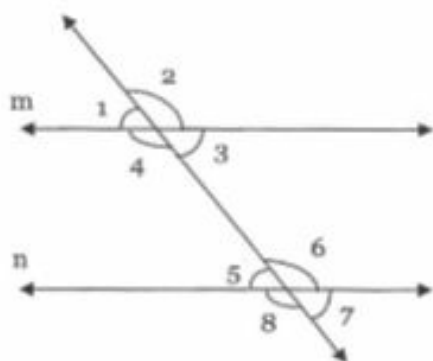


CBSE Test Paper 01
CH-11 Constructions

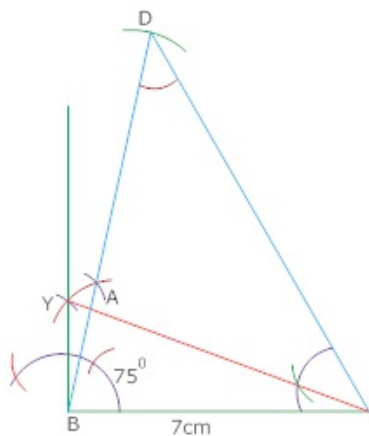
1. With the help of a ruler and a compass, it is not possible to construct an angle of ____.
 - a. 37.5°
 - b. 40°
 - c. 22.5°
 - d. 67.5°
2. The construction of a triangle ABC, given that $BC = 3$ cm, $\angle C = 60^{\circ}$ is possible when the difference of AB and AC is equal to ____.
 - a. 3.2 cm.
 - b. 3 cm.
 - c. 2.8 cm.
 - d. 3.1 cm.
3. In the adjoining figure, if $\angle 2 = 55^{\circ}$ and $\angle 5 = 55^{\circ}$, the lines m and n are



- a. cannot say
 - b. not parallel
 - c. parallel
 - d. none of these
4. With the help of a ruler and a compass, it is not possible to construct an angle of ____.
 - a. 67.5°
 - b. 7.5°
 - c. 35°
 - d. 82.5°
5. Which of the following angles cannot be constructed with the help of a ruler and a compass?

- $7\frac{1}{2}^{\circ}$
- $37\frac{1}{2}^{\circ}$
- $22\frac{1}{2}^{\circ}$
- $30\frac{1}{2}^{\circ}$

6. Can we construct an angle of 67.5° ? Justify for your answer
7. Construct an angle equal to a given angle.
8. Draw an obtuse angle. Bisect it. Measure each of the angles so obtained.
9. Using protractor, draw a right angle. Bisect it to get an angle of measure 45° .
10. Construct a triangle ABC with perimeter 12 cm, $\angle B = 60^\circ$ and $\angle C = 45^\circ$.
11. Construct an angle of 90° at the initial point of a given ray and justify the construction.
12. Construct a triangle ABC with perimeter 10 cm and each base angle is of 45° .
13. Construct a right triangle ABC whose base BC is 6 cm and the sum of hypotenuse AC and other side AB is 10 cm.
14. Draw an angle of 110° with the help of a protractor and bisect it. Measure each angle.
15. Construct a triangle ABC in which $BC = 7\text{cm}$, $\angle B = 75^\circ$ and $AB + AC = 9\text{cm}$.



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Solution

1. (b) 40°

Explanation: With the help of a ruler and a compass, it is not possible to construct an angle which is not a multiple of 15° . Since 40° is not a multiple of 15° , so, we cannot construct it.

2. (c) 2.8 cm.

Explanation: The construction of $\triangle ABC$ is possible when difference of other two sides is less than its base i.e $BC > AB - AC$.

3. (b) not parallel

Explanation: For the parallel lines, the corresponding or alternate angles should be equal, but here $\angle 2$ and $\angle 5$ are neither corresponding nor alternate so, the lines m and n cannot be parallel.

4. (c) 35°

Explanation: With the help of a ruler and a compass, it is not possible to construct an angle which is not a multiple of 15° and as in these option, 35° is not a multiple of 15° , so we can not construct an angle of 35° .

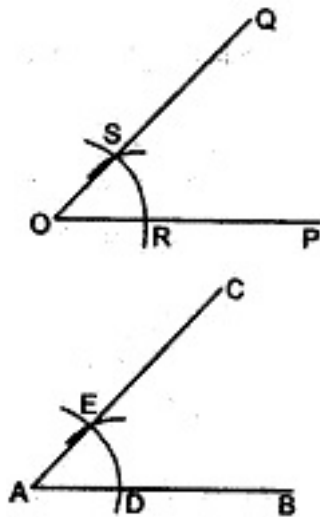
5. (d) $30\frac{1}{2}^\circ$

Explanation: With the help of a ruler and a compass, we can not construct an angle which is not a multiple of 15° . Since $30\frac{1}{2}^\circ$ is not a multiple of 15° , so, we can not construct it.

6. Yes, we can draw by constructing an angle of 135° with protractor and bisecting it with compass. (Since bisecting angles means dividing it into half, hence $\frac{135^\circ}{2} = 67.5$)

7. Given: $\angle POQ$ and a point A

Required: To construct an angle at A equal to $\angle POQ$.



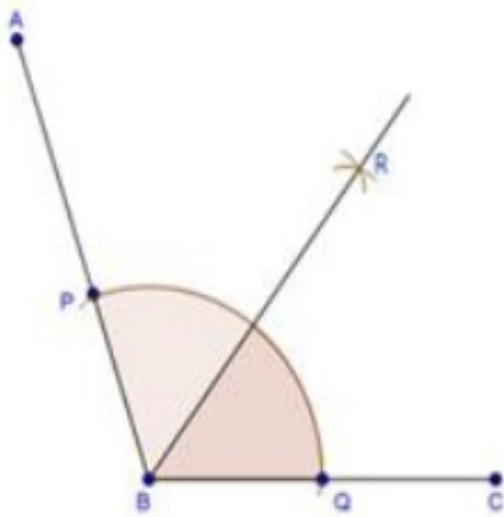
Steps in construction:

- i. With O as centre and suitable radius, draw an arc to meet OP at R and OQ at S.
- ii. Through A draw a line AB of any length.
- iii. Taking A as centre and radius equal to OR draw an arc to meet AB at D.
- iv. Measure the segment RS with compass.
- v. With D as centre and radius equal to RS, draw an arc to meet the previous arc at E.
- vi. Join AE and produce it to C, then $\angle BAC$ is the required angle equal to $\angle POQ$.

8. Steps of Construction:-

$$\therefore \angle ABR = \angle RBC = 60^\circ$$

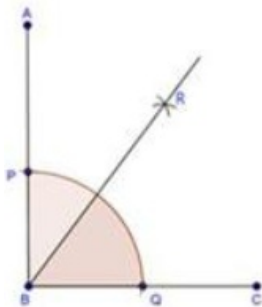
- i. Draw angle ABC of 120° .
- ii. With centre B and any radius, draw an arc which intersect AB at P and BC at Q.
- iii. With centre P and Q and radius more than $\frac{1}{2} PQ$, draw two arcs which intersect each other at R.
- iv. Join BR.



9. Steps of Construction:-

$$\therefore \angle RBC = 45^\circ.$$

- i. Draw an angle ABC of 90° .
- ii. With centre B and any radius, draw an arc which intersects AB at P and BC at Q.
- iii. With centres P and Q and radius more than $\frac{1}{2} PQ$, draw two arcs which intersect each other at R.
- iv. Join RB.



10. Given: In triangle ABC, $\angle B = 60^\circ$ and $\angle C = 45^\circ$ and $AB + BC + CA = 12$ cm.

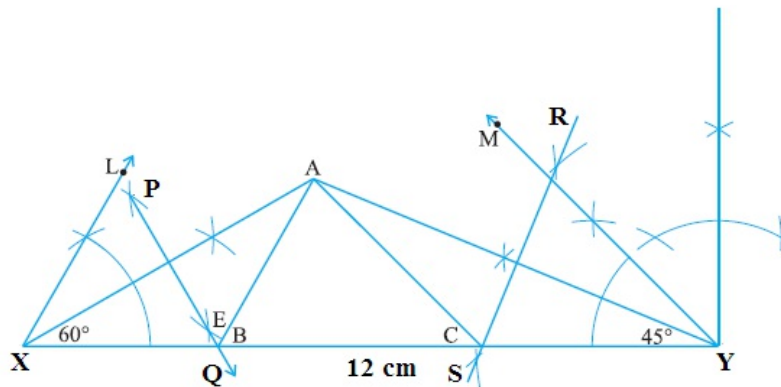
Required: To construct the triangle ABC.

Steps of construction :

ABC is the required triangle.

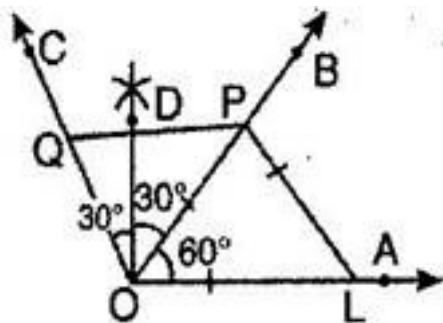
- i. Draw a line segment $XY = AB + BC + CA = 12$ cm.
- ii. Make $\angle LXY = \angle B = 60^\circ$ and $\angle MYX = \angle C = 45^\circ$
- iii. Bisect $\angle LXY$ and $\angle MYX$. Let these bisectors meet at a point A.

- iv. Draw the perpendicular bisectors PQ of AX and RS of AY.
- v. Let PQ intersects XY at B and RS intersects XY at C.
- vi. Join AB and AC.

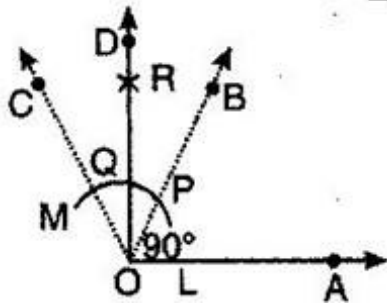


11. Steps of construction:

- a. Draw a ray OA.
- b. With O as centre and convenient radius, draw an arc LM cutting OA at L.
- c. Now with L as centre and radius OL, draw an arc cutting the arc LM at P.
- d. Then taking P as centre and radius OL, draw an arc cutting arc PM at the point Q.
- e. Join OP to draw the ray OB. Also join O and Q to draw the OC. We observe that:
 $\angle AOB = \angle BOC = 60^\circ$
- f. Now we have to bisect BOC. For this, with P as centre and radius greater than $\frac{1}{2} PQ$ draw an arc.
- g. Now with Q as centre and the same radius as in step 6, draw another arc cutting the arc drawn in step 6 at R.



- h. Join O and R and draw ray OD.
 Then $\angle AOD$ is the required angle of 90° .



Justification:

Join PL, then $OL = OP = PL$ [by construction]

Therefore $\triangle OLP$ is an equilateral triangle and $\angle POL$ which is same as $\angle BOA$ is equal to 60° .

Now join QP, then $OP = OQ = PQ$ [by construction]

Therefore $\triangle OQP$ is an equilateral triangle.

$\therefore \angle POQ$ which is same as $\angle BOC$ is equal to 60° .

By construction OD is bisector of $\angle BOC$.

$\therefore \angle DOC = \angle DOB = \frac{1}{2} \angle BOC = \frac{1}{2} \times 60^\circ = 30^\circ$

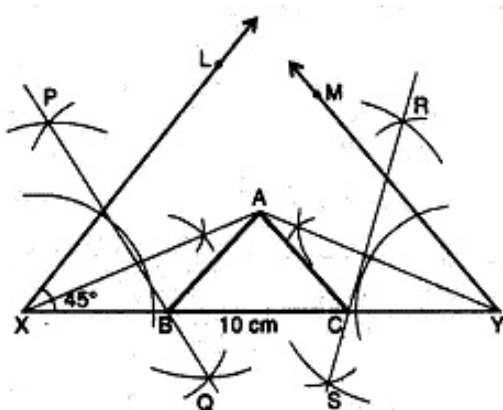
Now, $\angle DOA = \angle BOA + \angle DOB \Rightarrow \angle DOA = 60^\circ + 30^\circ$

$\Rightarrow \angle DOA = 90^\circ$

12. Given: In triangle ABC, $\angle B = 45^\circ$, $\angle C = 45^\circ$ and $AB + BC + CA = 10$ cm.

Required: To construct the triangle ABC.

Steps of construction :



ABC is the required triangle.

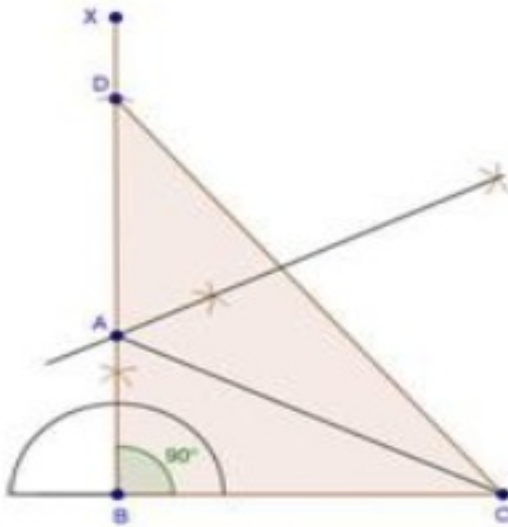
- i. Draw a line segment $XY = AB + BC + CA = 10$ cm.
- ii. Construct $\angle LXY = \angle B = 45^\circ$ and $\angle MYX = \angle C = 45^\circ$
- iii. Bisect $\angle LXY$ and $\angle MYX$. Let these bisectors meet at a point A.

- iv. Draw the perpendicular bisectors PQ of AX and RS of AY.
- v. Let PQ intersect XY at B and RS intersect XY at C.
- vi. Join AB and AC.

13. Steps of construction:-

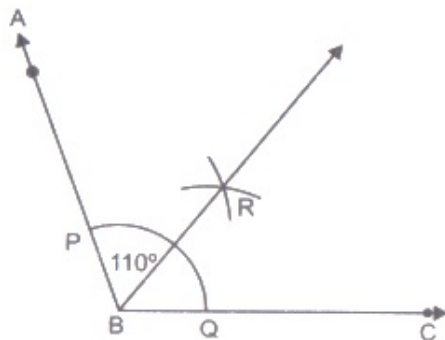
$\therefore \triangle ABC$ is the required triangle.

- i. Draw a line segment BC of 6 cm.
- ii. At B, draw an angle XBC of 90° .
- iii. With centre B and radius 10 cm draw an arc which intersects XB at D.
- iv. Join DC.
- v. Draw the perpendicular bisector of DC which intersects DB at A.
- vi. Join AC.



14. Given: An angle $ABC = 110^\circ$.

Required: To draw the bisector of $\angle ABC$



Steps of construction:

1. With B as centre and a convenient radius draw an arc to intersect the ray's BA and BC at P and Q respectively.
2. With centre P and a radius greater than half of PQ, draw an arc.
3. With Centre Q and the same radius (as in step 2), draw another arc to cut the previous arc at R.
4. Draw ray BR. This ray BR is the required bisectors of $\angle ABC$.

15. Steps of construction:

- i. Draw $BC = 7\text{cm}$
- ii. Draw $\angle DBC = 75^\circ$
- iii. Cut a line segment $BD = 9\text{cm}$
- iv. Join DC and make $\angle DCY = \angle BDC$
- v. Let CY intersect BX at A
- vi. Triangle ABC is required triangle