theta \quad b$

$AD = \dfrac{2ab}{a+b} \cos\theta$

8cm 120° 10cm

$AD = \dfrac{2 \times 8 \times 10}{8 + 10} \times \cos 60°$

$= \dfrac{\overset{40}{\cancel{160}}}{\underset{9}{\cancel{18}}} \times \dfrac{1}{\cancel{2}} = \dfrac{40}{9} \text{cm}$

(ii) $a \quad b$

$B \quad m \quad D \quad n \quad C$

$AD^2 = a \times b - mn$

A

12cm (4)   (3) 9cm

(4)x2   (3)x2
8cm   D   6cm

B   C

14cm
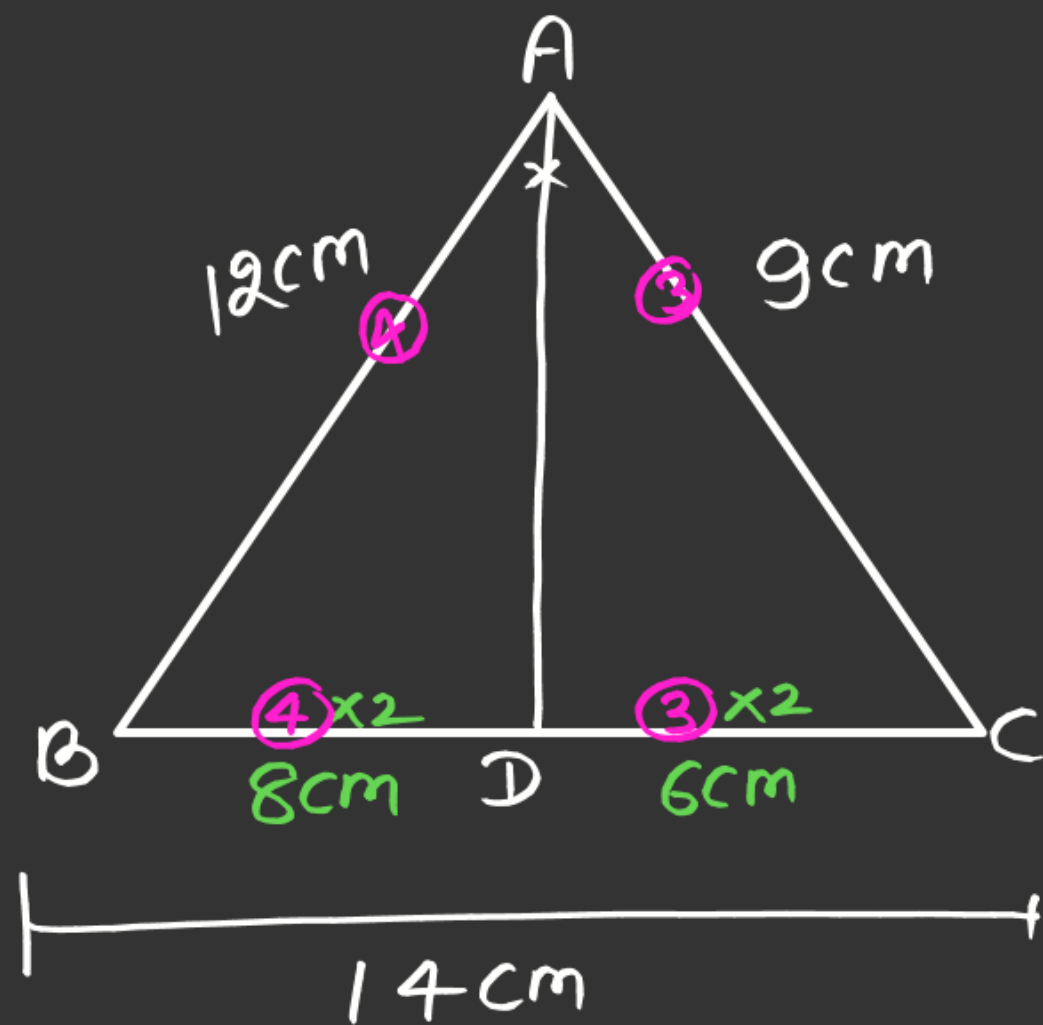
AD =

$AD^2 = ab - mn$

$AD^2 = 12 \times 9 - 8 \times 6$
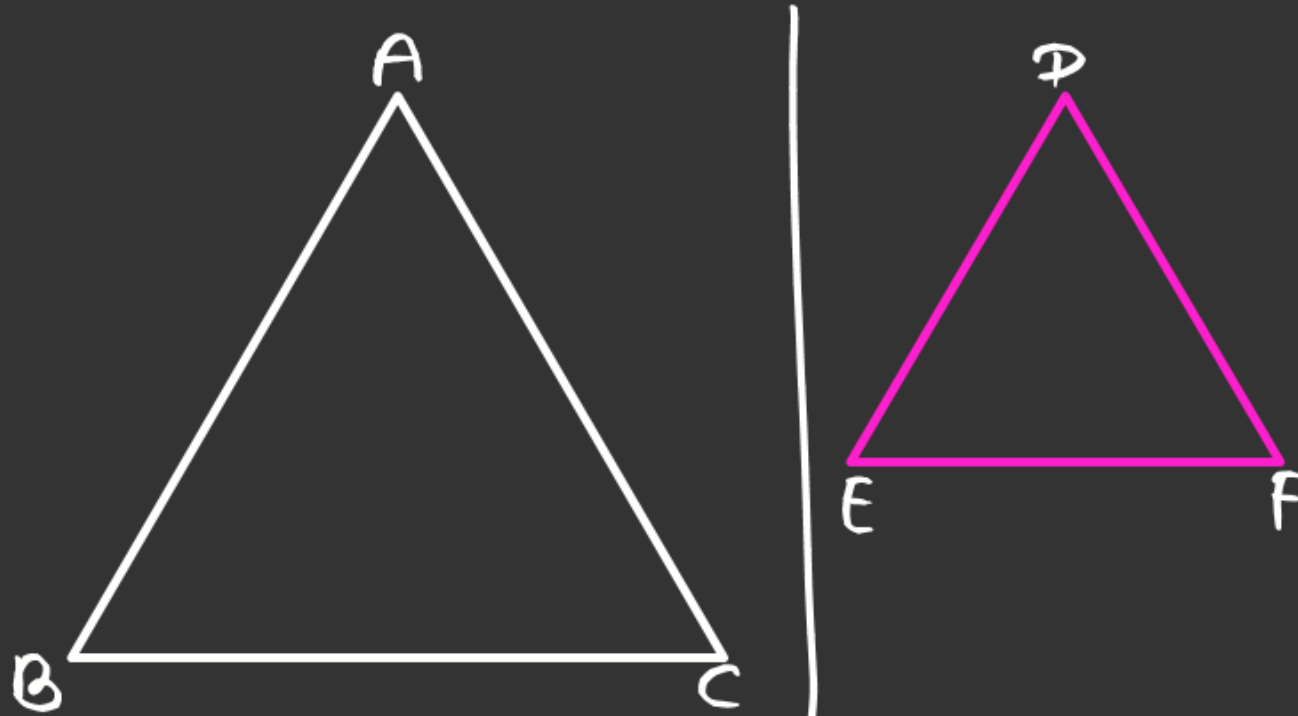
$AD^2 = 108 - 48$

$AD^2 = 60$

$AD = \sqrt{60} = 2\sqrt{15}\,cm$

↳ समरुप त्रिभुज

$\angle A = \angle D$

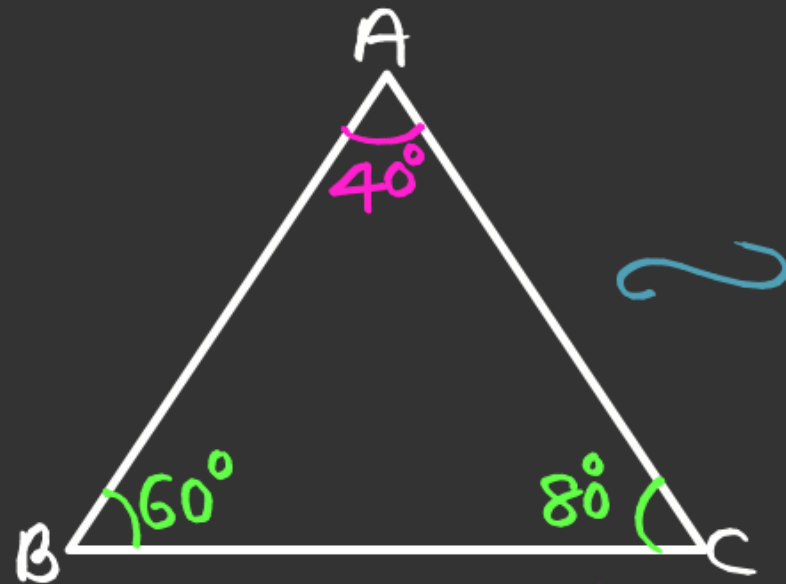$\angle B = \angle E$

$\angle C = \angle F$

→ कोण को समान करना है।
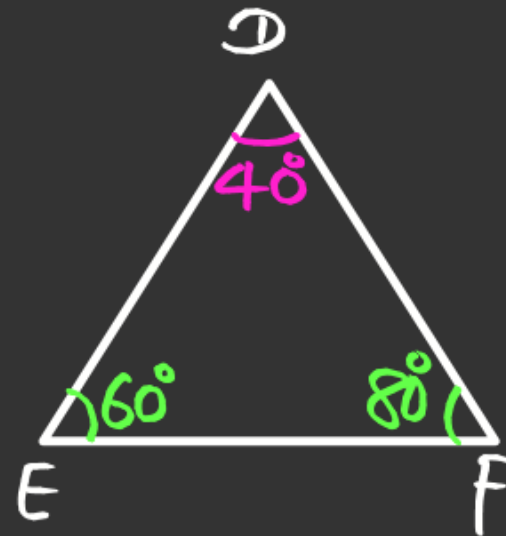
$\triangle ABC \sim \triangle DEF$

(i) AA → Angle-Angle

(ii) AAA → Angle-Angle-Angle

(iii) SSS → Side-side-side

(i) AA (Angle-Angle) :→

$\angle B = \angle E$

$\angle C = \angle F$

$\angle A = \angle D$

Note→ संगत कोण के समाने संगत भुजा होता है।

$\triangle ABC \sim \triangle DEF$
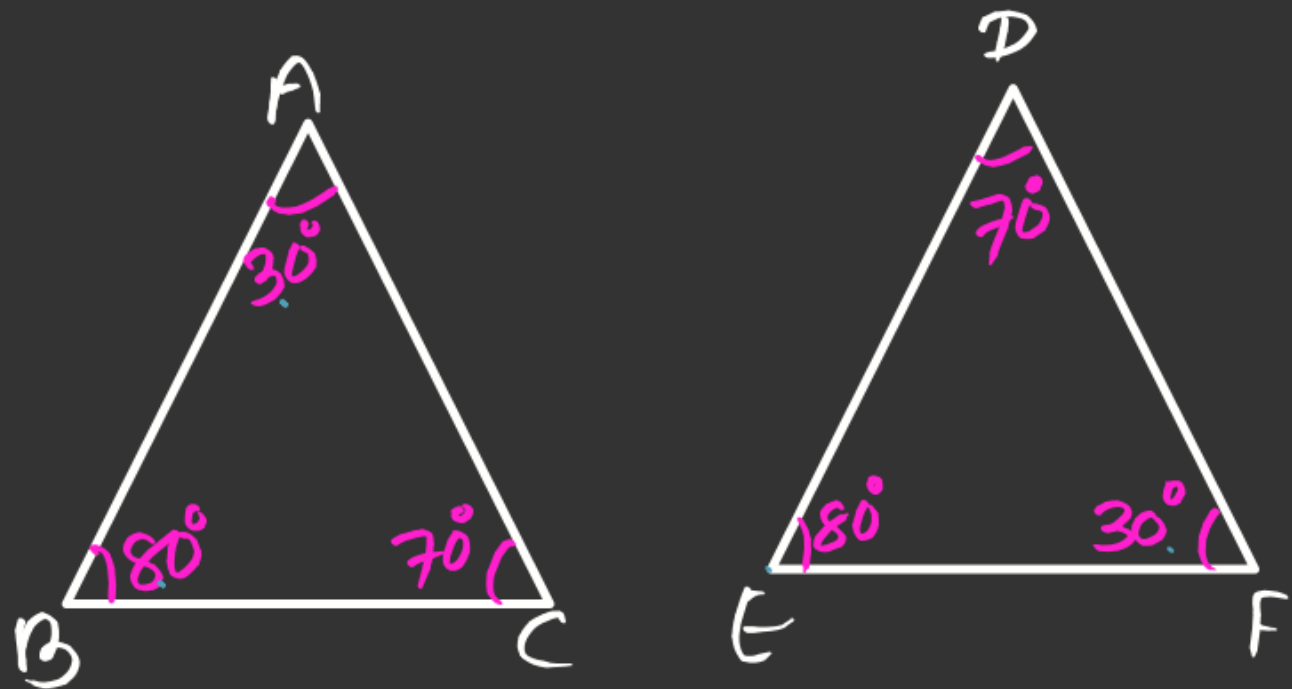
$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

समरूप नहीं हैं।

ⓐ $\triangle ABC \sim \triangle DEF$ ✓

ⓑ $\triangle BCA \sim \triangle EFD$ ✓

ⓒ $\triangle CBA \sim \triangle FED$ ✓
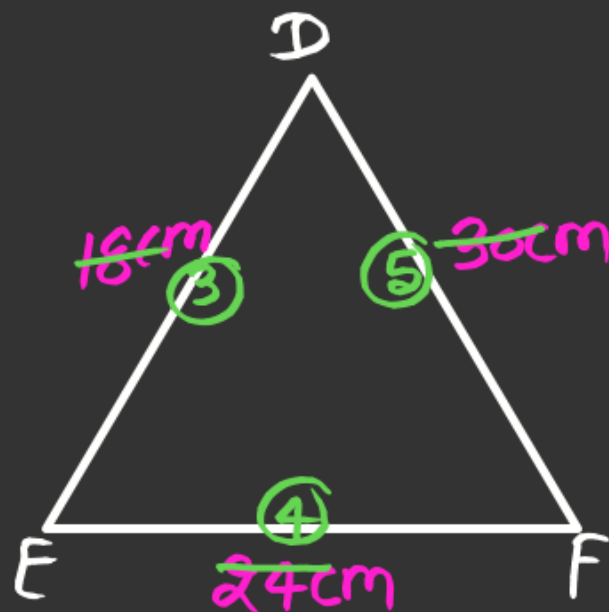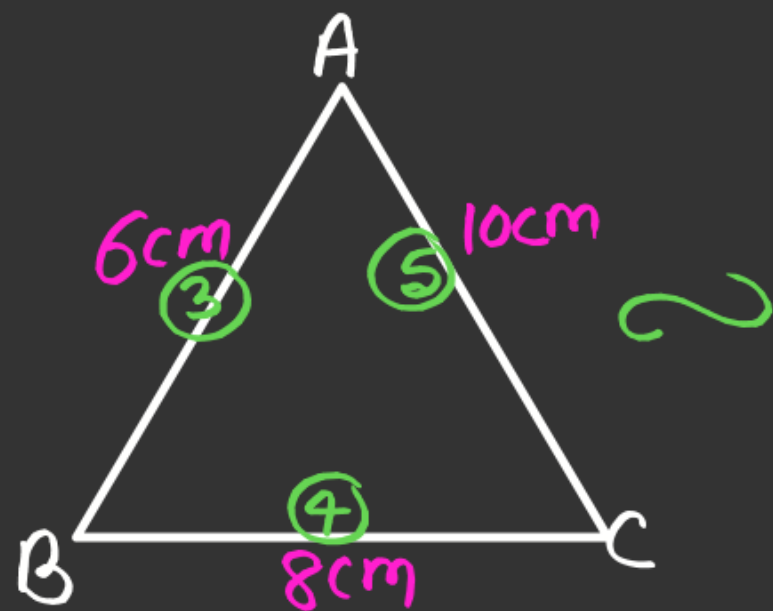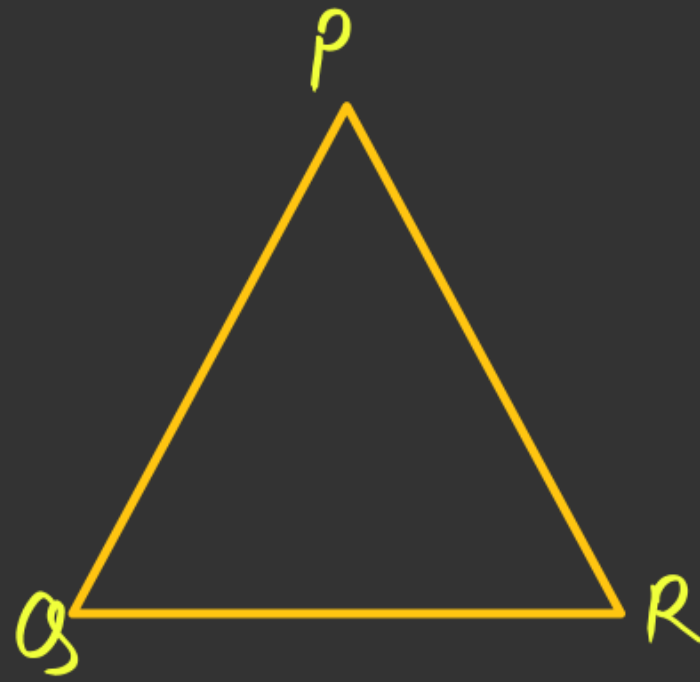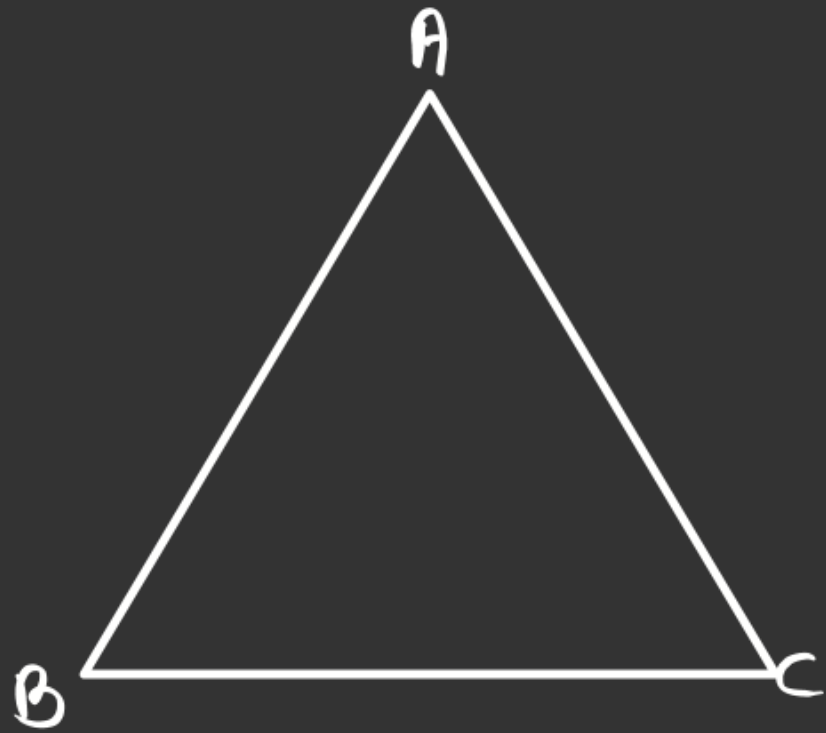
ⓓ $\triangle BAC \sim \triangle DEF$ ✗

$\triangle ABC \sim \triangle FED$

(ii) A-A-A

(iii) S-S-S :→ पहले △

A

6cm ③   ⑤ 10cm

B   ④   C
    8cm

~

D

16cm ③   ⑤ 30cm

E   ④   F
    24cm

$$h_1, h_2 \rightarrow \text{ऊँचाई}$$
$$m_1, m_2 \rightarrow \text{माधिका}$$
$$r_1, r_2 \rightarrow \text{अंतःवृत के त्रिज्या}$$
$$R_1, R_2 \rightarrow \text{परिवृत के त्रिज्या}$$
$$P_1, P_2 \rightarrow \text{परिमाप}$$

(i) $\dfrac{AB}{PQ} = \dfrac{AC}{PR} = \dfrac{BC}{QR} = \dfrac{h_1}{h_2} = \dfrac{m_1}{m_2} = \dfrac{r_1}{r_2} = \dfrac{R_1}{R_2} = \dfrac{P_1}{P_2}$

(ii) $\dfrac{ar\,\Delta ABC}{ar\,\Delta PQR} = \left(\dfrac{AB}{PQ}\right)^2 = \left(\dfrac{AC}{PR}\right)^2 = \left(\dfrac{BC}{QR}\right)^2 = \left(\dfrac{h_1}{h_2}\right)^2 = \left(\dfrac{m_1}{m_2}\right)^2 = \left(\dfrac{r_1}{r_2}\right)^2 = \left(\dfrac{R_1}{R_2}\right)^2 = \left(\dfrac{P_1}{P_2}\right)^2$

$\Delta ABC : \Delta PQR$
परिमाप $\rightarrow$ 4 : 7

$\Delta ABC : \Delta PQR$
Area $\rightarrow$ 64 : 81

भुजा | ऊँचाई | माधिका | परिमाप $\rightarrow \sqrt{64} : \sqrt{81}$
$$8 : 9$$
r/R

क्षे० $\rightarrow 4^2 : 7^2$
$$16 : 49$$