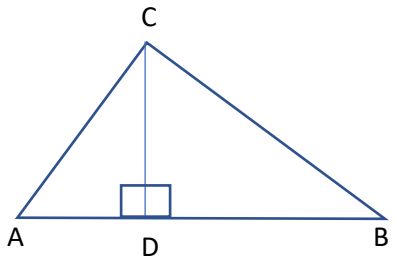
WORKSHEET ON MODULE 5/5 OF TRIANGLES

SOLVED EXAMPLES

1) Triangle ABC is right angled at C and CD is perpendicular to AB. Prove that $BC^2 \times AD = AC^2 \times BD$.



Solution:

Given: ΔABC is right-angled at C and $CD \perp AB$

To Prove: $BC^2 \times AD = AC^2 \times BD$

Proof:
If a perpendicular is drawn from the vertex of the right angle of a right triangle to the hypotenuse then triangles on both sides of the perpendicular are similar to the whole triangle and to each other
$\Longrightarrow \Delta ACD \sim \Delta CBD$
Therefore, the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides

$$\frac{ar(\Delta ACD)}{ar(\Delta CBD)} = \left(\frac{AC}{BC}\right)^2$$

Since area of a triangle $= \frac{1}{2} \times$ base $\times$ height

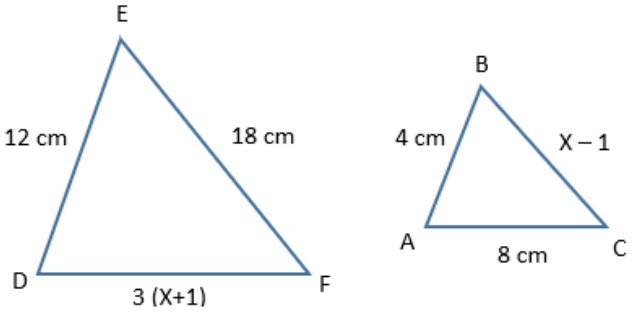
$$ar(\Delta ACD) = \frac{1}{2} \times AD \times CD$$
$$ar(\Delta CBD) = \frac{1}{2} \times BD \times CD$$

$$\Longrightarrow \quad \frac{\frac{1}{2} \times AD \times CD}{\frac{1}{2} \times BD \times CD} = \left(\frac{AC}{BC}\right)^2$$

$$\Longrightarrow \quad \frac{AD}{BD} = \left(\frac{AC}{BC}\right)^2$$

$$\Longrightarrow \quad BC^2 \times AD = AC^2 \times BD$$

2) Find the value of x that makes ΔABC ~ ΔDEF



Solution:

Since ΔABC ~ ΔDEF, by SSS Similarity

we get $\frac{AB}{DE} = \frac{BC}{EF}$

$\frac{4}{12} = \frac{x-1}{18}$

So, $4 \times 18 = 12(x - 1)$

7 cm = x

Checking: Check the side lengths are proportional.

When x = 7cm, BC = x – 1 = 6cm

$\frac{AB}{DE} = \frac{4}{12}$

$\frac{BC}{EF} = \frac{6}{18}$

DF = 3(x + 1) = 3(7 + 1) = 24

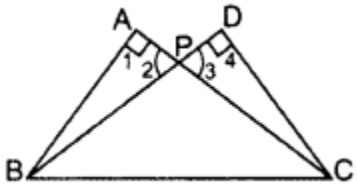
$\frac{AC}{DF} = \frac{8}{24}$

$\Longrightarrow \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF} = \frac{1}{3}$

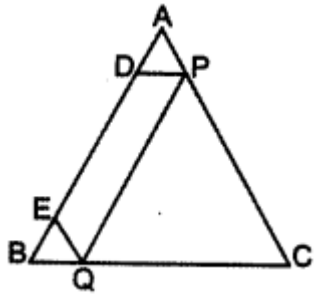
Therefore, when x =7cm, the triangles are similar by SSS Similarity.

SOLVE THE FOLLOWING

1) In the figure ABC and DBC are two right triangles. Prove that AP × PC = BP × PD.

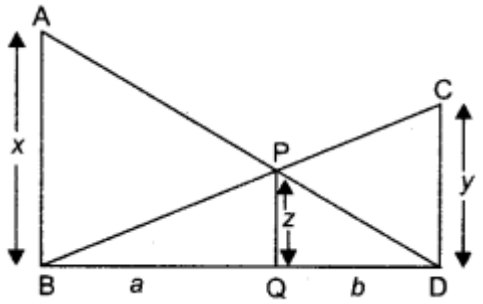


2) Let ABC be a triangle and D and E be two points on side AB such that AD = BE. If DP || BC and EQ || AC, then prove that PQ || AB.



3) The height of two building is 34 m and 29 m respectively. If the distance between the two building is 12 m, find the distance between their tops.
4) The areas of two similar triangles are respectively 9 cm^2 and 16 cm^2. Determine the ratio of the corresponding sides.
5) in figure, AB || PQ || CD, AB = x units, CD =y units and PQ = z units, prove that

$$\frac{1}{x}+\frac{1}{y}=\frac{1}{z}$$



6) The lengths of the diagonals of a rhombus are 30 cm and 40 cm. Find the side of the rhombus.