Board – ICSE	Class – 10	Topic – Constructions Solved Examples

1. Using a ruler and a compass construct a triangle ABC in which AB = 7 cm, ∠CAB = 60° and AC = 5 cm. Construct the locus of:

(i) points equidistance from AB and AC.

(ii) points equidistant from BA and BC.

Hence construct a circle touching the three sides of the triangle internally.

Solution :

Given, AB = 7 cm, ∠CAB = 60°, AC = 5 cm

Steps of construction:

(1) Construct triangle ABC with given measurements.

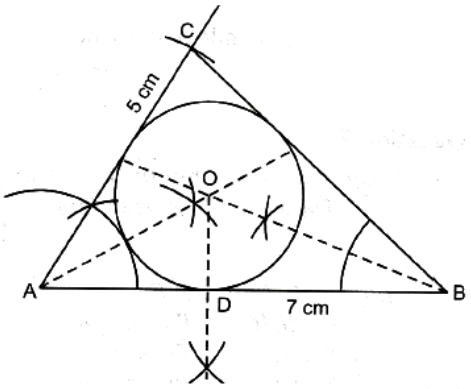
(2) Draw bisector of ∠BAC which is the locus of points equidistant from AB and AC.

(3) Draw bisector of ∠ABC which is the locus of points equidistant from AB and BC.

(4) Let the bisectors meet at O.

(5) Draw a perpendicular from O to AB intersecting AB at D.

(6) Taking O as centre and OD as radius, construct a circle touching the three sides of triangle internally.



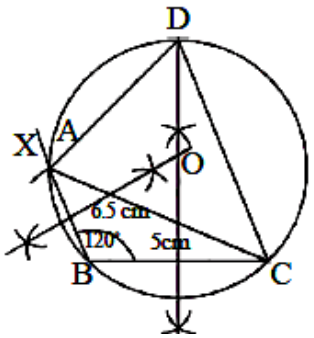
2. Using ruler and compass only, construct a △ ABC such that BC = 5 cm and AB = 6.5 cm and ∠ABC = 120°

(i) Construct a circum-circle of △ ABC

(ii) Construct a cyclic quadrilateral ABCD, such that D is equidistant from AB and BC.

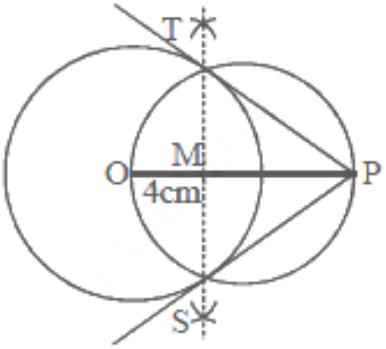
Solution :

Steps of construction:



1) Draw a line segment BC of length 5 cm.
2) At B, draw a ray BX making an angle of 120° with BC.
3) With B as centre and radius 6.5 cm, draw an arc to cut the ray BX at A. Join AC. △ ABC will be obtained
4) Draw the perpendicular bisectors of AB and BC to meet at point O.
5) With O as centre and radius OA, draw a circle. The circle will circumscribe △ ABC
6) Draw the angle bisector of ∠ABC
7) The angle bisector of ∠ABC and let it meet circle at point D.
8) Join AD and DC to obtain the required cyclic quadrilateral ABCD such that point D is equidistant from AB and BC.

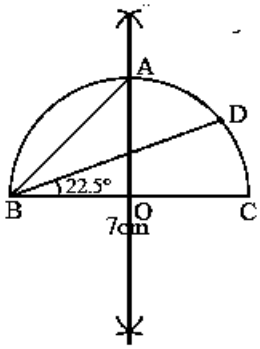
3. Use ruler and compass only for answering this question.
Draw a circle of radius 4 cm. Mark the centre as O. Mark a point P outside the circle at a distance of 7 cm from the centre. Construct two tangents to the circle from the external point P.
Measure and write down the length of any one tangent.



Solution :

i. Draw a line segment OP = 7 cm
ii. With centre O and radius 4 cm, draw a circle.
iii. Draw the mid-point of OP.
iv. With centre M and diameter OP, draw a circle which intersect the circle at T and S.
v. Joint PT and PS
PT and PS are the required tangent on measuring the length of PT = PS = 5.74 cm

4. Using ruler and a compass only construct a semi-circle with diameter BC = 7 cm. Locate a point A on the circumference of the semicircle such that A is equidistant from B and C. Complete the cyclic quadrilateral ABCD, such that D is equidistant from AB and BC. Measure ∠ADC and write it down.

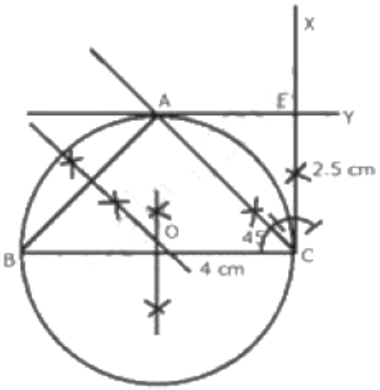


Solution :

i. Draw a line segment BC = 7 cm
ii. Taking mid-point of BC as centre O, draw a semi-circle with radius = 3.5 cm
iii. Now, the semicircle circumscribes the △ ABC
iv. Draw angle bisector of ∠ABC and make it intersect the semi-circle at D.
v. Measure the angle ∠DBC which comes out to be 22.5°

5. Using ruler and compass construct a triangle ABC in which BC = 4 cm, ∠ACB = 45° and a perpendicular from A on BC is 2.5 cm. Hence construct a circle circumscribing the triangle △ ABC. Measure and write down the radius of the circle.

Solution :



Steps of Construction:
i) Draw a line segment BC = 4 cm.
ii) At C, draw a perpendicular line CX and from it, cut off CE = 2.5 cm.
iii) From E, draw another perpendicular line EY.
iv) From C, draw a ray making an angle of 45° with CB, which intersects EY at A.
v) Join AB.
vi) △ ABC is the required triangle.
vii) Draw perpendicular bisectors of sides AB and BC intersecting each other at O.
viii) With centre O, and radius OB, draw a circle which will pass through A, B and C.
Measuring the radius OB = OC = OA = 2 cm

6. Using a ruler and a compass construct a triangle ABC in which AB = 7 cm, ∠CAB = 60° and AC = 5 cm. Construct the locus of

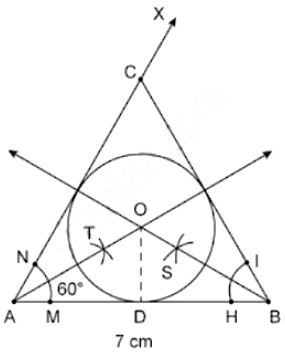
points equidistant from AB and AC

points equidistant from BA and BC

Hence construct a circle touching the three sides of the triangle internally.

Solution :

Steps of construction:



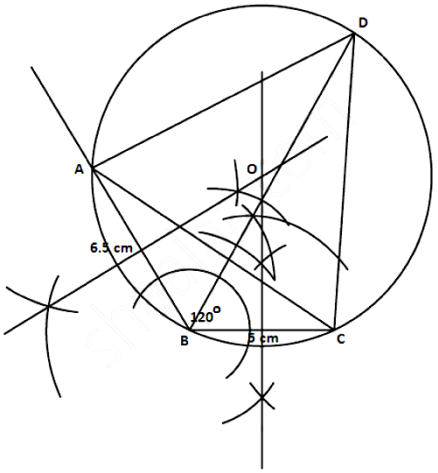
1) Draw a line AB = 7 cm
2) Taking P as centre and same radius, draw an arc of a circle which intersects AB at M.
3) Taking M as centre and with the same radius as before drawn an arc intersecting previously drawn arc, at point N.
4) Draw the ray AX passing through N, then
5) Taking A as centre and radius equal to 5 cm, draw an arc cutting AX at C.
6) Join BC
7) The required triangle ABC is obtained.
8) Draw angle bisector of ∠CAB and ∠ABC
9) Mark their intersection as O
10) With O as center, draw a circle with radius OD

7. Using ruler and compass only, construct a △ ABC such that BC = 5 cm and AB = 6.5 cm and ∠ABC = 120°

i. Construct a circum-circle of △ ABC
ii. Construct a cyclic quadrilateral $ABCD$, such that D is equidistant from AB and BC.

Solution :

Steps of construction:



1) Draw a line segment BC of length 5 cm.
2) At B, draw a ray BX making an angle of 120° with BC.
3) With B as centre and radius 6.5 cm, draw an arc to cut the ray BX at A. Join AC.
   $\triangle$ ABC will be obtained
4) Draw the perpendicular bisectors of AB and BC to meet at point O.
5) With O as centre and radius OA, draw a circle. The circle will circumscribe $\triangle$ ABC
6) Draw the angle bisector of $\angle$ABC
7) The angle bisector of $\angle$ABC and let it meet circle at point D.
8) Join AD and DC to obtain the required cyclic quadrilateral ABCD such that point D is equidistant from AB and BC.