Revision Notes

Class - 10 Mathematics

Chapter 11 - Constructions

Division of a Line Segment :

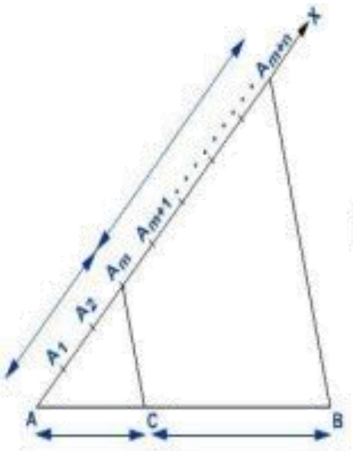
To divide a line segment internally in a given ratio $m:n$, where both m and n are **positive integers**.

Steps:

Step 1: Draw a line segment AB of a 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:

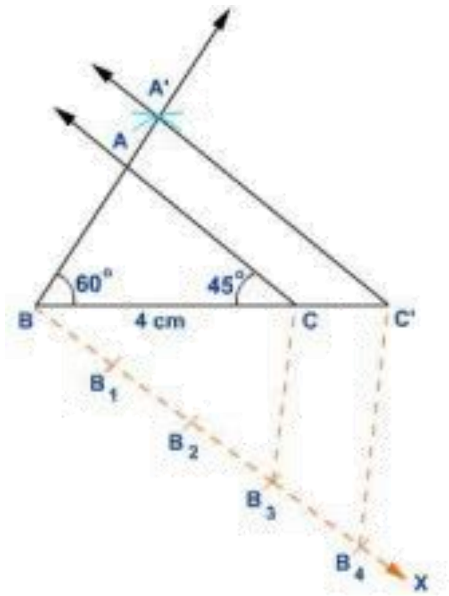
In $\triangle ABA_{m+n}$, CA_m is parallel to BA_{m+n}.
By basic proportionality theorem, we get,
Here 'C' divides AB internally in the ratio $m:n$.



$\frac{AC}{CB} = \frac{m}{n}$

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

Construct a $\triangle ABC$ in which $BC = 4cm$, $\angle B = 60^0$ and $\angle C = 45^0$. Also, construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle ABC$.



Steps of construction:

Step 1: Construct a triangle ABC with the given data that are $BC = 4cm$, $\angle B = 60^0$ and $\angle C = 45^0$

Step 2: Construct an acute angle CBX downwards.

Step 3: On BX, make four equal parts and mark them as 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'.

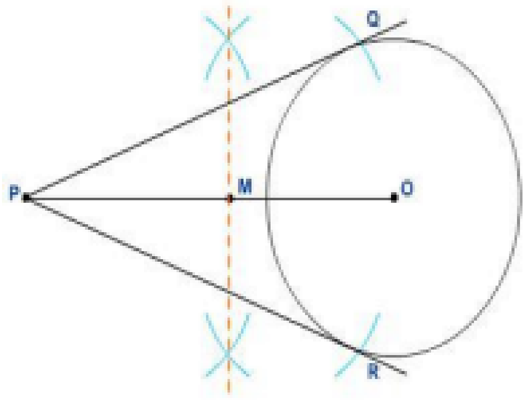
Step 5: In the same way draw $C'A'$ parallel to CA. Thus $\triangle A'BC'$ is the required triangle similar to $\triangle ABC$ whose sides are $\frac{4}{3}$ times the corresponding sides of $\triangle ABC$.

Construction of Tangents to a Circle:

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

Given: A circle with center '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 center 'O'

Step 2: Join OP.

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

Step 4: Taking 'M' as center and OM as radius draw arcs which cut the circle with center '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 center 'O' from an external point 'P'.

Note:

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