Unit 17

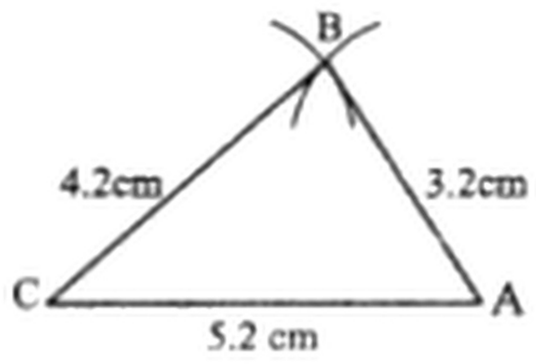
RATIO AND PROPORTION

EXERCISE 17.1

Q1. Construct, a ΔABC, in which

(i) m$\overline{AB}$ = 3. 2cm, m$\overline{BC}$ =4.2 cm, m$\overline{CA}$ = 5.2 cm

Solution:



Construction:

(i) Draw a line segment m$\overline{CA}$ = 5.2 cm.

(ii) With center A and radius equal to 3.2 cm, draw an arc.

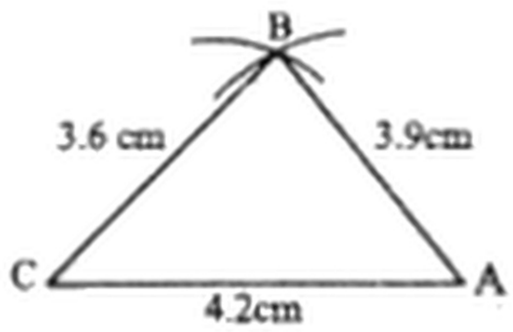
(iii) With center C and radius equal to 4.2 cm, draw another arc to cut the first arc at point B.

(iv) Join BC and AB.

Then ABC is the required triangle.

(ii) m$\overline{AB}$ = 4.2cm, m$\overline{BC}$ = 3.9cm, m$\overline{CA}$ = 3.6cm

Solution:



(i) Draw a line segment $\overline{AB}$ such that m$\overline{AB}$ = 4.2 cm.

(ii) With center B and radius 3.9 cm draw an arc.

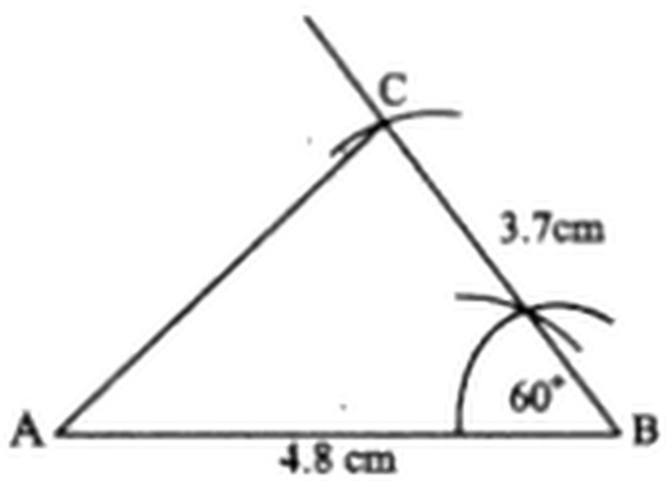
(iii) With center A and radius 3.6 cm draw another arc to cut the first arc at C.

(iv) Join C to A and B.

ABC is the required angle.

(iii) m$\overline{AB}$ = 4.8cm, m$\overline{BC}$ = 3.7cm, m∠B = 60°

Solution:



Construction:

(i) Draw a line segment m$\overline{AB}$ = 4.8 cm.

(ii) At the end B of AB make m∠ABC = 60°.

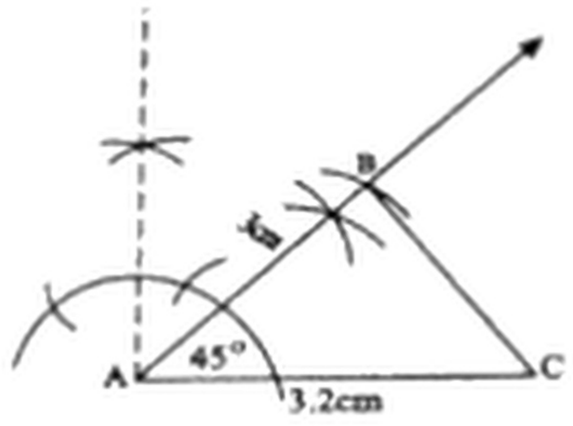
(iii) Cut of m$\overline{BC}$ = 3.7 cm.

(iv) Join A to C

ABC is the required angle.

(iv) m$\overline{AB}$ = 3cm, m$\overline{AC}$ = 3.2cm, m∠A = 45°

Solution:



Construction:

(i) Draw a line segment mAC = 3.2 cm.

(ii) At the end A of $\overline{AC}$ make ∠CAB = 45°.

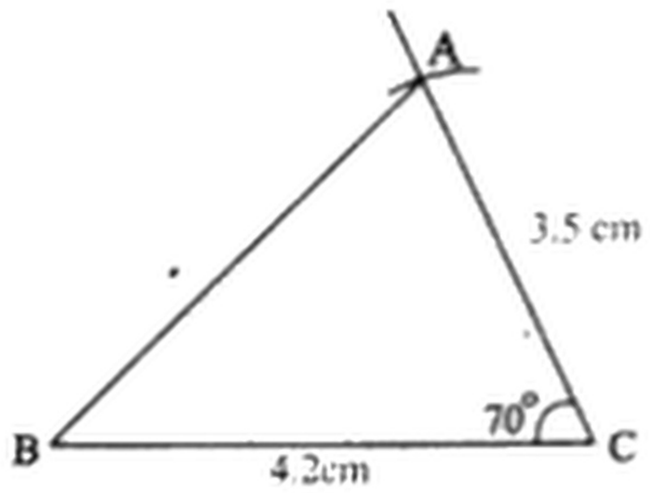
(iii) Cut off m$\overline{AB}$ = 3 cm.

(iv) Join B to C

So, ABC is the required triangle.

(v) m$\overline{AB}$ = 4.2cm, m$\overline{CA}$ = 3.5cm, m∠C = 75°

Solution:



Construction:

(i) Draw a line segment m$\overline{BC}$ = 4.2 cm.

(ii) At the end C of $\overline{BC}$ make ∠BCA = 70°.

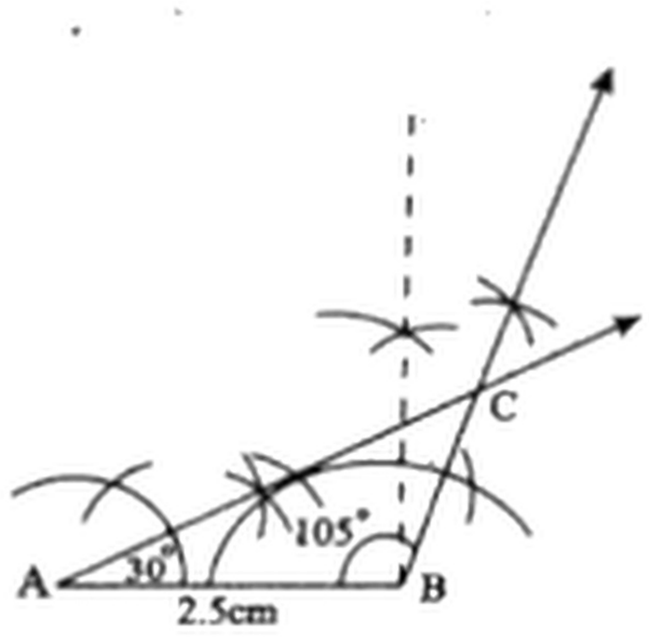
(iii) Cut off m$\overline{CA}$ = 3.5 cm.

(iv) Join A to B

So, ABC is the required triangle

(vi) $m\overline{AB}$ = 2.5cm, m∠A = 30° , m∠B = 105°

Solution:



Construction:

(i) Draw a line segment $m\overline{AB}$ = 2.5 cm.

(ii) At the end point A of $\overline{AB}$ make ∠BAC = 30°.

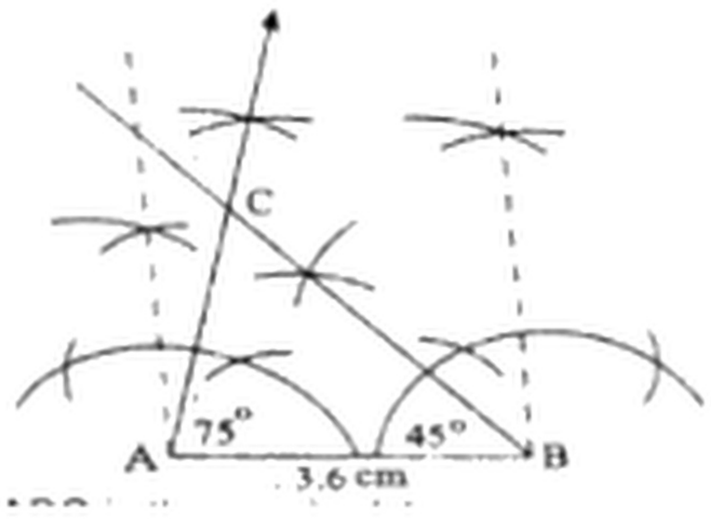
(iii) At the end point B of $\overline{AB}$ make ∠ABC = 105°.

(iv) The terminal sides of these two angles meet at C.

Then ABC is the required triangle.

(vii) $m\overline{AB}$ = 3.6cm, m∠A = 75° , m∠B = 45°

Solution:



Construction:

(ii) At the end point A of $\overline{AB}$ make $\angle BAC = 75^\circ$

(iii) At the end point. B of $\overline{AB}$ make $\angle ABC = 45^\circ$

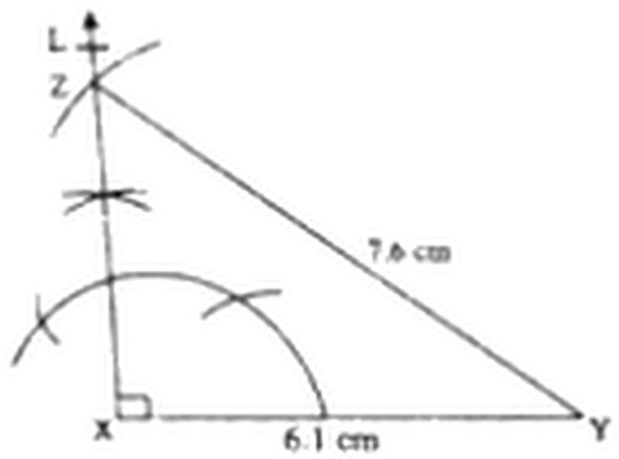
(iv) The terminal sides of these two angles meet at C.

Then ABC is the required triangle.

2. Construct ΔXYZ in which

(i) $m\overline{YZ}$ = 7.6cm, $m\overline{XY}$ = 6.1cm and $m\angle X = 90^\circ$

Solution:



Construction:

(i) Draw a line segment $m\overline{XY}$ = 6.1' cm.

(ii) At the end point X of $\overline{XY}$ make $\angle YXL = 90^\circ$.

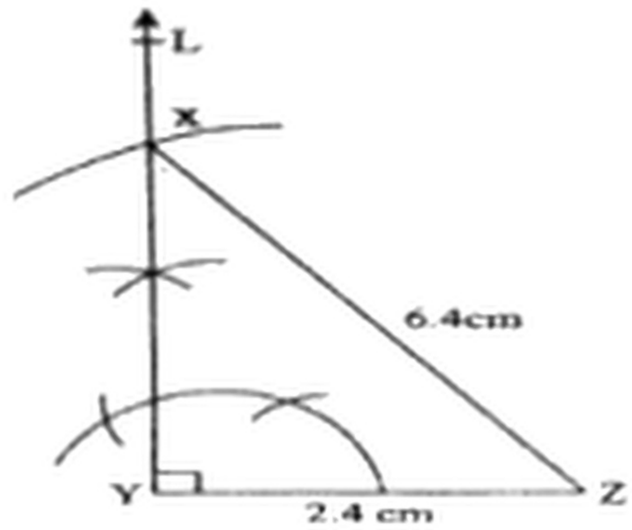
(iii) With center Y and radius equal to 7.6 cm draw an arc to cut $\vec{XL}$ at point Z.

(iv) Join T to Z.

Then XYZ is the required Δ.

(ii) $m\overline{ZX}$ = 6.4cm, $m\overline{YZ}$ = 2.4cm and $m\angle X = 90^\circ$

Solution:



Construction:

(i) Draw a line segment m$\overline{YZ}$ = 2.4 cm.

(ii) At the end point Y of $\overline{YZ}$ make ∠XYZ = 90°.

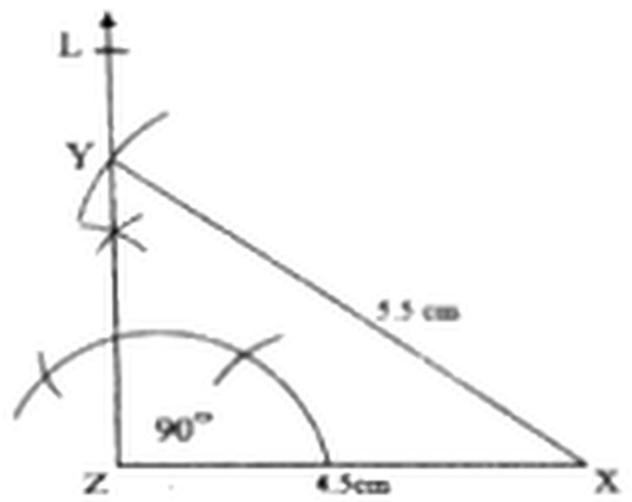
(iii) With center Z and radius equal to 6.4 cm draw an arc to cut $\overleftarrow{YL}$ at point X.

(iv) Join X to Z.

Then XYZ is the required Δ.

(iii) m$\overline{XY}$ = 5.5cm, m$\overline{ZX}$ = 4.5cm and m∠Z = 90°

Solution:



Construction:

(i) Draw a line segment m$\overline{ZX}$ = 4.5 cm.

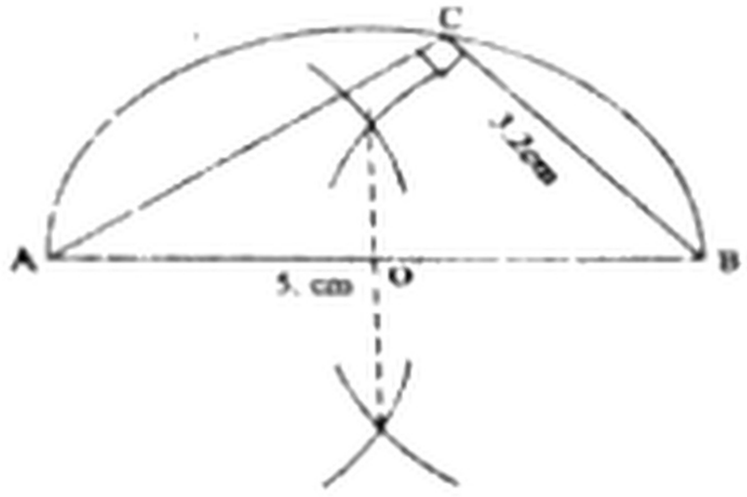
(ii) At the end point Z of $\overline{ZX}$ make ∠XZL = 90°

(iv) Join Y to X.

Then the required triangle is ΔXYZ.

Q3. Construct a right-angled r measure of whose hypotenuse is 5 cm and one side is 3.2 cm. (Hint: Angle in a semi-circle is a right angle).

Solution:



Construction:

(i) Draw a line segment m$\overline{AB}$ = 5.2 cm.

(ii) Find the mid-point O of $\overline{AB}$.

(iii) With center at O and radius equal to $\overline{OA}$ draw and semi-circle.

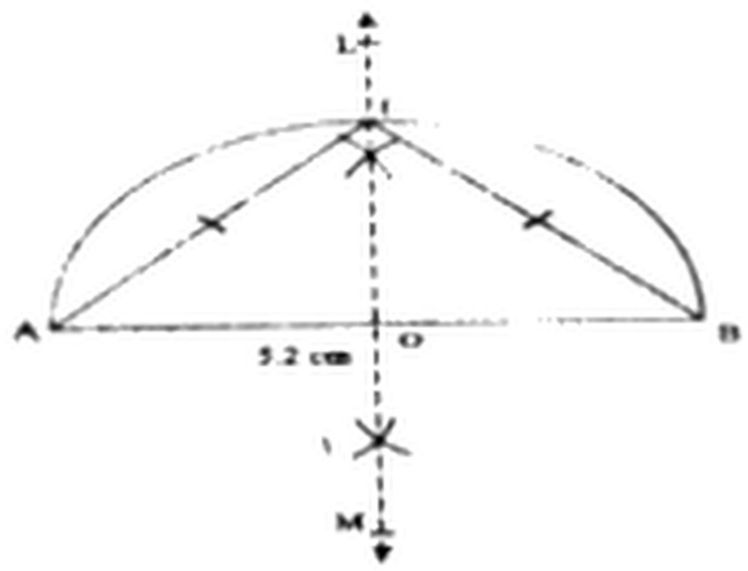
(iv) Join C to A and B.

Then ABC is the required triangle.

Q4. Construct a right-angled isosceles triangle whose hypotenuse is

(i) 5.2 cm long

Solution:



(i) Draw a line segment m$\overline{AB}$ = 5cm

(ii) Draw $\overleftrightarrow{LM}$ the right bisector of $\overline{AB}$ cutting it at the point O.

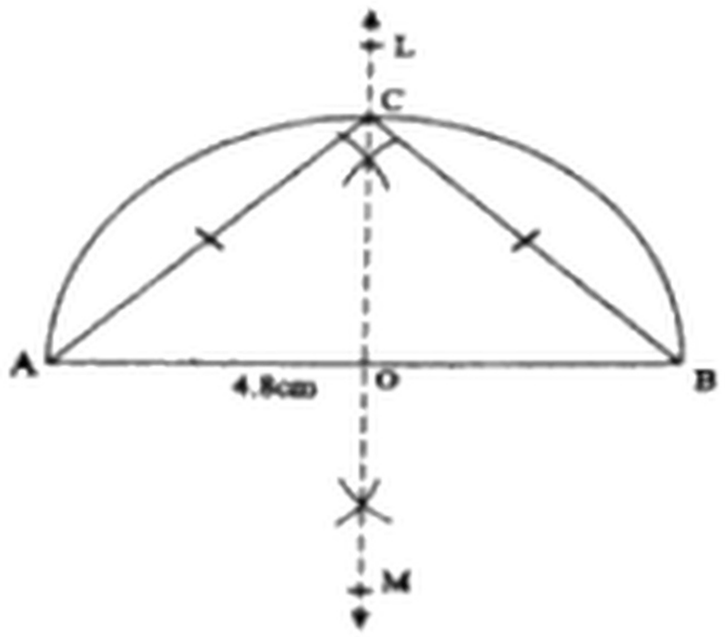
(iii) With center at the point O end AB as diameter draw a semi-circle to cut $\overleftrightarrow{LM}$ at the point C.

(iv) Join C to A and B.

So, the required triangle is ΔABC.

(ii) 4.8 cm

Solution:



Construction

(i) Draw a line segment m$\overline{AB}$ = 4.8 cm.

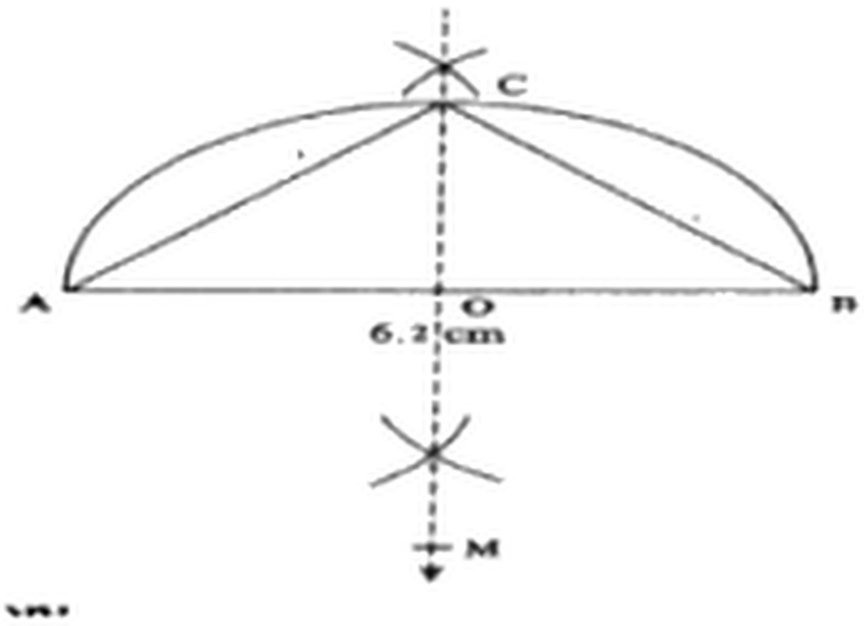
(ii) Draw $\overleftrightarrow{LM}$ the right bisector of $\overline{AB}$ cutting it at the point O.

(iii) With O as center and AB as diameter draw a semicircle to cut $\overleftrightarrow{LM}$ at the point C.

(iv) Join C to A and B.

Then the required triangle is ABC.

(iii) 6.2 cm



Construction:

(i) Draw a line segment m$\overline{AB}$ = 6.2 cm.

(ii) Draw $\overleftrightarrow{LM}$ the right bisector of $\overline{AB}$ cutting it at the point O.

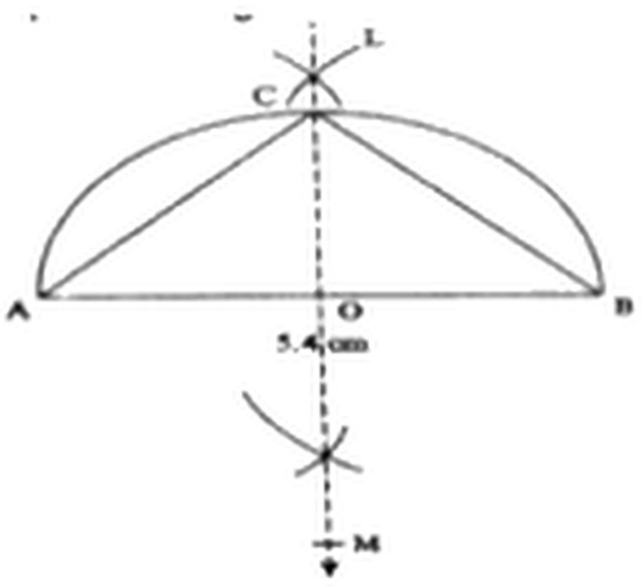
(iii) With center at the point O $\overline{AB}$ as diameter, draw a semi-circle to cut $\overleftrightarrow{LM}$ at the point C.

(iv) Join C to A and B.

Then the required triangle is ABC.

(iv) 5.4 cm

Solution:



Construction:

(i) Draw a line segment m$\overline{AB}$ = 5.4 cm.

(ii) Draw $\overleftrightarrow{LM}$ the right bisector of $\overline{AB}$ cutting it at the point O.

(iii) With center at the point O and $\overline{AB}$ as diameter, draw a semi-circle to cut $\overleftrightarrow{LM}$ at the point C.

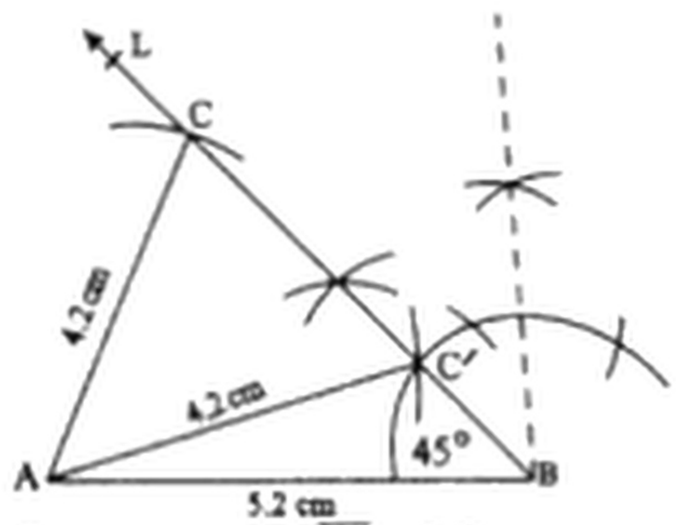
(iv) Join C to A and B.

Then the required triangle is ABC.

Q5. (Ambiguous Case) Construct a ΔABC in which

(i) m$\overline{AC}$ = 4.2cm, m$\overline{AB}$ = 5.2cm, m∠B = 45° (two Δs)

Solution:



Construction:

(i) Draw a line segment m$\overline{AB}$ = 5.2 cm

(ii) At the end point B make m∠ABL = 45°

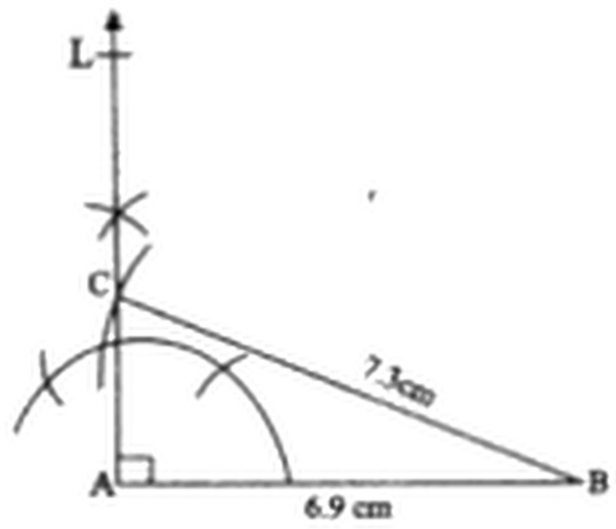
(iii) With center at A and radius 4.2 cm, draw an arc to cut $\overline{BL}$ at two points C and C'.

(iv) Join A to C and C'.

So ΔABC and Z.ABC' are two required triangles.

(ii) m$\overline{AB}$= 6.9cm, m$\overline{BC}$ = 7.3cm, m∠A = 90° (one Δ)

Solution:



Construction:

(i) Draw a line segment $m\overline{AB}$ = 6.9 cm

(ii) At the end point A make m∠BAL = 90°

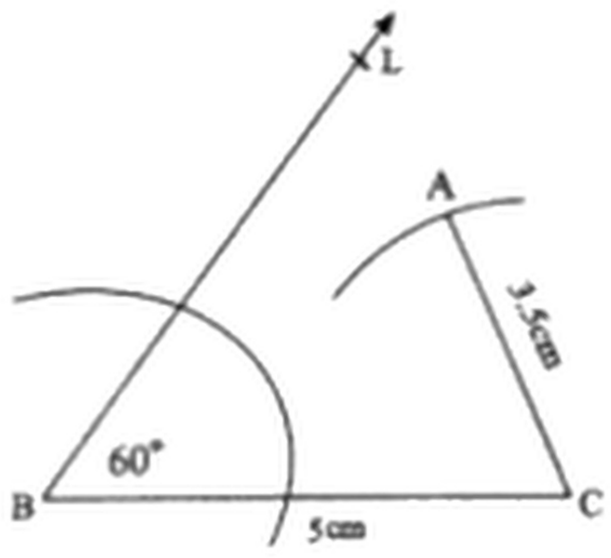
(iii) With center at B and radius 7.3 cm, draw an arc to cut $\overleftrightarrow{AL}$ at the end point C.

(iv) Join A to C.

Then ΔABC is the required triangles.

(iii) $m\overline{BC}$ = 5cm, $m\overline{AB}$ = 3.5cm, m∠B = 60°

Solution:



Construction:

(i) Draw a line segment $m\overline{BC}$ = 5 cm.

(ii) At the end point B make m∠CBL = 60°

(iii) With center at the point C and radius 3.5 cm draw an arc.

So, we cannot construct a triangle with the given data.