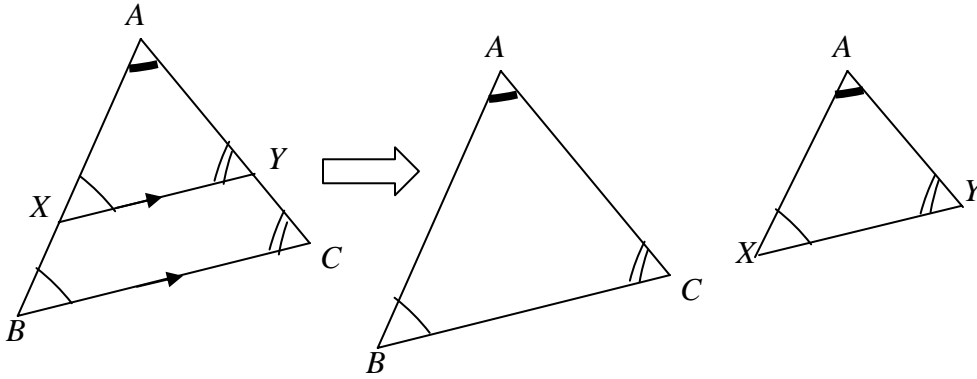
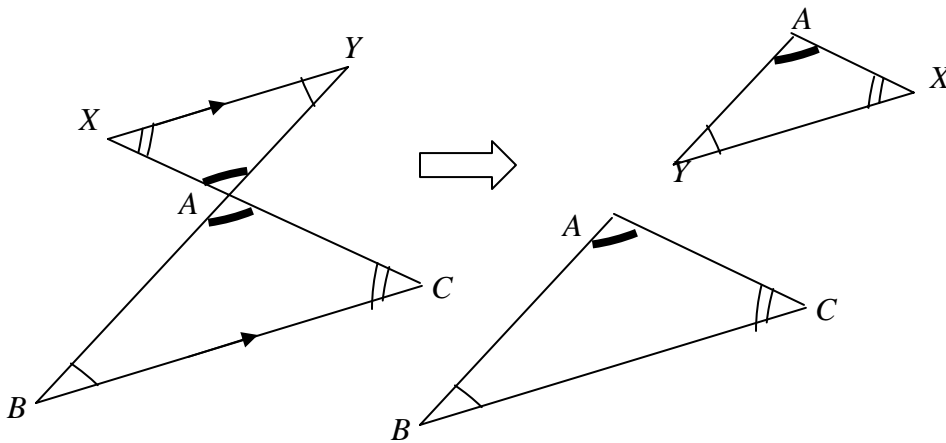


**Similar Figures/Solids – Length, Area and Volume**

**Identifying Similar Triangles**



$\triangle ABC \sim \triangle AXY$  (~ denotes 'is similar to')

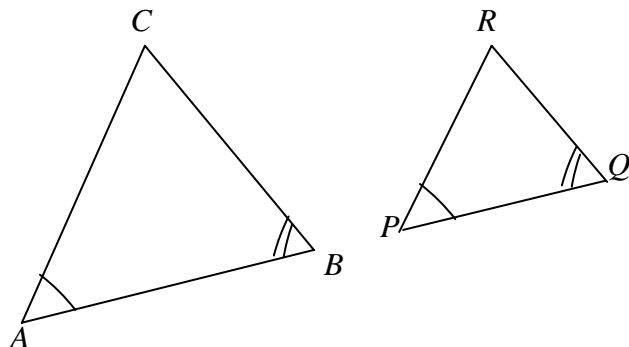


$\triangle ABC \sim \triangle AYX$  (note the order when naming!)

**Conditions for similarity between 2 triangles.**

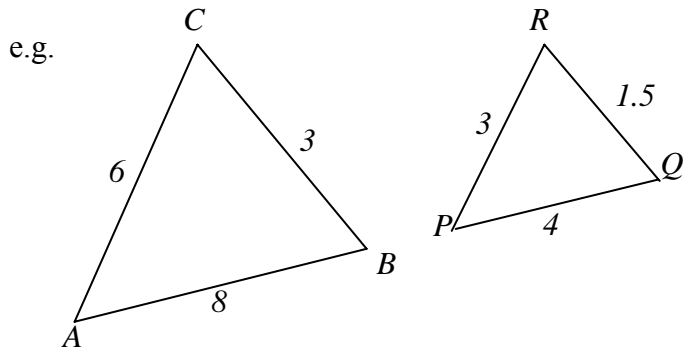
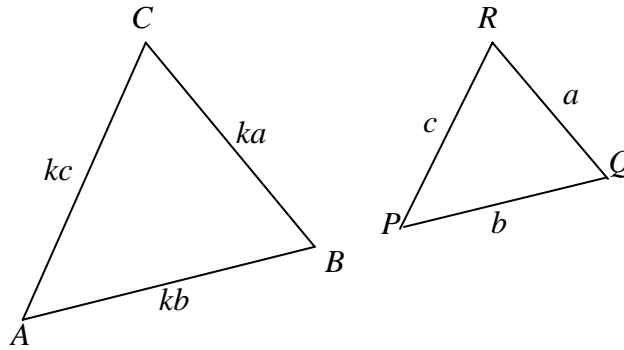
1. 3 equal angles (AAA)

In  $\triangle ABC$  and  $\triangle PQR$ ,  
 $\hat{A} = \hat{P}$ ,  $\hat{B} = \hat{Q}$  and  $\hat{C} = \hat{R}$   
 Hence  $\triangle ABC \sim \triangle PQR$  (AAA)



2. Ratio of 3 corresponding sides =  $k$

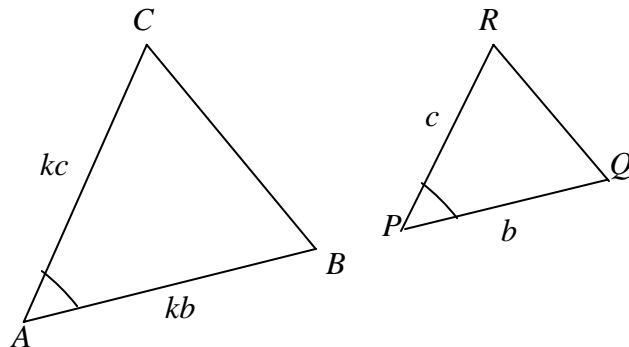
In  $\triangle ABC$  and  $\triangle PQR$ ,  
 $\frac{AB}{PQ} = \frac{BC}{QR} = \frac{CA}{RP} = k$ ,  
 where  $k$  is a constant.  
 Hence  $\triangle ABC \sim \triangle PQR$



$$\frac{8}{4} = \frac{3}{1.5} = \frac{6}{3} = 2$$

3. Ratio of 2 corresponding sides =  $k$  and **included** angle equal. (SAS)

In  $\triangle ABC$  and  $\triangle PQR$ ,  
 $\hat{A} = \hat{P}$  and  $\frac{AB}{PQ} = \frac{BC}{QR} = k$   
 where  $k$  is a constant.  
 Hence  $\triangle ABC \sim \triangle PQR$

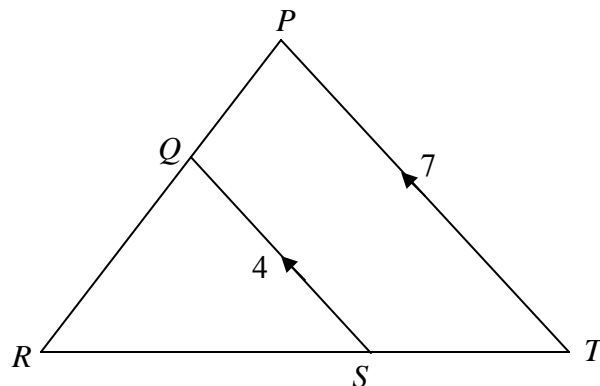


**Example:**

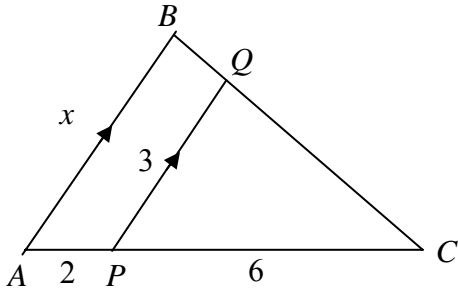
1 Given that  $\triangle PRT$  is similar to  $\triangle QRS$ . Complete the following ratios:

$$\frac{7}{4} = \frac{PR}{( )} = \frac{( )}{( )}$$

Ans:  $\frac{7}{4} = \frac{PR}{(QR)} = \frac{(RT)}{(RS)}$



2 Find the lengths of the unknown sides. All lengths are given in cm.



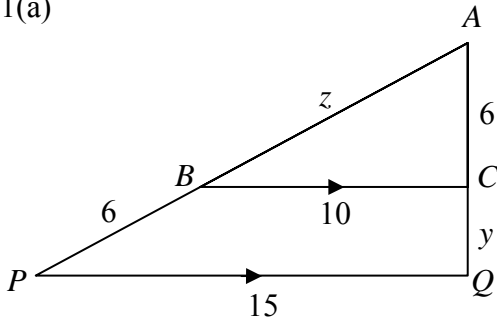
Ans: Start by writing the corresponding ratios first!

$$\triangle ABC \sim \triangle PQC \rightarrow \frac{x}{3} = \frac{8}{6} = \frac{BC}{QC}$$

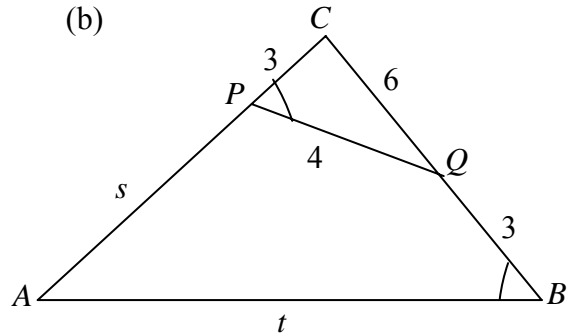
Solving,  $x = 4$  cm

**Exercises**

Q1(a)

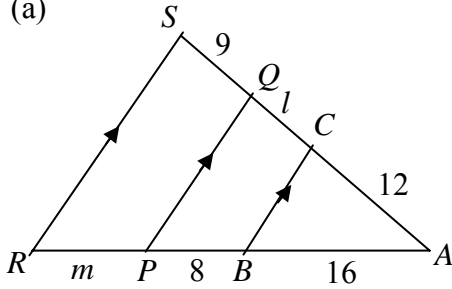


(b)

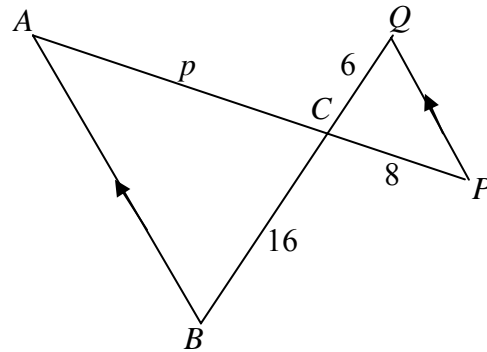


Q2 Find the values of  $l$ ,  $m$ , and  $p$  in the following.

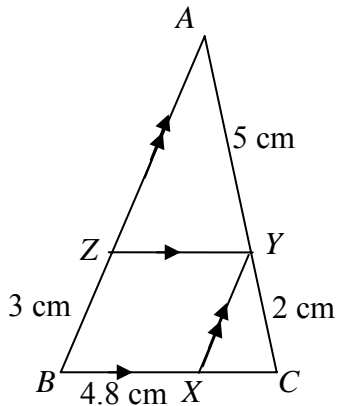
(a)



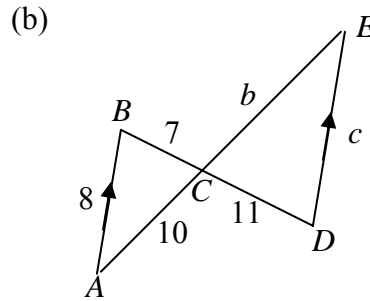
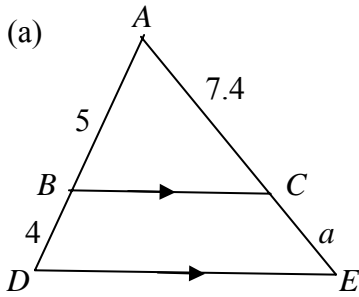
(b)



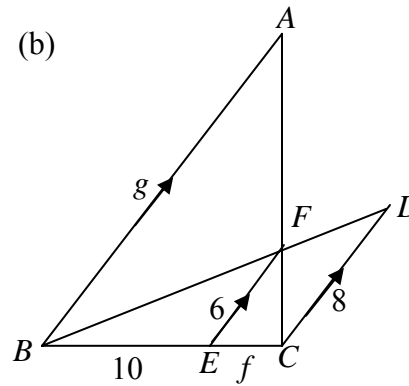
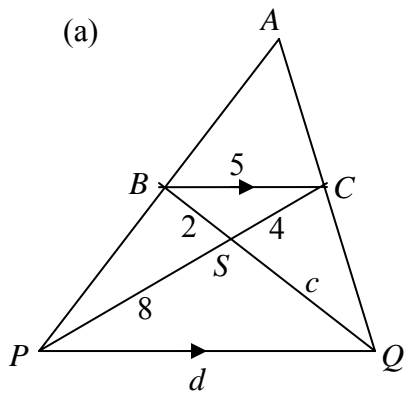
Q3 Find the lengths of AZ and CX in the following figure.



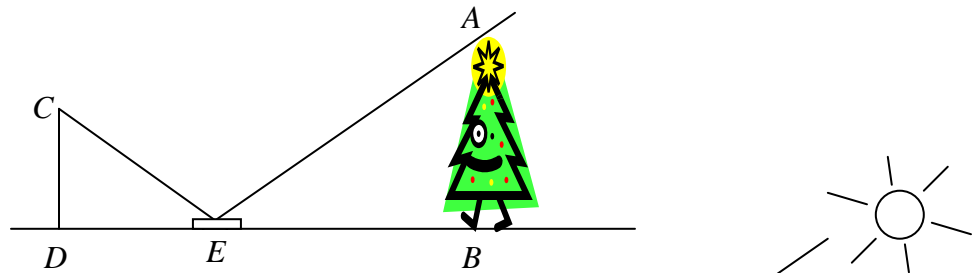
Q4 Find the values of  $a$ ,  $b$  and  $c$  in the following figures.



Q5 Find the lengths of the unknown sides in the following figures.



Q6 To determine the height  $AB$  of a tree, a man places a mirror on the ground at  $E$ . From  $E$ , he walks backwards to a point  $D$ , where he is just able to see the top of the tree in the mirror. Given  $BE = 18$  m,  $ED = 2.1$  m and that his eyes are 1.4 m above the ground, find the height of the tree.



Q7 The figure shows a tree  $SR$  and a pole  $PQ$  casting shadows of lengths 30 m and 15 m respectively. If the length of the pole is 4 m, find the height of the tree.

