Constructions

Division of a Line Segment

To divide a line segment internally in a given ratio m: n, where both m and n are positive integers.

Steps:

Step 1: Draw a line segment AB of given length using a ruler.

Step 2: Draw any ray AX making an acute angle with AB.

Step 3: Along AX mark off (m + n) points, namely A_1, A_2… A_m, A_{m+1}… A_{m+n}

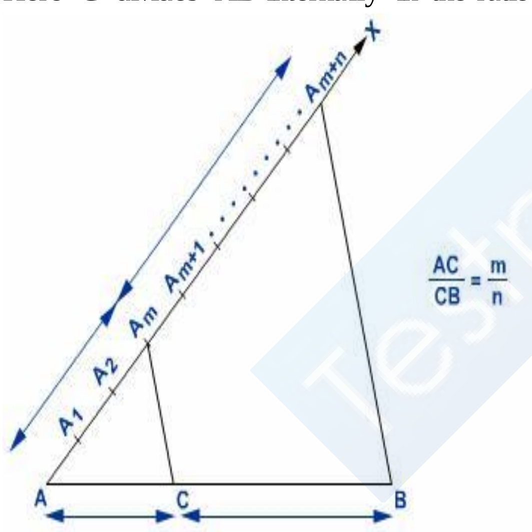
Step 4: Join B to A_{m+n}

Step 5: Through the point A_m draw a line parallel to A_{m+n}B at A_m. Let this line meet AB at 'C' which divides AB internally in the ratio m: n.

Proof: In ΔABA_{m+n}, CA_m is parallel to BA_{m+n}.

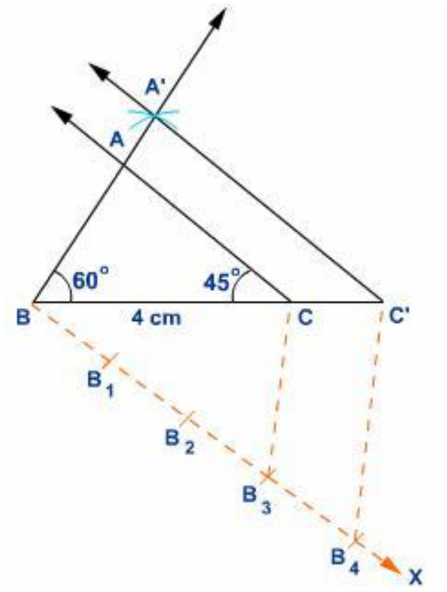
By basic proportionality theorem, we get, ——— — –

Here 'C' divides AB internally in the ratio m: n.



To Construct a Triangle Similar To a Given Triangle as Per the Given Scale Factor

Construct a ΔABC in which BC = 4cm, $\angle B = 60°$ and $\angle C = 45°$. Also construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC.



Steps of construction:

Step 1: Construct a triangle ABC with the given measurement i.e. BC = 4cm, $\angle B = 60°$ and $\angle C = 75°$

Step 2: Construct an acute angle CBX downwards.

Step 3: On BX, make 4 equal parts and mark them B_1, B_2, B_3, B_4.

Step 4: Join 'C' to B_3 and draw a line through B_4 parallel to B_3C, intersecting the extended line segment BC at C'.

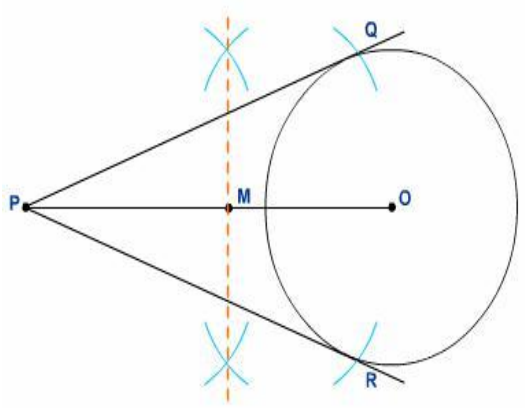
Step 5: In the same way draw C'A' parallel to CA. Thus $\Delta A'BC'$ is the required triangle similar to ΔABC whose sides are $\frac{4}{3}$ times the corresponding sides of ΔABC.

Construction of Tangents to a Circle

To construct the tangents to a circle from a point outside it

Given: A circle with centre 'O' and a point 'P' outside it

Required: To construct the tangents to the circle from P.



Steps of construction:

Step 1: Draw a circle with centre 'O'

Step 2: Join OP.

Step 3: Draw the perpendicular bisector OP. It meets OP at 'M'.

Step 4: Taking 'M' as centre and OM as radius draw arcs which cut the circle with centre 'O' at two points. Name them as Q and R.

Step 5: Join PQ and PR

Step 6: PQ and PR are the required tangents to the circle with centre 'O' from an external point 'P'.

Note:

We can prove that the length of PQ and PR are equal.