

CONSTRUCTION

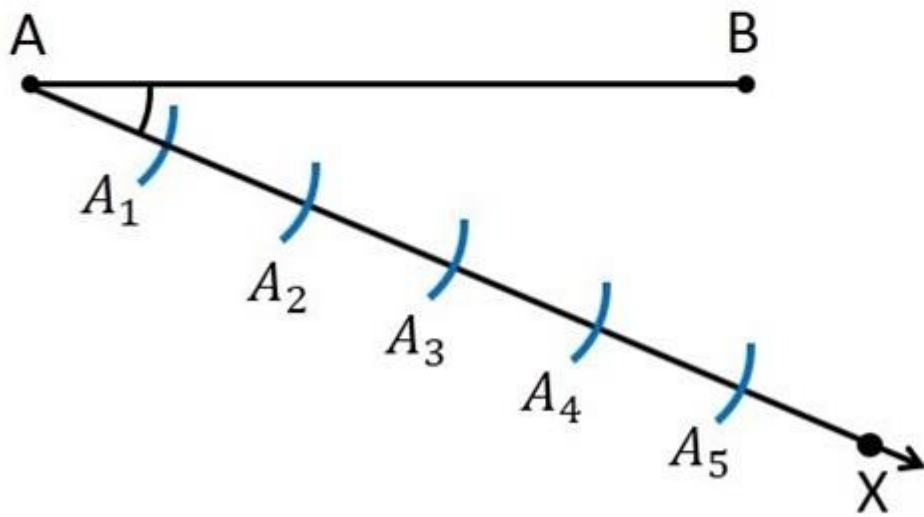
CONSTRUCTION

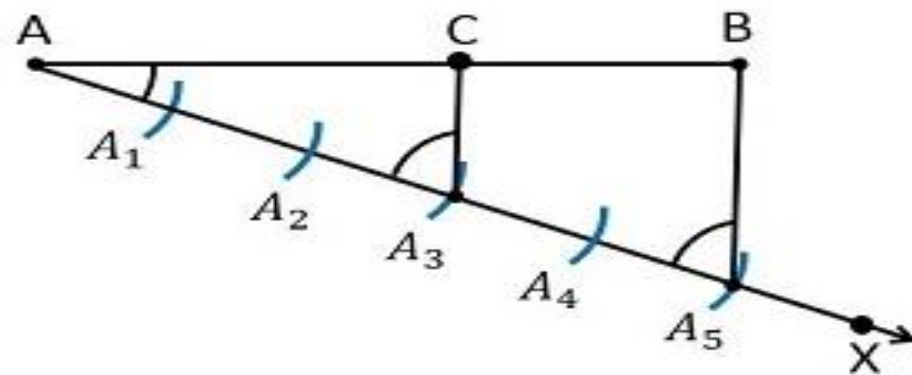
To divide the given line segment in a given ratio

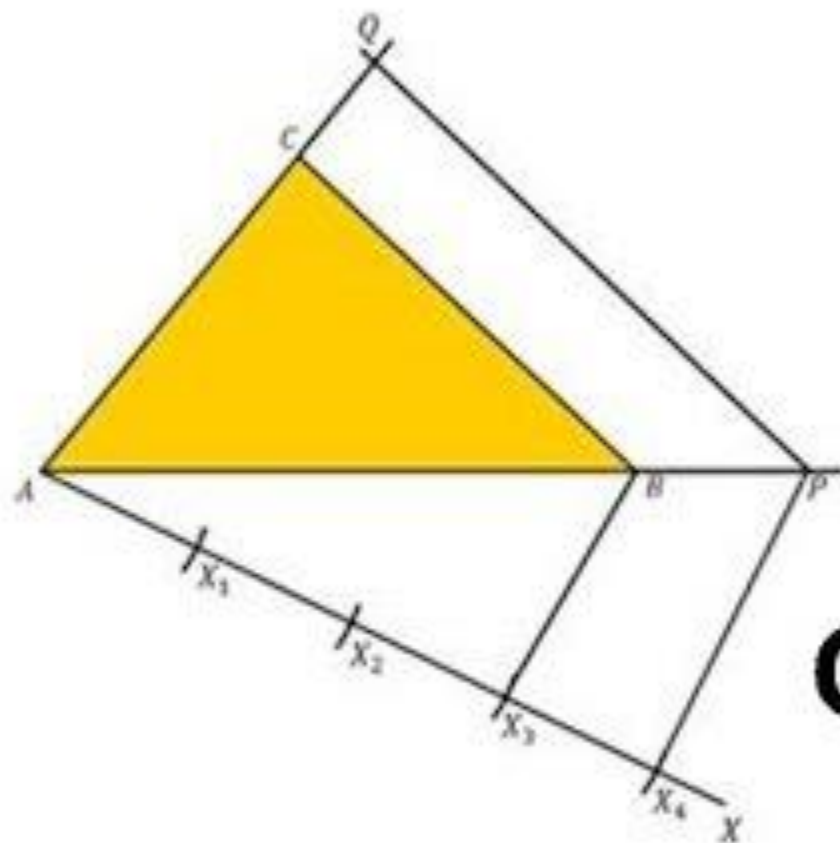
Let us divide the line segment in the ratio 2:3

STEPS OF CONSTRUCTION

1. Draw line segment AB
2. Draw any ray AX, making an acute angle with AB.
3. Locate 5 ($= m + n$) points A1 , A2 , A3 , A4 and A5 on AX by drawing equal arcs
4. Join BA5.
5. Through the point A3 ($m = 3$), draw a line parallel to A5B (by making an angle equal to $\angle A A5B$) at A3 intersecting AB at the point C Then, $AC : CB = 3 : 2$.







Construct A Triangle Similar To A Given Triangle

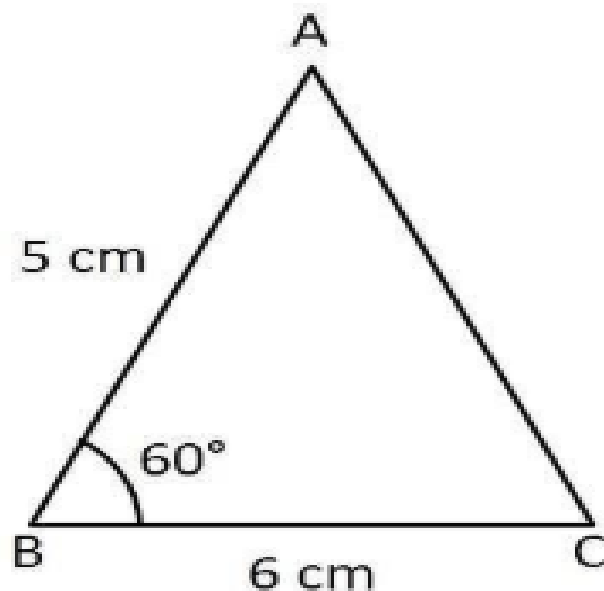
Draw a triangle ABC with side $BC = 6\text{ cm}$, $AB = 5\text{ cm}$ and $\angle ABC = 60^\circ$.
Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

Let's first draw a rough diagram

Now, Let's construct it

Steps to draw ΔABC

1. Draw base BC of side 6 cm

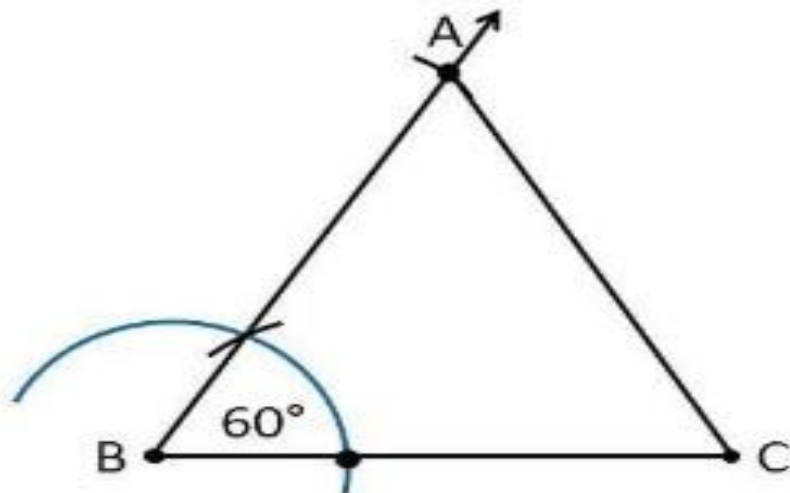


2. Draw $\angle B = 60^\circ$

3. Taking B as center, 5 cm as radius, we draw an arc

Let the point where arc intersects the ray be point A

4. Join AC



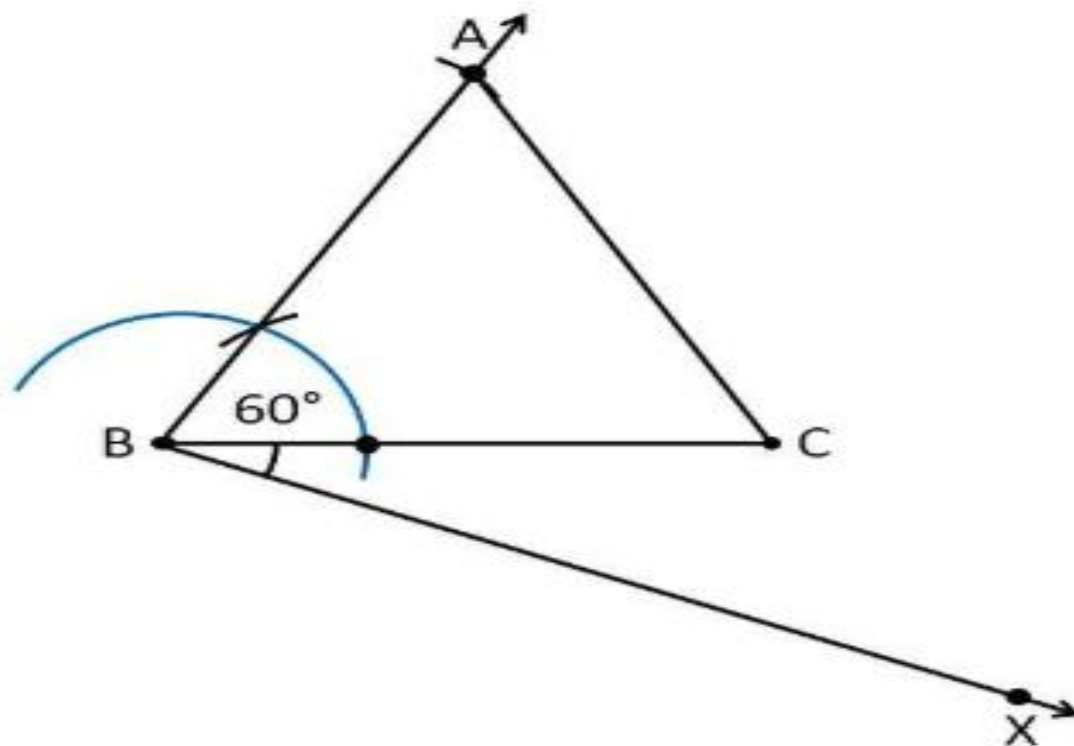
$\therefore \triangle ABC$ is the required triangle

Now, we need to make a triangle which is $\frac{3}{4}$ times its size

$$\therefore \text{Scale factor} = \frac{3}{4} < 1$$

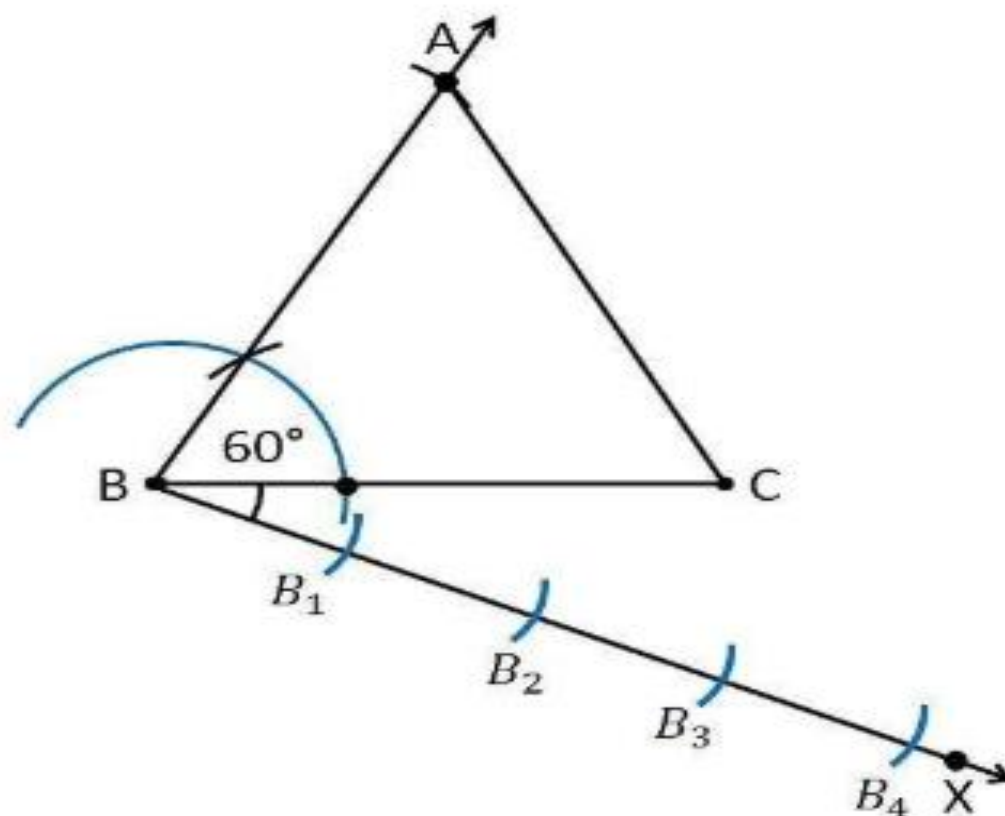
Steps of construction

1. Draw any ray BX making an acute angle with BC on the side opposite to the vertex A.



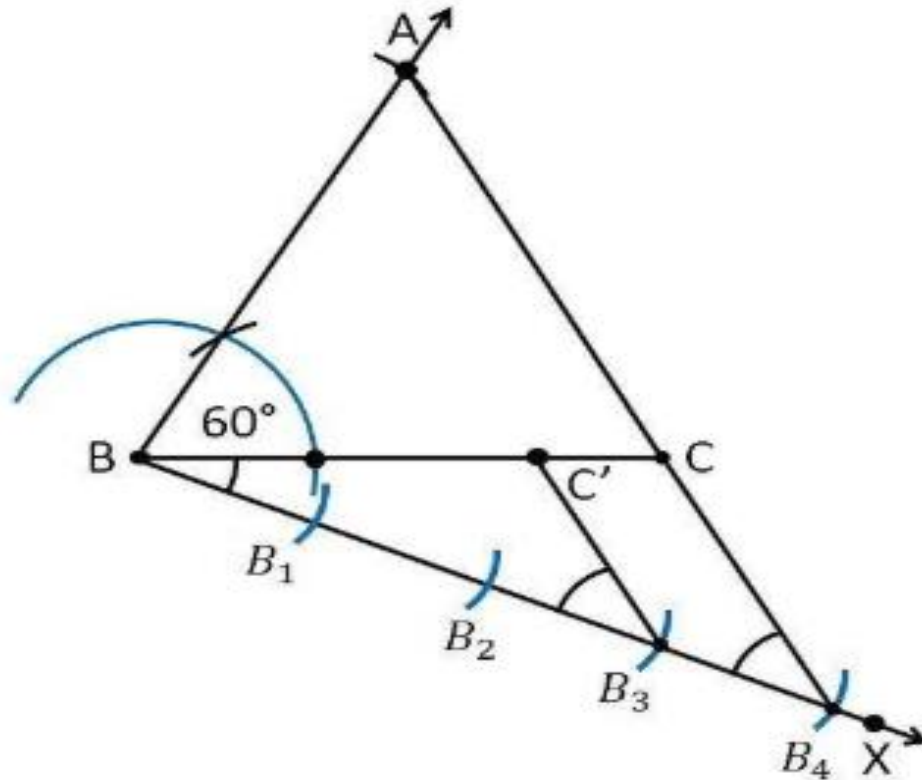
2. Mark 4 (the greater of 3 and 4 in $\frac{3}{4}$) points

B_1, B_2, B_3, B_4 on BX so that $BB_1 = B_1B_2 = B_2B_3 = B_3B_4$

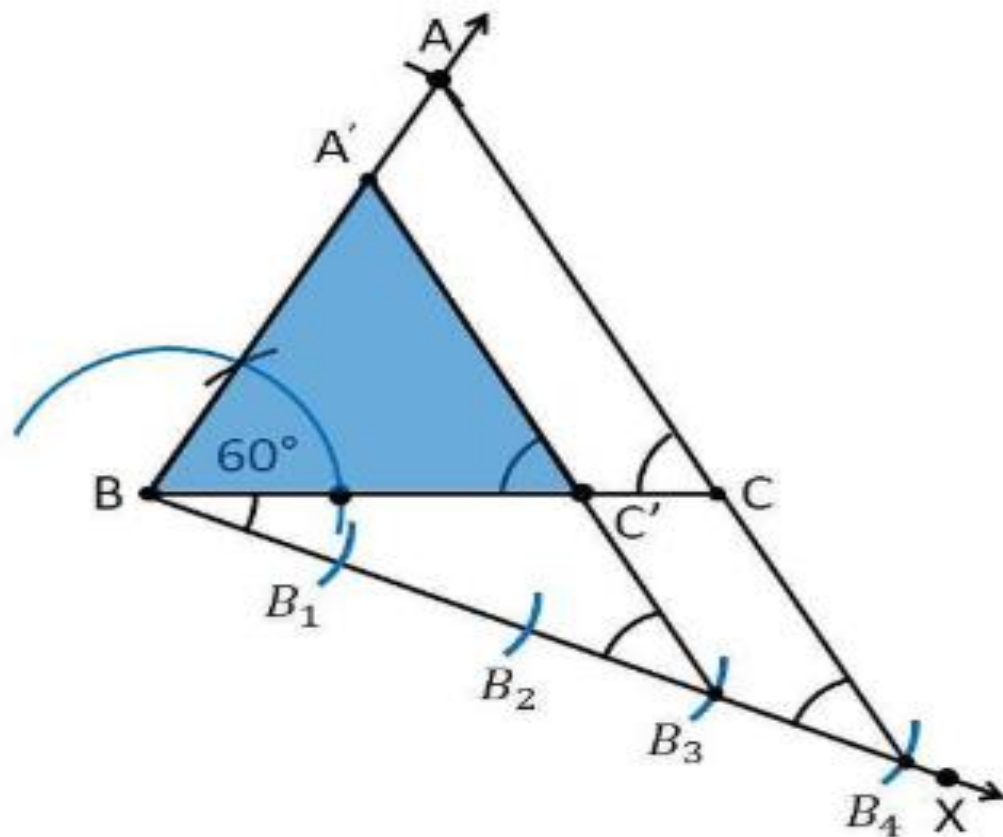


3. Join B_4C

and draw a line through B_3 (the 3rd point, 3 being smaller of 3 and 4 in $\frac{3}{4}$) parallel to B_4C ,
to intersect BC at C' .



4. Draw a line through C' parallel to the line AC to intersect BA at A' .



Thus, $\triangle A'BC'$ is the required triangle

Justification

Since scale factor is $\frac{3}{4}$,

we need to prove $\frac{A'B}{AB} = \frac{A'C'}{AC} = \frac{BC'}{BC} = \frac{3}{4}$.

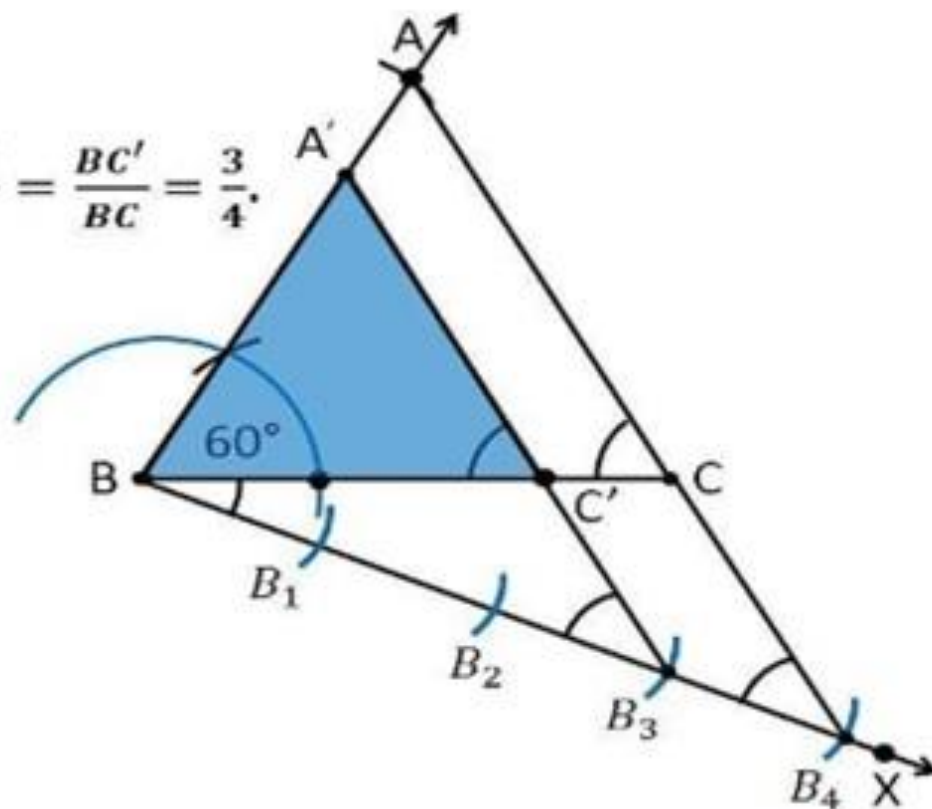
By construction,

$$\frac{BC'}{BC} = \frac{BB_3}{BB_4} = \frac{3}{4}, \quad \dots(1)$$

Also, $A'C'$ is parallel to AC

So, they will make the same angle with line BC

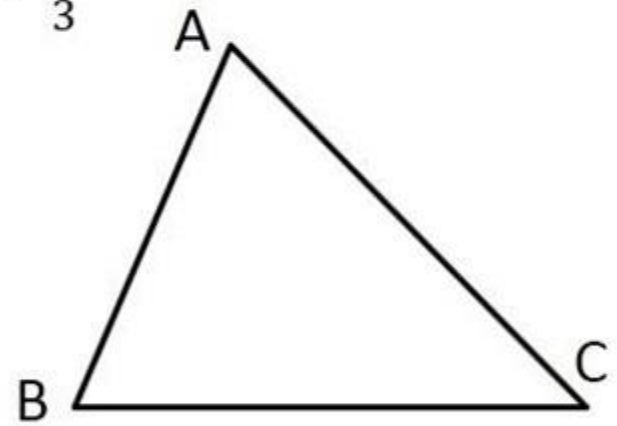
$$\therefore \angle A'C'B = \angle ACB \quad (\text{Corresponding angles}) \quad \dots(2)$$



Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{5}{3}$ of the corresponding sides of the triangle ABC (scale factor $\frac{5}{3}$).

Here, we are given ΔABC , and scale factor $\frac{5}{3}$

$\therefore$ Scale Factor > 1



We need to construct triangle similar to ΔABC

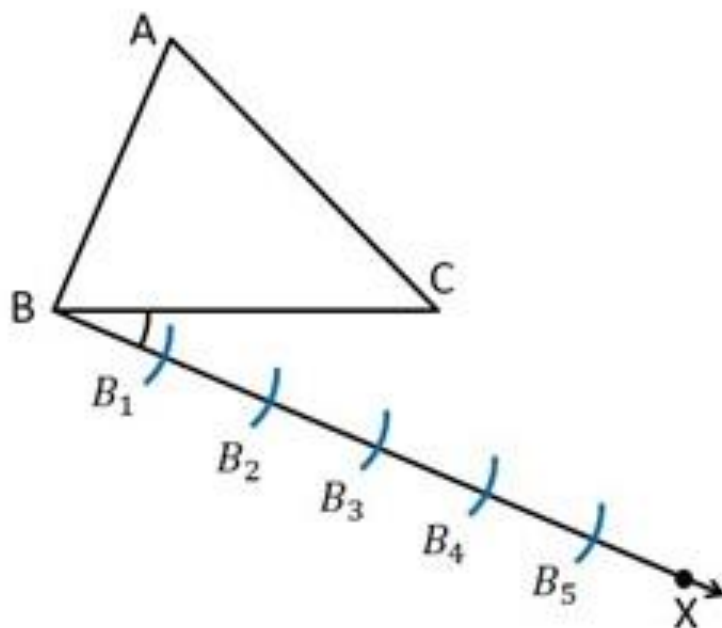
Let's follow these steps

Steps of construction

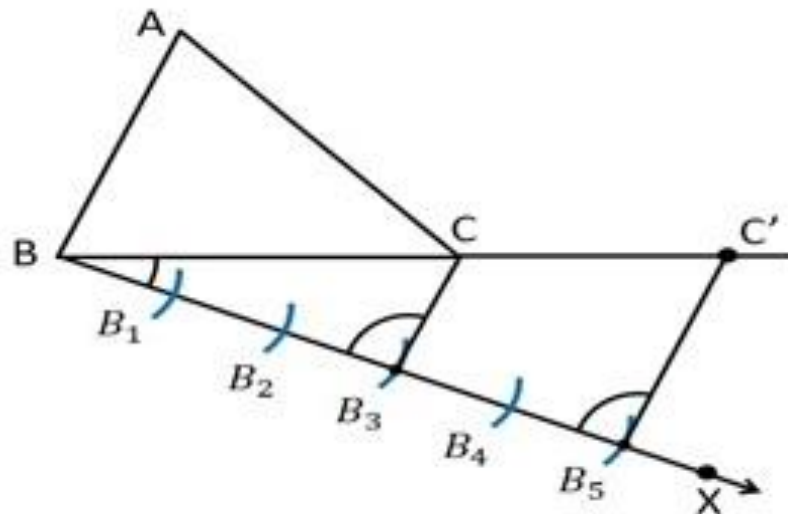
1. Draw any ray BX making an acute angle with BC on the side opposite to the vertex A.

2. Mark 5 (the greater of 5 and 3 in $\frac{5}{3}$) points

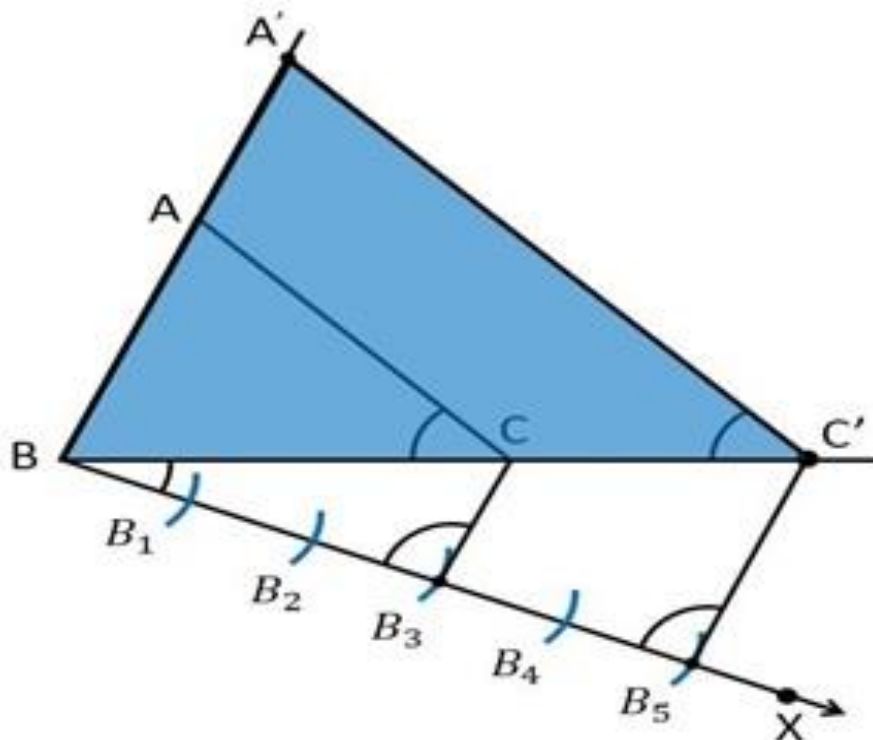
B_1, B_2, B_3, B_4, B_5 on BX so that $BB_1 = B_1B_2 = B_2B_3 = B_3B_4 = B_4B_5$



3. Join B_3C (3rd point as 3 is smaller in $\frac{5}{3}$)
and draw a line through B_5 parallel to B_3C ,
to intersect BC extended at C' .



4. Draw a line through C' parallel to the line CA to intersect BA extended at A' .



Thus, $\Delta A'BC'$ is the required triangle

In $\triangle A'BC'$ and $\triangle ABC$

$$\angle B = \angle B \quad (\text{Common})$$

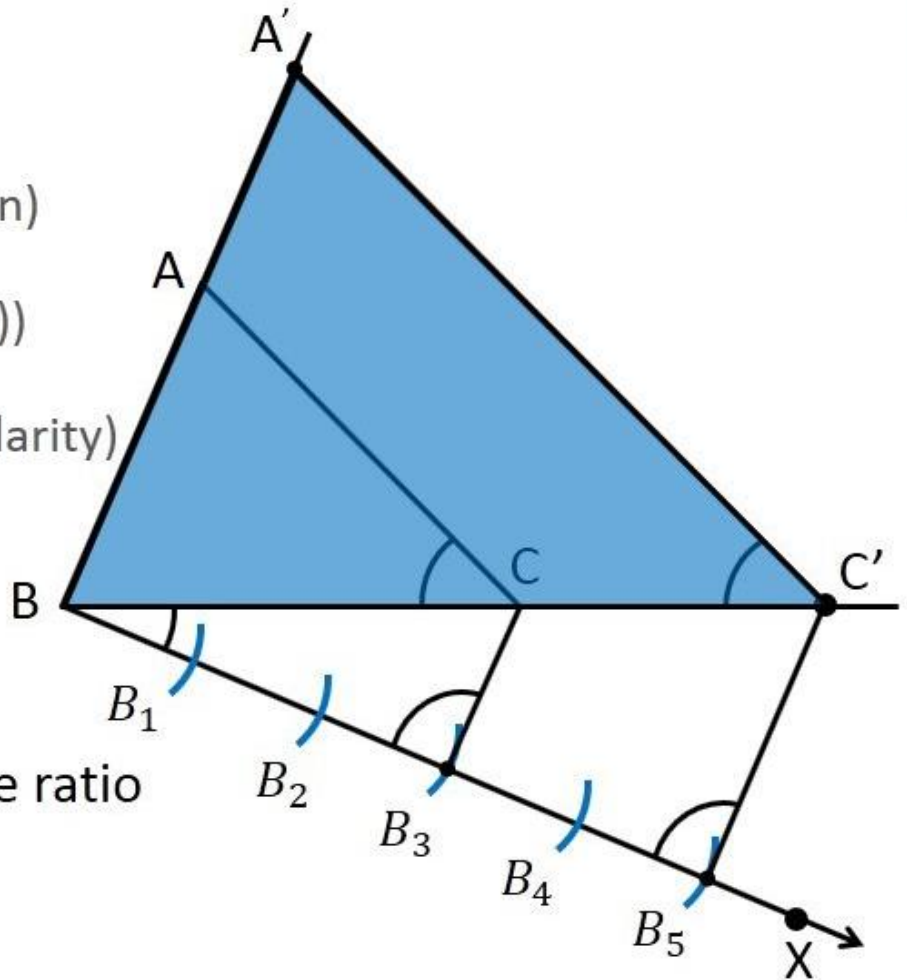
$$\angle A'C'B = \angle ACB \quad (\text{From (2)})$$

$$\Delta A'BC' \sim \Delta ABC \quad (\text{AA Similarity})$$

Since corresponding sides of B_1 and B_2 are in the same ratio

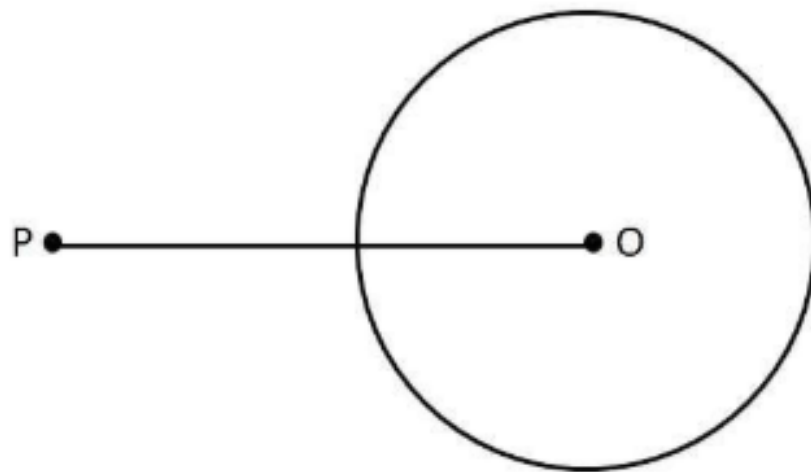
$$\frac{A'B}{AB} = \frac{A'C'}{AC} = \frac{BC'}{BC}$$

$$\text{So, } \frac{A'B}{AB} = \frac{A'C'}{AC} = \frac{BC'}{BC} = \frac{5}{3}. \quad (\text{From (1)})$$



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

We are given a circle with center O
and point P outside the circle



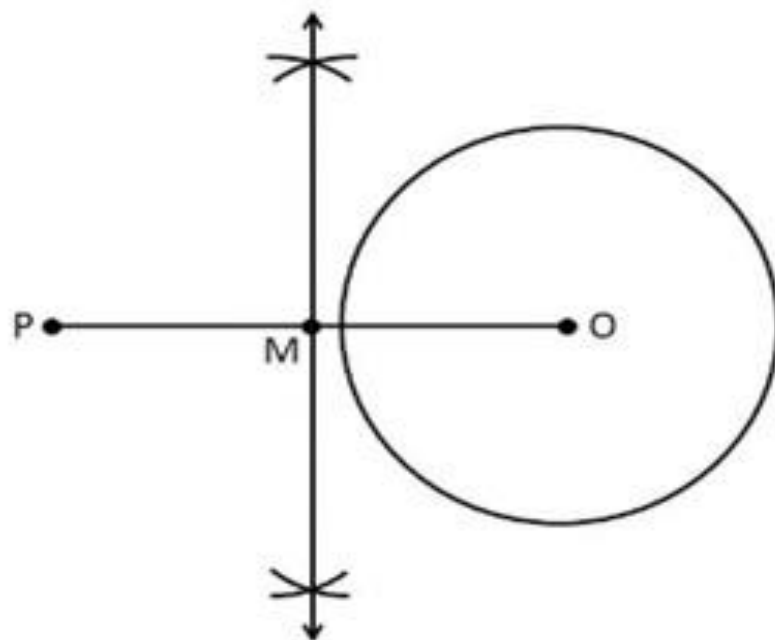
We need to draw tangents from point P to the circle
Let's follow these steps

Steps of construction

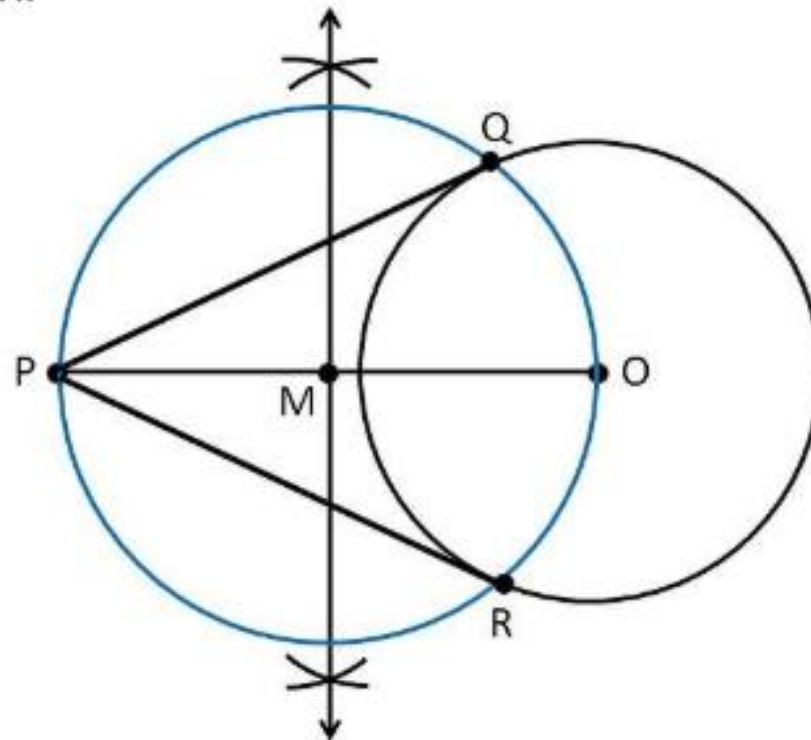
1. Join PO .

Make perpendicular bisector of PO

Let M be the midpoint of PO .



2. Taking M as centre and MO as radius, draw a circle.
3. Let it intersect the given circle at points Q and R.
4. Join PQ and PR.



Then, PQ and PR are the required two tangents.