**1** A perpendicular drawn from the vertex of the right angle of a right-angled triangle divides the triangle into two triangles similar to each other and also to the original triangle. Prove it.

Hence Proved.

**2** In the given figure, lines *l* and *m* are parallel. Three concurrent lines through point O meet line *l* at points A, B and C; and line *m* at points P, Q and R as shown.
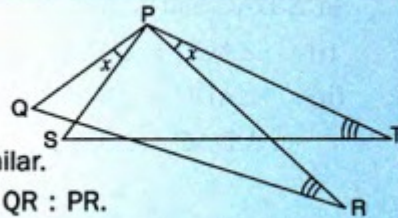
Prove that : $\dfrac{AB}{BC} = \dfrac{QR}{PQ}$.
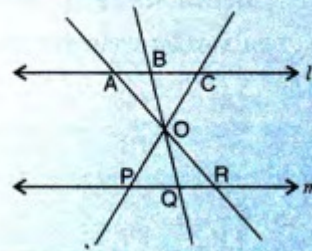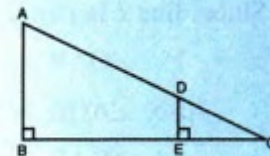
**3** In the figure, given alongside,

∠QPS = ∠RPT

and ∠PRQ = ∠PTS.

(i) Prove that triangles PQR and PST are similar.

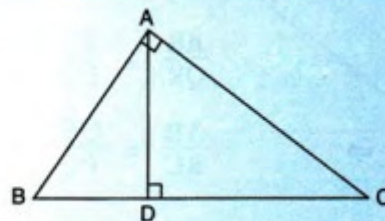(ii) If PT : ST = 3 : 4; find the ratio between QR : PR.

**Solution :**

**4** In the given figure, AB and DE are perpendiculars to BC. If AB = 9 cm, DE = 3 cm and AC = 24 cm, calculate AD.　　　　　　　　　　[2005]
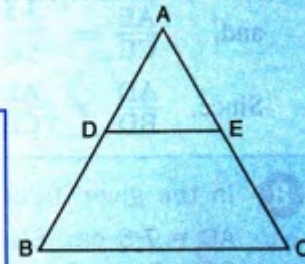
**5** In the adjoining figure, ABC is a triangle right-angled at vertex A and AD is altitude.

(i) Prove that : △ ABD is similar to △ CAD.

(ii) If BD = 3·6 cm and CD = 6·4 cm; find the length of AD.

**6** In the adjoining figure; DE // BC and D divides AB in the ratio 2 : 3. Find :

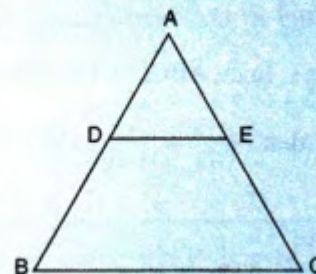(i) $\dfrac{AE}{EC}$     (ii) $\dfrac{AE}{AC}$     (iii) DE, if BC = 7·5 cm.



**Solution :**

(i) Since, a line drawn parallel to one side of a triangle, divides the other two sides proportionally;

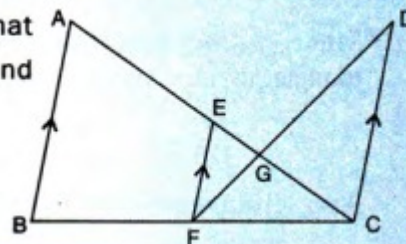$$\therefore \qquad \frac{AD}{DB} = \frac{AE}{EC} \qquad \text{.................. I}$$

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**7** In Δ ABC, D and E are points on the sides AB and AC respectively. Find whether DE // BC; if :

(i) AD = 3 cm,       BD = 4·5 cm,
   AE = 4 cm   and    AC = 10 cm

(ii) AB = 7 cm,       BD = 4·5 cm,
    AE = 3·5 cm   and    CE = 5·6 cm



Solution :

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**8** In the given figure; AB//EF//CD. Given that AB = 7·5 cm, EG = 2·5 cm, GC = 5 cm and DC = 9 cm. Calculate : (i) EF (ii) AC.
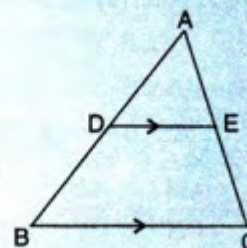


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**9** In the given figure, DE // BC.

(i) Prove that Δ ADE and Δ ABC are similar.

(ii) Given that AD = $\dfrac{1}{2}$ BD, calculate DE, if BC = 4·5 cm.         [2004]

Also, find $\dfrac{Ar.\,(\Delta\,ADE)}{Ar.\,(\Delta\,ABC)}$ and $\dfrac{Ar.\,(\Delta\,ADE)}{Ar.\,(\text{trapezium BCED})}$
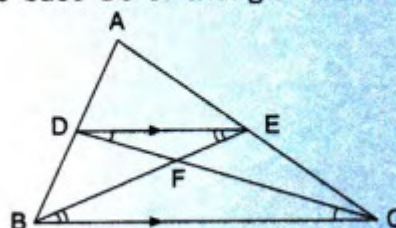


**Solution :**

**10** In the figure, given alongside, PB and QA are perpendiculars to the line segment AB. If PO = 6 cm, QO = 9 cm and area of △ POB = 120 cm², find the area of △ QOA.
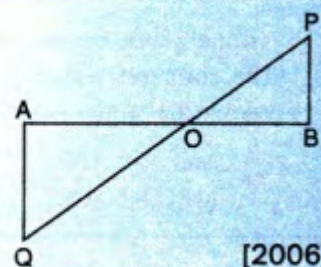
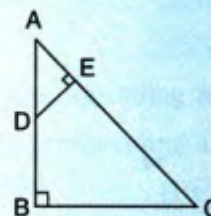[2006]

**11** In the given figure, DE is parallel to the base BC of triangle ABC and AD : DB = 5 : 3. Find the ratio :

(i) $\dfrac{AD}{AB}$ and then $\dfrac{DE}{BC}$.

(ii) $\dfrac{\text{Area of } \triangle DEF}{\text{Area of } \triangle DEC}$.

Solution :

**12** In △ ABC, ∠B = 90°, AB = 12 cm and AC = 15 cm. D and E are points on AB and AC respectively such that ∠AED = 90° and DE = 3 cm. Calculate the area of △ ABC and then the area of △ ADE.

**13** A model of a ship is made to a scale of 1 : 200. If the length of the model is 4 m; calculate the length of the ship.

**14** The scale of map is 1 : 50,000. In the map, a triangular plot ABC of land has the following dimensions :
AB = 2 cm, BC = 3·5 cm and angle ABC = 90°.
Calculate : (i) the actual length of side BC, in km, of the land.
(ii) the area of the plot in sq. km.

**15** A rectangular tank has length = 4 m, width = 3 m and capacity = 30 m³. A small model of the tank is made with capacity 240 cm³. Find :

(i) the dimensions of the model.

(ii) the ratio between the total surface area of the tank and its model.