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:
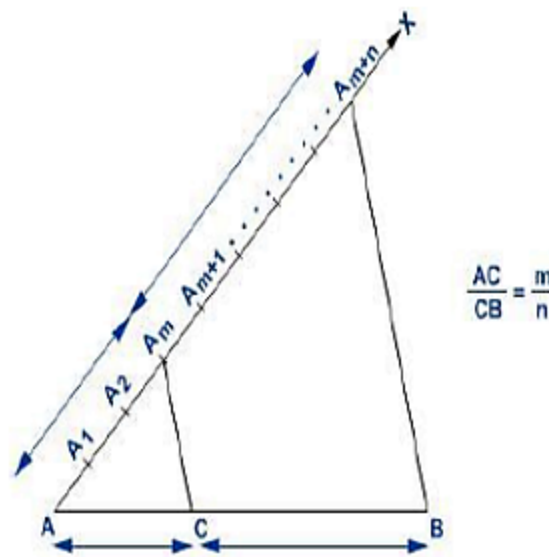Step 1: Draw a line segment AB of a given length using a ruler.
Step 2: Draw any ray AX making an acute angle with AB.
Step 3: Along AX mark off $(m + n)$ points, namely $A_1, A_2 \dots A_m, A_{m+1} \dots A_{m+n}$

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

Step 5: Through point A, 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 $m: n$.

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

- To construct a triangle similar to a given triangle as per the given scale factor construct a

  $\triangle ABC$ in which $BC = 4\ cm, \angle B = 60^\circ$, and $\angle C = 45^\circ$. Also, construct a triangle whose

  sides are $\frac{4}{3}$ times the corresponding sides of $\triangle ABC$
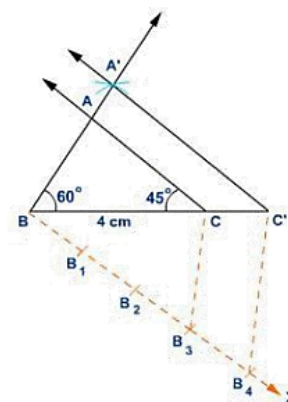
Steps of construction:

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

$\angle C = 75^\circ$

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 $\triangle A'BC'$ is the required triangle similar to $\triangle ABC$ whose sides are $\frac{3}{4}$ 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 2: Join OP.

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

  Step 4: Taking 'M' as the center and OM as the 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'.