BYJU'S
POST CLASS NOTES

Constructions

Topics

1. Division of a line segment in the given ratio

2. Construction of similar triangles

3. Construction of pair of tangents

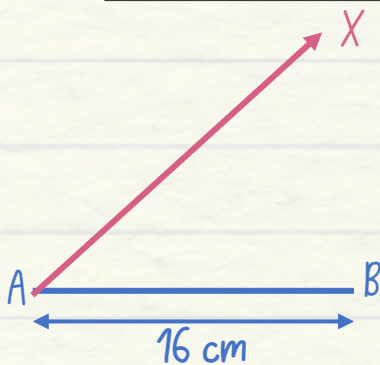# 1. Division of a Line Segment in the Given Ratio

Let's divide a line segment of length 16 cm in the ratio 5:3.
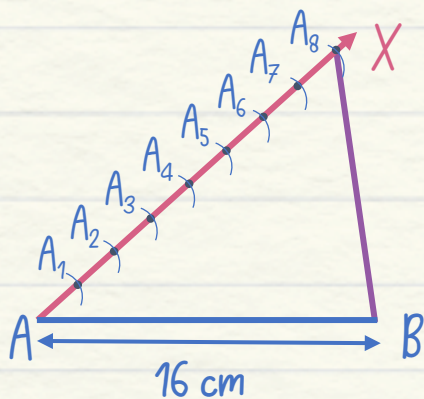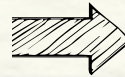
Step 1: Draw AB = 16 cm.

A ———————————— B

16 cm

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

X

A ———— B

16 cm

Step 3: Locate 8 (= 5 + 3) points on ray AX such that,
$AA_1 = A_1A_2 = A_2A_3 = A_3A_4 = \ldots = A_7A_8$.

$A_1\ A_2\ A_3\ A_4\ A_5\ A_6\ A_7\ A_8\ X$

A ———— B

16 cm

Step 4: Join BA_8.

$A_1\ A_2\ A_3\ A_4\ A_5\ A_6\ A_7\ A_8\ X$

A ———— B

16 cm
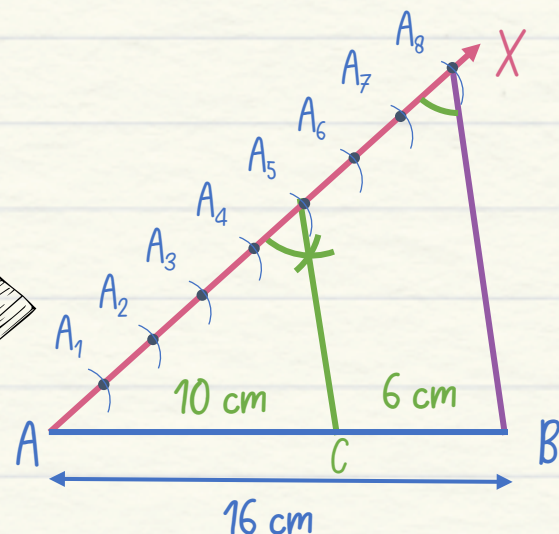
Step 5:

Draw a line parallel to BA_8 from point A_5 (by making an angle equal to $\angle AA_8B$) intersecting AB at the point C.

$A_1\ A_2\ A_3\ A_4\ A_5\ A_6\ A_7\ A_8\ X$

A ———— 10 cm — C — 6 cm — B
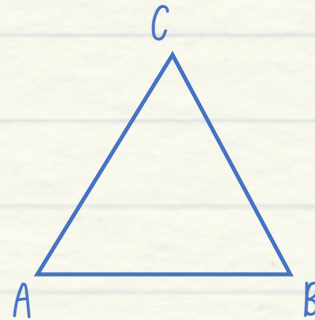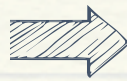
16 cm

Then, $AC:CB$ = 5:3

2. Construction of Similar Triangles

2.1 Scale Factor > 1

To construct a triangle whose sides are $\frac{5}{2}$ times the corresponding sides of the given $\triangle ABC$.
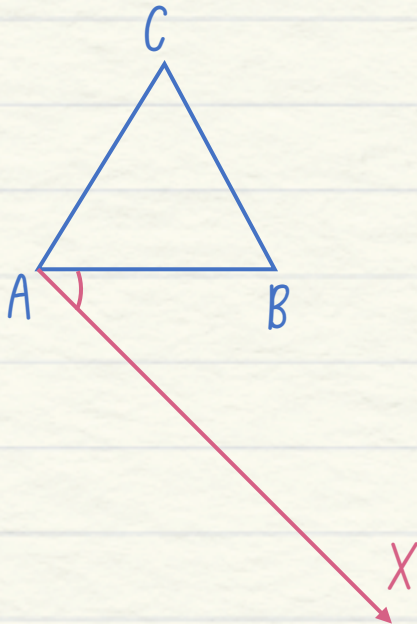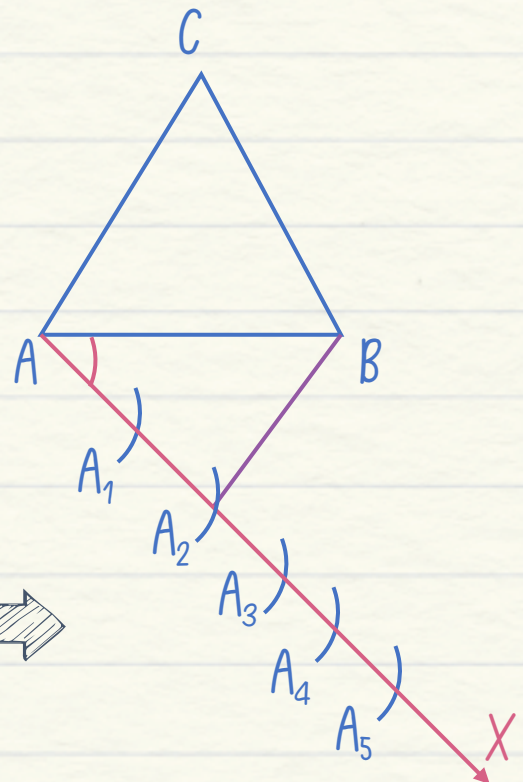
Step 1:

Draw given $\triangle ABC$.

Step 2:

Draw any ray AX making an acute angle with AB on the side opposite of the vertex C.

Step 3:

Locate 5 (the greater part of 5 and 2 in $\frac{5}{2}$) points A_1, A_2, A_3, A_4 and A_5 on AX such that $AA_1 = A_1A_2 = A_2A_3 = A_3A_4 = A_4A_5$.
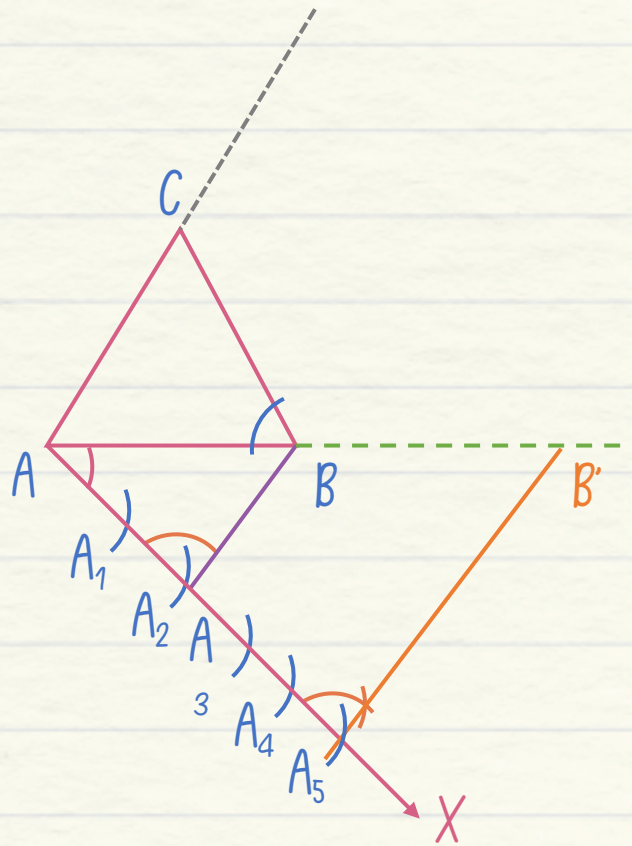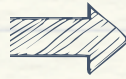
Step 4:

Step 4: Join A_2B.

Step 5:

Extend AB to right side of point B.

Step 6:

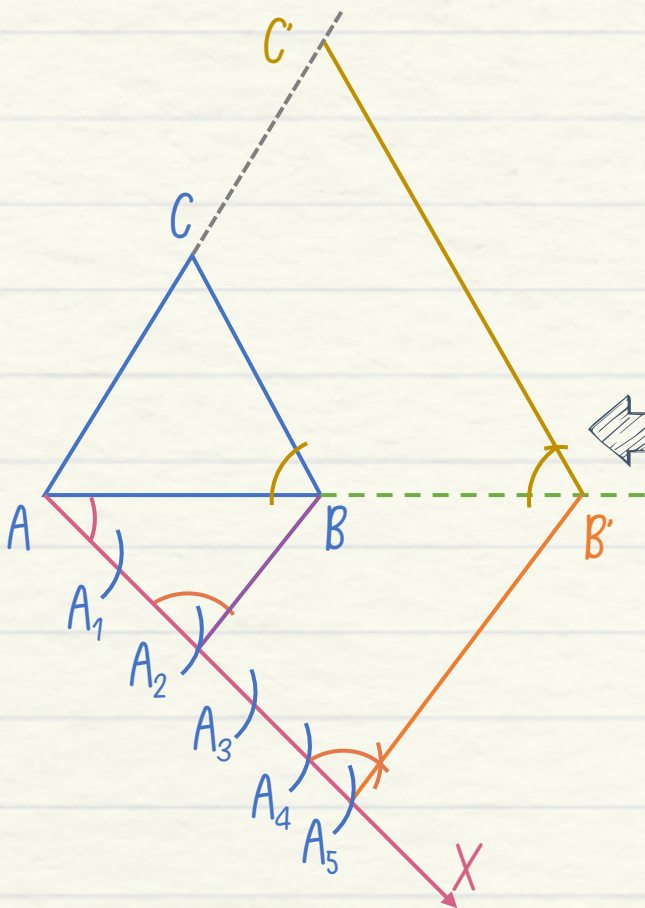Draw a line through A_5 parallel to A_2B which intersects AB at B'.

Step 7:

Produce the line AC to the right of point C.

Step 8:

Draw a line through B' parallel to the line BC to intersect AC at C'.

The $\triangle AB'C'$ has sides that are $\frac{5}{2}$ times the corresponding sides of the given $\triangle ABC$.

2.2 Scale Factor < 1

To construct a triangle whose sides are $\frac{2}{5}$ times the corresponding sides of the given $\triangle ABC$.

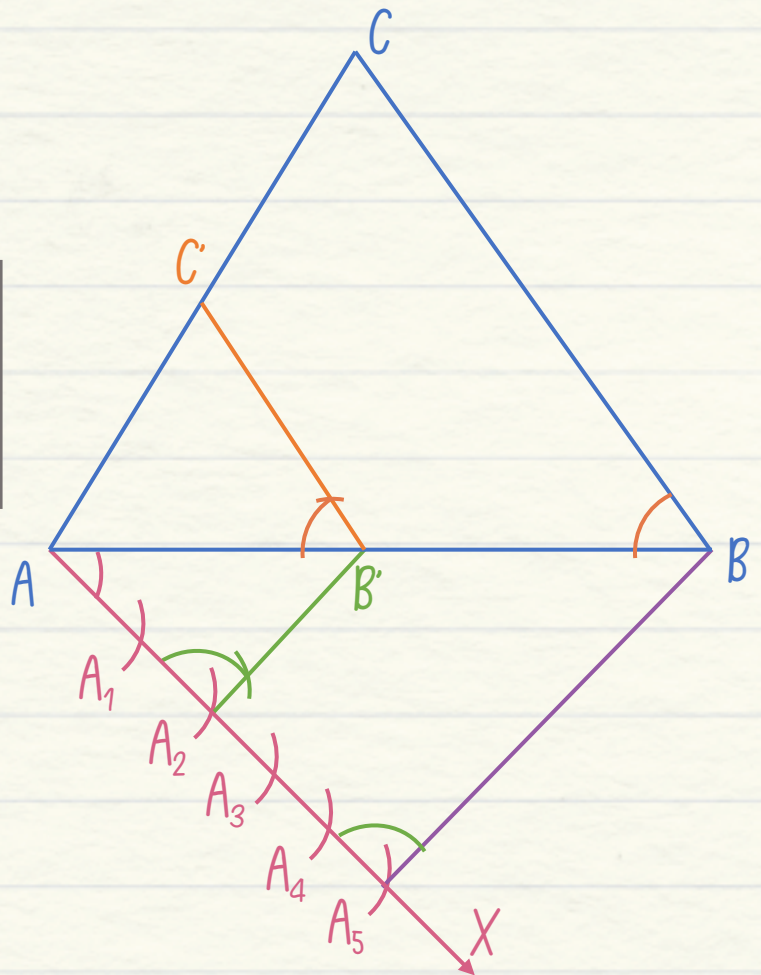Same first 3 steps as the construction of triangle with SF > 1.

Step 4:

Join A_5B.

Step 5:

Draw a line through A_2 parallel to A_5B to intersect AB at B'.

Step 6:

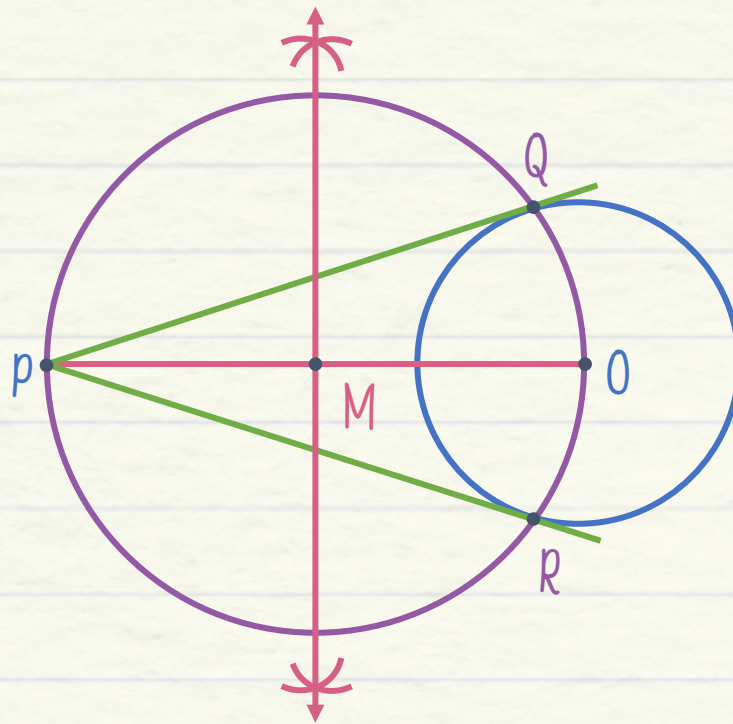Draw a line through B' parallel to the line BC to intersect AC at C'.

The $\triangle AB'C'$ has sides that are $\frac{2}{5}$ times the corresponding sides of the given $\triangle ABC$.

3. Construction of Pair of Tangents

To construct the tangents to a circle from a point (say P) outside it.

Given: A point P outside the circle of centre O.

Step 1:

Join PO and draw a perpendicular bisector of PO in order to locate its midpoint. Let's say M is the midpoint of PO.

Step 2:

Taking M as centre and MO (or MP) as radius, draw a circle. Let it intersect the given circle at the points Q and R.

Step 3:

Join PQ and PR.

Mind Map

Construction of line segment in a given ratio

Construction of pair of tangents to a circle from a point outside it

Construction

Construction of similar triangle

Scale factor > 1

Scale factor < 1