

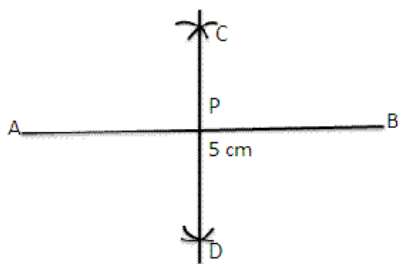
## Geometrical Constructions

### Exercise 12A

#### Question 1:

##### Steps of Construction:

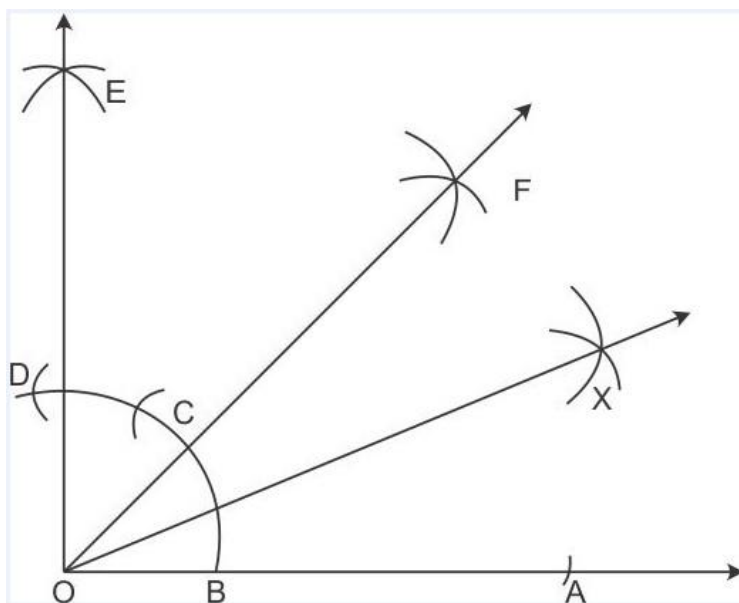
- (i) Draw a line segment  $AB = 5\text{ cm}$
  - (ii) With  $A$  as centre and radius equal to more than half of  $AB$ , draw two arcs, one above  $AB$  and the other below  $AB$ .
  - (iii) With  $B$  as a centre and the same radius draw two arcs which cuts the previously drawn arcs at  $C$  and  $D$ .
  - (iv) Join  $CD$ , intersecting  $AB$  at point  $P$ .
- $\therefore CD$  is the perpendicular bisector of  $AB$  at the point  $P$ .



#### Question 2:

##### Step of Construction:

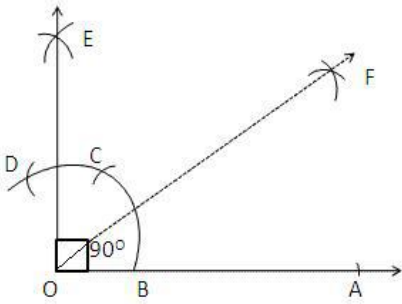
- (i) Draw a line segment  $OA$ .
- (ii) At  $A$ , draw  $\angle AOE = 90^\circ$ , using ruler and compass.
- (iii) With  $B$  as centre and radius more than half of  $BD$ , draw an arc.
- (iv) With  $D$  as centre and same radius draw another arc which cuts the previous arc at  $F$ .
- (v) Join  $OF$ .  $\therefore \angle AOF = 45^\circ$ .
- (vi) Now with centre  $B$  and radius more than half of  $BC$ , draw an arc.
- (vii) With centre  $C$  and same radius draw another arc which cuts the previously drawn arc at  $X$ .
- (viii) Join  $OX$ .  $\therefore OX$  is the bisector of  $\angle AOF$ .



**Question 3:**

**Step of Construction:**

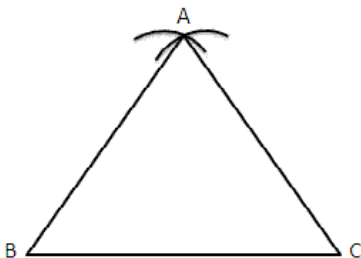
- (i) Draw a line segment OA.
- (ii) With O as centre and any suitable radius draw an arc, cutting OA at B.
- (iii) With B as centre and the same radius cut the previously drawn arc at C.
- (iv) With C as centre and the same radius cut the arc at D.
- (v) With C as centre and the radius more than half CD draw an arc.
- (vi) With D as centre and the same radius draw another arc which cuts the previous arc at E.
- (vii) Join E Now,  $\angle AOE = 90^\circ$
- (viii) Now with B as centre and radius more than half of CB draw an arc.
- (iv) With C as centre and same radius draw an arc which cuts the previous at F.
- (x) Join OF.
- (xi)  $\therefore$  F is the bisector of right  $\angle AOE$ .



**Question 4:**

**Step of construction:**

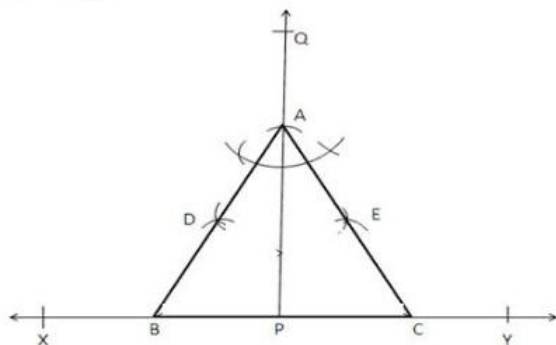
- (i) Draw a line segment BC=5cm.
  - (ii) With B as centre and radius equal to BC draw an arc.
  - (iii) With C as centre and the same radius draw another arc which cuts the previous arc at A.
  - (iv) Join AB and AC.
- Then  $\triangle ABC$  is the required equilateral triangle.



**Question 5:**

- (i) Draw a line XY.
- (ii) Mark any point P on it.
- (iii) From P, draw  $PQ \perp XY$ .
- (iv) From P, set off  $PA = 5.4$  cm cutting PQ at A.
- (v) Construct  $\angle PAB = 30^\circ$  and  $\angle PAC = 30^\circ$ , meeting XY at B and C respectively.

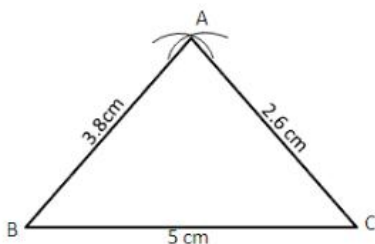
$\therefore \triangle ABC$  is required equilateral triangle.



**Question 6:**

Steps of construction:

- (i) Draw a line segment  $BC = 5$  cm.
- (ii) With centre B and radius equal to 3.8 cm draw an arc.
- (iii) With centre C and radius equal to 2.6 cm draw another arc which cuts the previous drawn arc at A.
- (iv) Join AB and AC.  $\therefore \triangle ABC$  is required equilateral triangle.



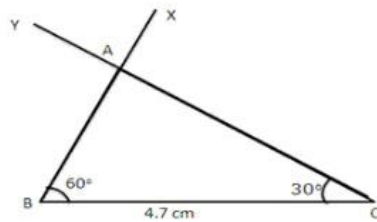
**Question 7:**

Steps of Construction:

- (i) Draw a line segment  $BC = 4.7$  cm.
- (ii) At B draw  $\angle XBC = 60^\circ$
- (iii) At C draw  $\angle YCB = 30^\circ$ .

Let XB and YC intersect at A.

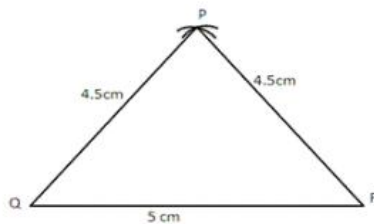
$\therefore \triangle ABC$  is the required triangle.



**Question 8:**

Steps of Construction :

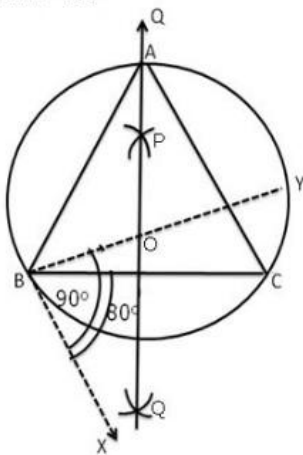
- (i) Draw a line of segment  $QR = 5$ cm which is the base..
- (ii) With centre Q and radius equal to 4.5 cm, draw an arc.
- (iii) With centre P and same radius draw another arc which cuts the previous arc at P.
- (iv) Join PQ and PR.  $\therefore \triangle PQR$  is the required isosceles triangle.



**Question 9:**

Steps of Construction :

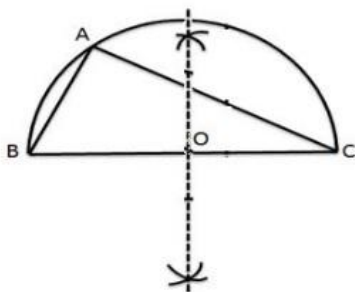
- (i) Draw a line segment  $BC = 4.8$  cm.
- (ii) Make  $\angle CBX = 80^\circ$ , below the line segment BC.
- (iii) Make  $\angle XBY = 90^\circ$ .
- (iv) Draw the right bisector PQ of BC, intersecting BY at O.
- (v) With O as centre and radius OB, draw a circle intersecting PQ at A.
- (vi) Join AB and AC.  $\therefore \triangle ABC$  is the required isosceles triangle in which  $AB = AC$ .



**Question 10:**

Steps of construction :

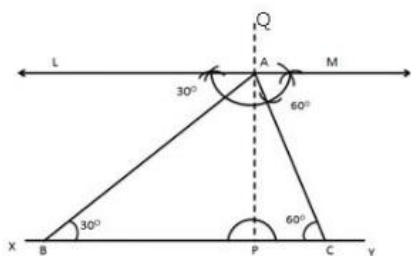
- (i) Draw a line segment  $BC=5.3\text{cm}$ .
- (ii) Find the mid-point  $O$  of  $BC$ .
- (iii) With  $O$  as a centre and radius  $OB$ , draw a semicircle on  $BC$ .
- (iv) With  $B$  as centre and radius equal to  $4.5\text{ cm}$  draw an arc cutting the semicircle at  $A$ .
- (v) Join  $AB$  and  $AC$ ,  $\therefore \triangle ABC$  is the required triangle.



#### Question 11:

Steps of Construction :

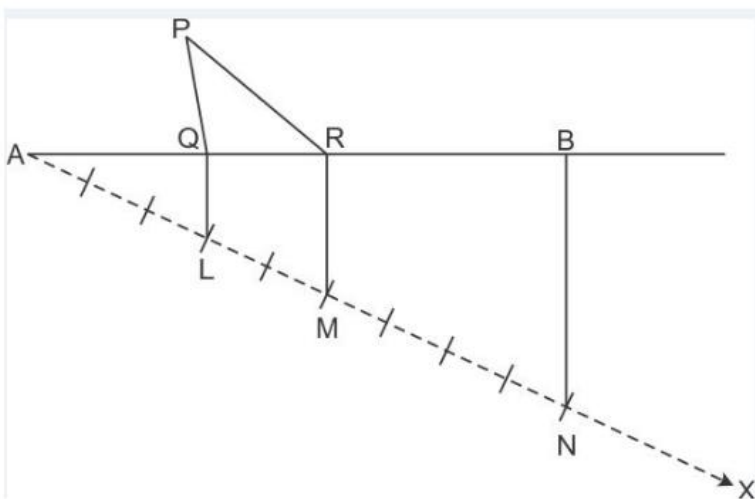
- (i) Draw any line  $XY$ .
  - (ii) Take any point  $P$  on  $XY$  and draw  $PQ \perp XY$ .
  - (iii) Along  $PQ$ , set off  $PA=4.8\text{ cm}$ .
  - (iv) Through  $A$ , draw  $LM \parallel XY$ .
  - (v) Construct  $\angle LAB = 30^\circ$  and  $\angle MAC = 60^\circ$  meeting  $XY$  at  $B$  and  $C$  respectively .
- $\therefore \triangle ABC$  is the required triangle.



#### Question 12:

Steps of Construction :

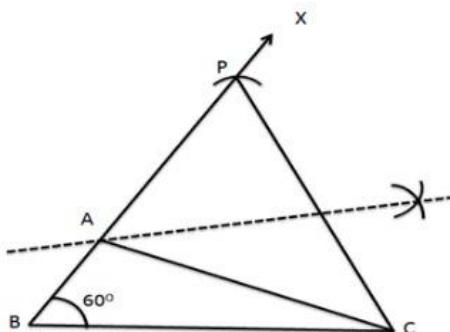
- (i) Draw a line segment  $AB=12$  cm.
  - (ii) Draw a ray  $AX$ , making an acute angle with  $AB$  and drawn in the downward direction.
  - (iii) From  $A$  set off  $(3+2+4) = 9$  equal distances along  $AX$ .
  - (iv) Mark points  $L, M, N$  on  $AX$  such as that  $AL = 3$  units,  $LM = 2$  units and  $MN = 4$  units.
  - (v) Join  $NB$ .
  - (vi) Through  $L$  and  $M$ , draw  $LQ \parallel NB$  and  $MR \parallel NB$  cutting  $AB$  at  $Q$  and  $R$  respectively.
  - (vii) With  $Q$  as centre and radius  $AQ$ , draw an arc.
  - (viii) With  $R$  as centre and radius  $RB$ , draw another arc, cutting the previous arc at  $P$ .
  - (ix) Join  $PQ$  and  $PR$ .
- $\therefore \triangle PQR$  is the required triangle.



**Question 13:**

**Steps of Construction:**

- (i) Draw  $BC = 4.5$  cm.
- (ii) Construct  $\angle CBX = 60^\circ$
- (iii) Along  $BX$  set off  $BP = 8$ cm.
- (iv) Join  $CP$ .
- (v) Draw the perpendicular bisector of  $CP$  to intersecting  $BP$  at  $A$ .
- (vi) Join  $AC$ .  $\therefore \triangle ABC$  is the required triangle.



**Question 14:**

**Steps of Construction:**

- (i) Draw  $BC = 5.2$  cm.
- (ii) Construct  $\angle CBX = 30^\circ$

(iii) Set off  $BP = 3.5$  cm.

(iv) Join  $PC$ .

(v) Draw the right bisector of  $PC$ , meeting  $BP$  produced at  $A$ .

(vi) Join  $AC$ .  $\therefore \triangle ABC$  is the required triangle.

