

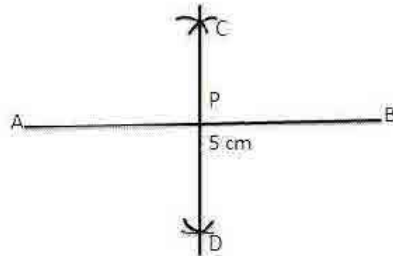
Geometrical Constructions

Exercise 12A

Question 1:

Steps of Construction:

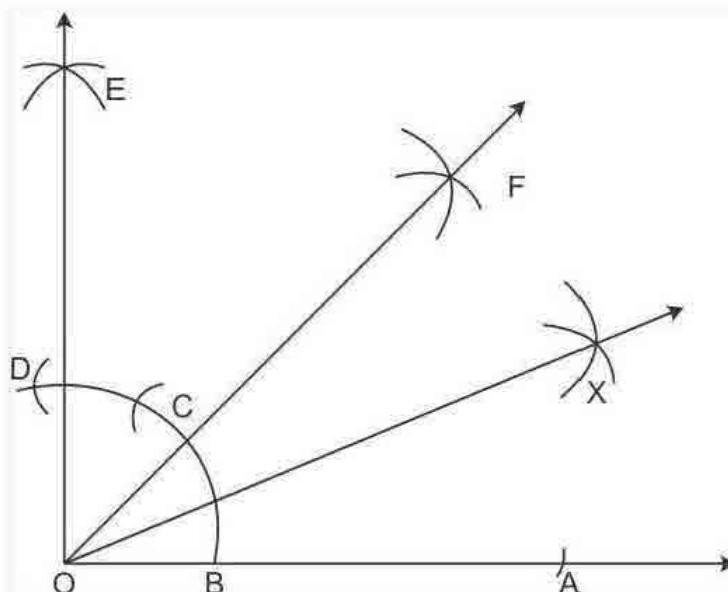
- (i) Draw a line segment $AB = 5 \text{ cm}$
 - (ii) With A as centre and radius equal to more than half of AB, draw two arcs, one above AB and the other below AB.
 - (iii) With B as a centre and the same radius draw two arcs which cuts the previously drawn arcs at C and D.
 - (iv) Join CD, intersecting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



Question 2:

Step of Construction:

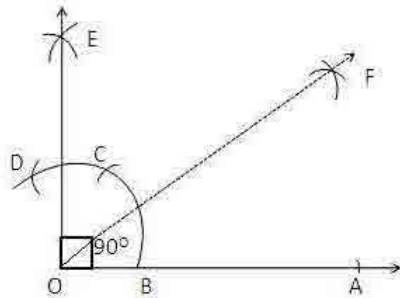
- (i) Draw a line segment OA.
- (ii) At A, draw $\angle AOE = 90^\circ$, using ruler and compass.
- (iii) With B as centre and radius more than half of BA, draw an arc.
- (iv) With D as centre and same radius draw another arc which cuts the previous arc at F.
- (v) Join OF. $\therefore \angle AOF = 45^\circ$.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

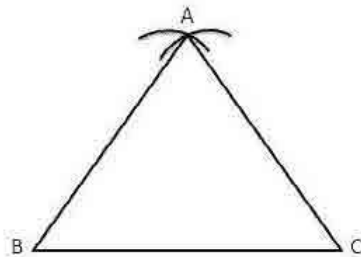
- (i) Draw a line segment OA.
- (ii) With O as centre and any suitable radius draw an arc, cutting OA at B.
- (iii) With B as centre and the same radius cut the previously drawn arc at C.
- (iv) With C as centre and the same radius cut the arc at D.
- (v) With C as centre and the radius more than half 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.
- (ix) 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:

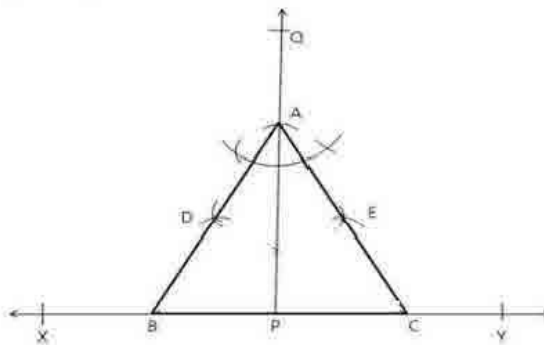
Step of construction:

- (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:

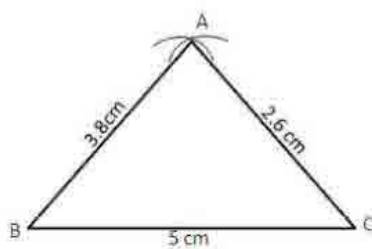
- (i) Draw a line XY.
 - (ii) Mark any point P on it.
 - (iii) From P, draw $PQ \perp XY$.
 - (iv) From P, set off $PA = 5.4$ cm cutting PQ at A.
 - (v) Construct $\angle PAB = 30^\circ$ and $\angle PAC = 30^\circ$, meeting XY at B and C respectively.
- $\therefore \Delta ABC$ is required equilateral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



Question 7:

Steps of Construction:

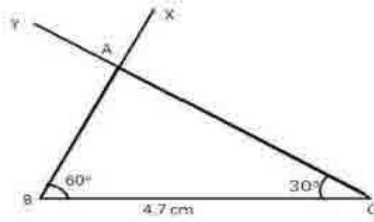
(i) Draw a line segment $BC = 4.7$ cm.

(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:

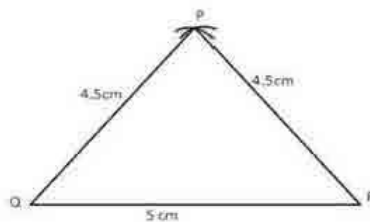
Steps of Construction :

(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 R 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.

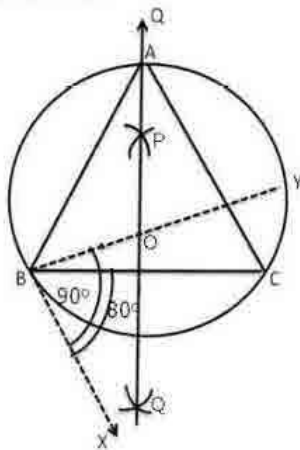
(ii) Make $\angle CBX = 80^\circ$, below the line segment BC.

(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.

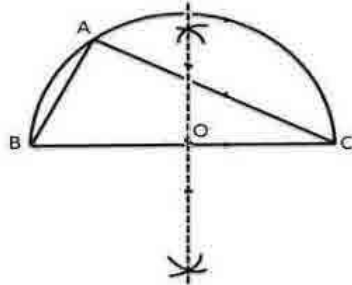
(vi) Join AB and AC. $\therefore \triangle ABC$ is the required isosceles triangle in which $AB = AC$.



Question 10:

Steps of construction :

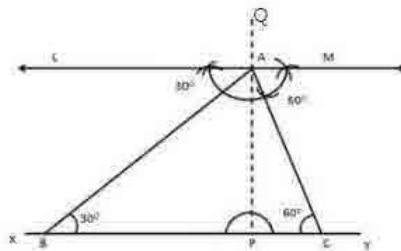
- (i) Draw a line segment $BC=5.3\text{cm}$.
- (ii) Find the mid-point O of BC .
- (iii) With O as a centre and radius OB , draw a semicircle on BC .
- (iv) With B as centre and radius equal to 4.5 cm draw an arc cutting the semicircle at A .
- (v) Join AB and AC , $\therefore \triangle ABC$ is the required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



Question 11:

Steps of Construction :

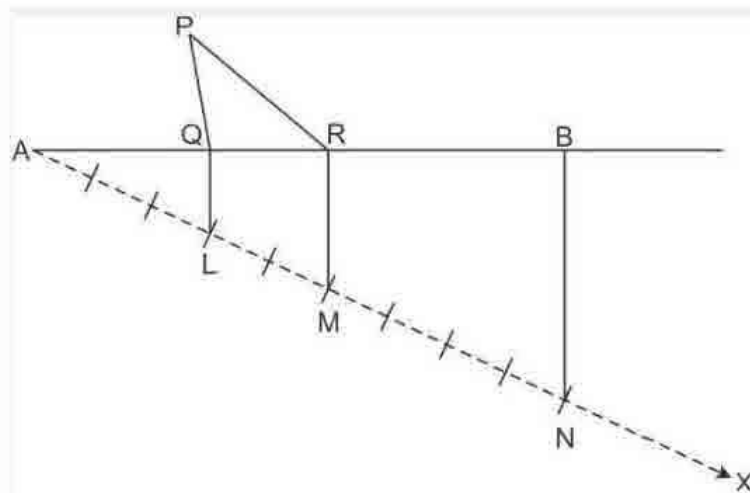
- (i) Draw any line XY .
 - (ii) Take any point P on XY and draw $PQ \perp XY$.
 - (iii) Along PQ , set off $PA=4.8\text{ cm}$.
 - (iv) Through A , draw $LM \parallel XY$.
 - (v) Construct $\angle LAB = 30^\circ$ and $\angle MAC = 60^\circ$ meeting XY at B and C respectively.
- $\therefore \triangle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



Question 12:

Steps of Construction :

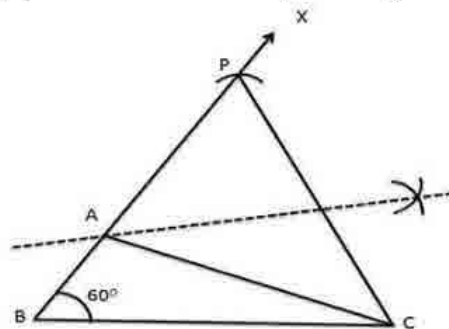
- (i) Draw a line segment $AB=12$ cm.
 - (ii) Draw a ray AX , making an acute angle with AB and drawn in the downward direction.
 - (iii) From A set off $(3+2+4) = 9$ equal distances along AX .
 - (iv) Mark points L, M, N on AX such as that $AL = 3$ units, $LM = 2$ units and $MN = 4$ units.
 - (v) Join 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 .
- $\therefore \Delta PQR$ 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 . $\therefore \Delta ABC$ 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.

