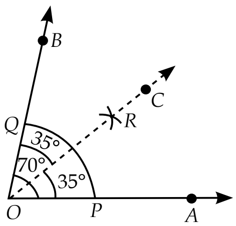
Constructions

CHAPTER 11

TRY YOURSELF — SOLUTIONS

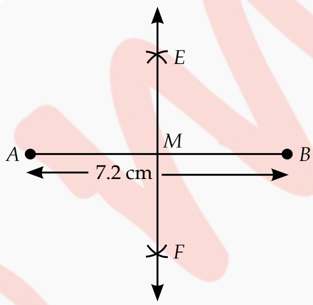
1. Steps of Construction :



Step I : Draw an $\angle AOB = 70°$ with the help of a protractor.
Step II : Taking O as centre and any suitable radius, draw an arc cutting $\overrightarrow{OA}$ at P and $\overrightarrow{OB}$ at Q.
Step III : Taking P as centre and with radius more than $\frac{1}{2}PQ$, draw an arc in the interior of $\angle AOB$.
Step IV : Taking Q as centre and with same radius as in step III, draw another arc intersecting the previous arc at R.
Step V : Join OR and produce it to C.
Then, ray OC is the required angle bisector of $\angle AOB$.
On measuring with protractor, we find that
$\angle AOC = \angle COB = 35°$

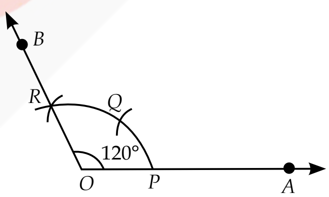
2. Steps of Construction :

Step I : Draw a line segment $AB = 7.2$ cm by using a graduated ruler.



Step II : Taking A as centre and radius more than half of AB, draw arcs on both sides of the line segment AB.
Step III : Taking B as centre and same radius as in step II, draw arcs on both sides of the line segment AB cutting the previous arcs at E and F.
Step IV : Join EF, intersecting AB at M.
Then, EF is the required perpendicular bisector of AB. On measuring with graduated ruler, we find that $AM = MB = 3.6$ cm.

3. Steps of Construction :



Step I : Draw a ray OA.
Step II : Taking O as centre and any suitable radius, draw an arc cutting $\overrightarrow{OA}$ at P.
Step III : Taking P as centre and same radius draw an arc, cutting the first arc at Q.
Step IV : Taking Q as centre and the same radius, draw an arc, cutting the arc, drawn in step II at R.
Step V : Join OR and produce it to any point B.
Then, $\angle AOB$ so obtained is the required angle of measure 120°.

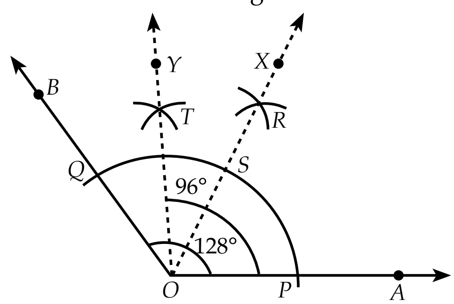
4. Steps of Construction :

Step I : Draw an $\angle AOB$ of measure 128° by using a protractor.
Step II : Taking O as centre and a convenient radius draw an arc cutting $\overrightarrow{OA}$ and $\overrightarrow{OB}$ at P and Q respectively.
Step III : Taking P as centre and radius more than $\frac{1}{2}PQ$, draw an arc in the interior of $\angle AOB$.
Step IV : Taking Q as centre and the same radius, as in step III, draw another arc intersecting the previously drawn arc at R.
Step V : Join OR and produce it to form ray OX. Then $\angle AOX$ so obtained is of measure $\left(\frac{128°}{2}\right)$ *i.e.* 64°.
Step VI : Taking S (the point where ray OX cuts the arc PQ) as centre and radius more than $\frac{1}{2}QS$, draw an arc in the interior of $\angle BOX$.
Step VII : Taking Q as centre and the same radius, as in step VI, draw another arc intersecting the previous arc drawn in step VI at T.
Step VIII : Join OT and produce it to form ray OY.

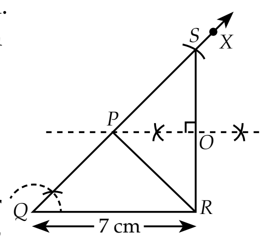
Clearly, $\angle XOY = \frac{1}{2}\angle XOB = \frac{1}{2}(64°) = 32°$

$\therefore \quad \angle AOT = \angle AOX + \angle XOY = 64° + 32° = 96°$

Then, $\angle AOY$ is the desired angle.



5. Steps of Construction :



Step I : Draw the base $QR = 7$ cm.
Step II : At point Q, construct an $\angle XQR = 60°$.
Step III : From $\overrightarrow{QX}$, cut-off $QS = 13$ cm ($= PQ + PR$).
Step IV : Join RS.
Step V : Draw the perpendicular bisector of RS, which intersects QS at P.
Step VI : Now join PR.

Then, PQR is the required triangle.

Justification : Since, point P lies on the perpendicular bisector of RS.

$\therefore \quad PS = PR$

Now, $PQ = QS - PS = QS - PR$

$\Rightarrow \quad PQ + PR = QS$, which justified the construction.

6. Steps of Construction :

Step I : Draw the base $BC = 4.5$ cm.

Step II : Construct $\angle XBC = 45°$.

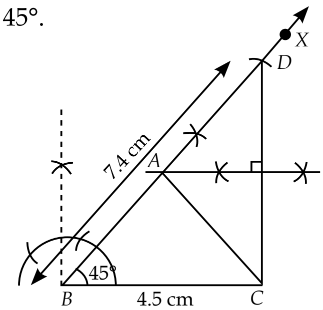
Step III : From $\overrightarrow{BX}$, cut-off $BD = 7.4$ cm (= $AB + AC$).

Step IV : Join CD.

Step V : Draw the perpendicular bisector of CD, intersecting BD at A.

Step VI : Join AC.

Then, ABC is the required triangle.



7. Steps of Construction :

Step I : Draw the base $AB = 6.2$ cm

Step II : Draw $\angle BAX = 30°$.

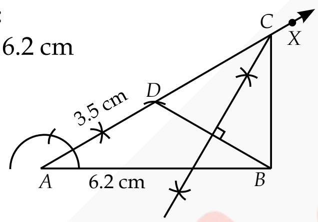
Step III : From $\overrightarrow{AX}$, cut-off line segment $AD = 3.5$ cm (= $AC - BC$).

Step IV : Join BD.

Step V : Draw the perpendicular bisector of BD which cut $\overrightarrow{AX}$ at C.

Step VI : Join BC.

Then, ABC is the required triangle.



Justification : Since, point C lies on the perpendicular bisector of DB.

$\therefore \quad CD = CB$

Now, $AD = 3.5$ cm

$\Rightarrow \quad AC - CD = 3.5$ cm

$\Rightarrow \quad AC - BC = 3.5$ cm, which justified the construction.

8. Steps of Construction :

Step I : Draw the base $BC = 5$ cm.

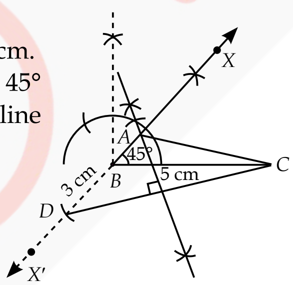
Step II : Construct an $\angle CBX = 45°$ and produce XB to X' to form line XBX'.

Step III : From ray BX', cut-off line segment $BD = 3$ cm (= $AC - AB$).

Step IV : Join CD.

Step V : Draw perpendicular bisector of CD which cuts BX at A.

Step VI : Join CA.



Then, ABC is the required triangle.

Justification : Since, point A lies on the perpendicular bisector of CD.

$\therefore \quad AC = AD$

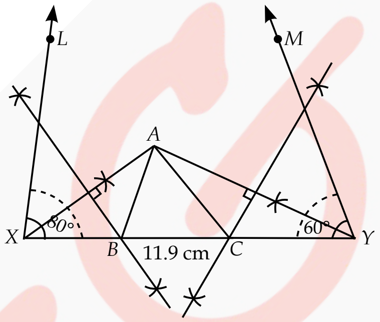
$\Rightarrow \quad AC = AB + BD$

$\Rightarrow \quad AC = AB + 3$ cm

$\Rightarrow \quad AC - AB = 3$ cm, which justified the construction.

9. Steps of Construction :

Step I : Draw a line segment $XY = 11.9$ cm (= Perimeter of triangle).



Step II : At X, construct an angle of 80° and at Y, an angle of 60°.

Step III : Bisect these angles. Let the bisectors of these angles intersect at a point A.

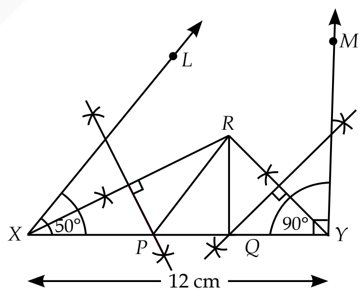
Step IV : Draw perpendicular bisectors of AX and AY to intersect XY at B and C respectively.

Step V : Join AB and AC.

Thus, ABC is the required triangle.

10. Steps of Construction :

Step I : Draw a line segment $XY = 12$ cm (= Perimeter of triangle)



Step II : At X construct an angle of 50° and at Y, an angle of 90°.

Step III : Bisect these angles. Let the bisectors of these angles intersect at a point R.

Step IV : Draw perpendicular bisectors of XR and YR to intersect XY at P and Q respectively.

Step V : Join PR and QR.

Then, PQR is the required triangle.

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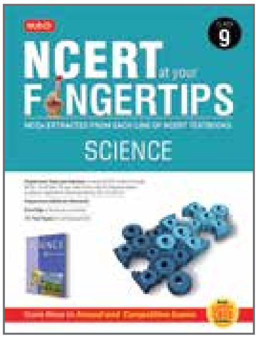

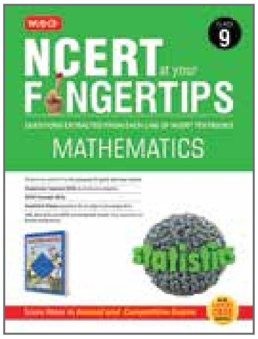

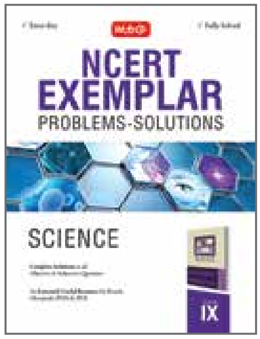

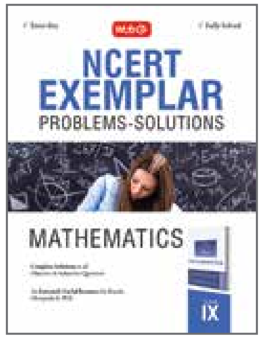

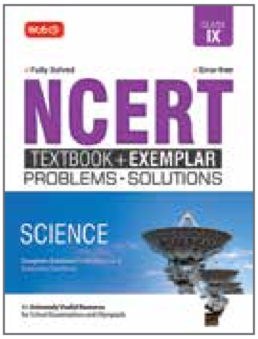

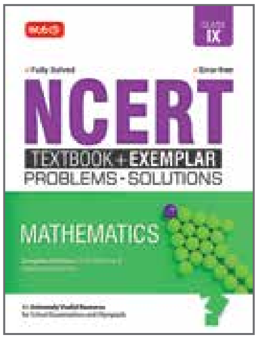

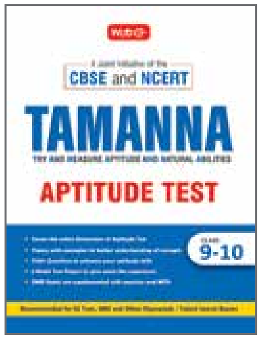

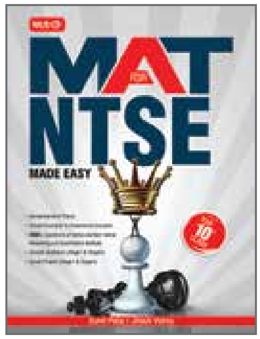

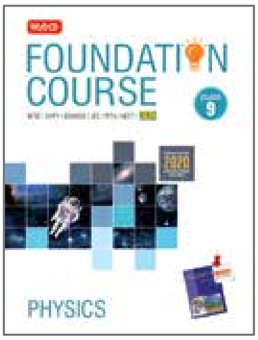

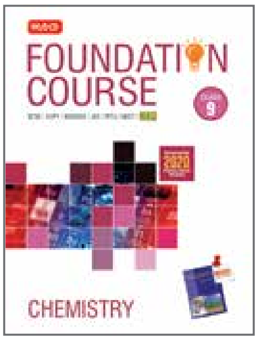

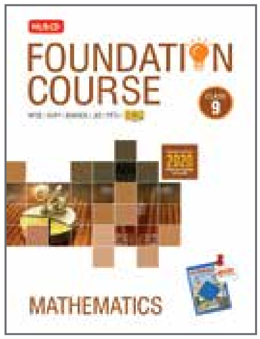

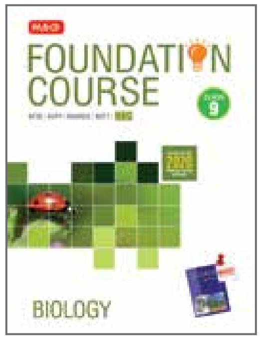

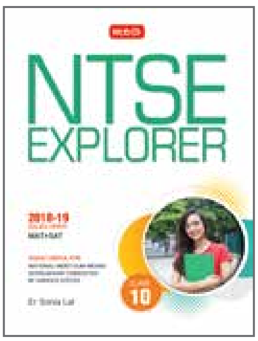

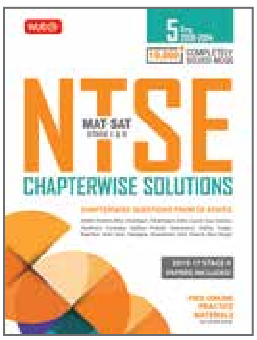

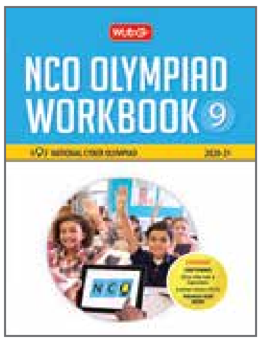

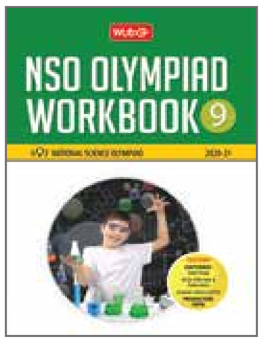

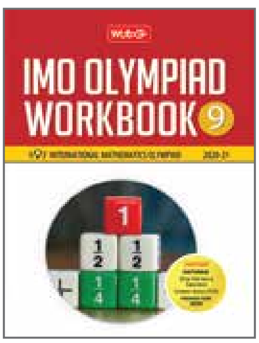

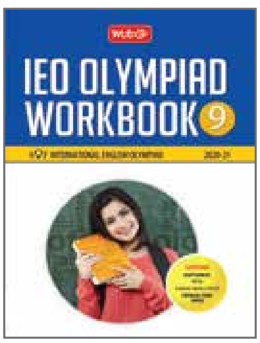

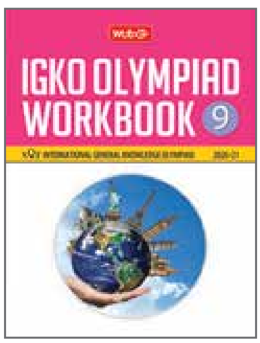

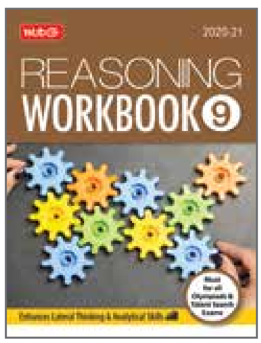

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