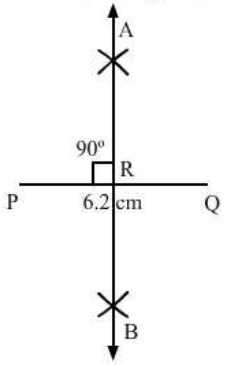
Constructions
Exercise 14A

Q1

Answer :

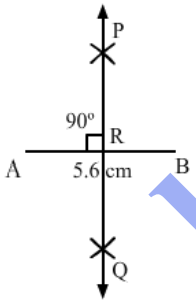
Steps for construction:
1. Draw a line segment PQ, which is equal 6.2 cm.
2. With P as the centre and radius more than half of PQ, draw arcs, one on each side of PQ.
3. With Q as the centre and the same radius as before, draw arcs cutting the perviously drawn arcs at A and B, respectively.
4. Draw AB, meeting PQ at R.



Q2

Answer :

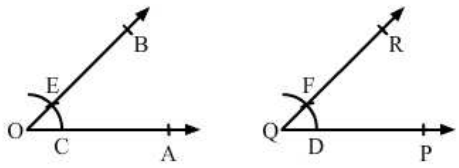
Steps for construction:
1. Draw a line segment AB = 5.6 cm.
2. With A as the centre and radius more than half of AB, draw arcs, one on each side of AB.
3. With B as the centre and the same radius as before, draw arcs cutting the perviously drawn arcs at P and Q, respectively.
4. Draw PQ, meeting AB at R.



Q3

Answer :

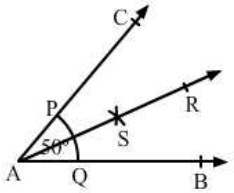
Here ∠AOB is given.
Steps for construction:
1. Draw a ray QP.
2. With O as the centre and any suitable radius, draw an arc cutting OA and OB at C and E, respectively..
3. With Q as the centre and the same radius as in step (2), draw an arc cutting QP at D.
4. With D as the centre and radius equal to CE, cut the arc through D at F.
5. Draw QF and produce it to point R.
∴ ∠PQR = ∠AOB



Q4

Answer :

Steps for construction:



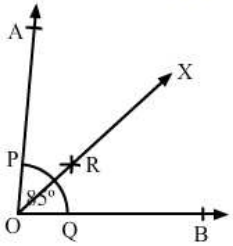
1. Draw ∠BAC = 50° with the help of protractor.
2. With A as the centre and any convenient radius, draw an arc cutting AB and AC at Q and P, respectively.
3. With P as the centre and radius more than half of PQ, draw an arc.
4. With Q as the centre and the same radius as before, draw another arc cutting the previously drawn arc at a point S.
5. Draw SA and produce it to point R.

Then, ray AR bisects ∠BAC.

Q5

Answer :

Steps for construction:



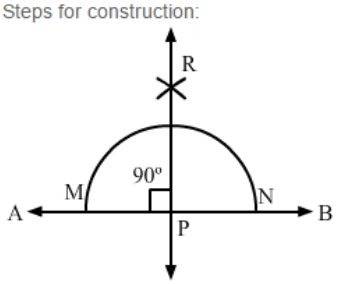
1. Draw ∠AOB = 85° with the help of a protractor.
2. With O as the centre and any convenient radius, draw an arc cutting OA and OB at P and Q, respectively.
3. With P as the centre and radius more than half of PQ, draw an arc.
4. With Q as the centre and the same radius as before, draw another arc cutting the previously drawn arc at a point R.
5. Draw RO and produce it to point X.

Then, ray OX bisects ∠AOB.

Q6

Answer :

Steps for construction:



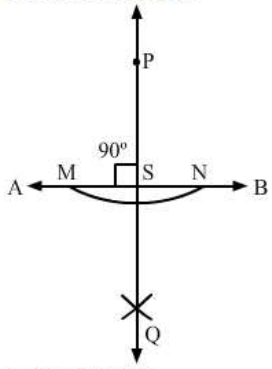
1. Draw a line AB.
2. Take a point P on line AB.
3. With P as the centre, draw an arc of any radius, which intersects line AB at M and N, respectively.
4. With M as the centre and radius more than half of MN, draw an arc.
5. With N as the centre and the same radius as in step (4), draw an arc that cuts the previously drawn arc at R.
6. Draw PR.

PR is the required line, which is perpendicular to AB.

Q7

Answer :

Steps for construction:



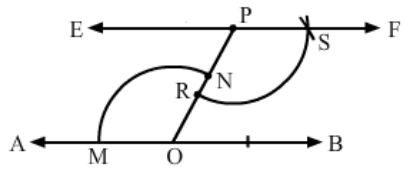
1. Draw a line AB.
2. Take a point P outside AB.
3. With P as the centre and a convenient radius, draw an arc intersecting AB at M and N, respectively.
4. With M as the centre and radius more than half of MN, draw an arc.
5. With N as the centre and the same radius, draw an arc cutting the previously drawn arc at Q.
6. Draw PQ meeting AB at S.

PQ is the required line that passes through P and is perpendicular to AB.

Q8

Answer :

Steps for construction:



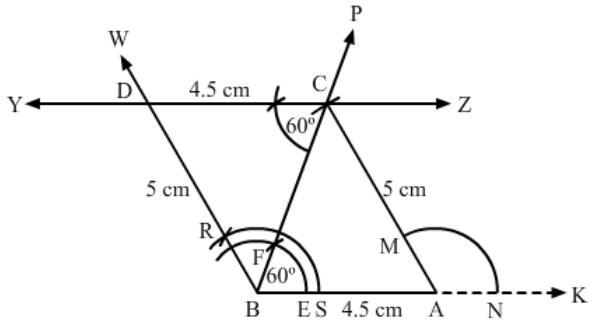
1. Draw a line AB.
2. Take a point P outside AB and another point O on AB.
3. Draw PO.
4. Draw ∠FPO such that ∠FPO is equal to AOP.
5. Extend FP to E.

Then, the line EF passes through the point P and EF||AB.

Q9

Answer :

Steps for construction:

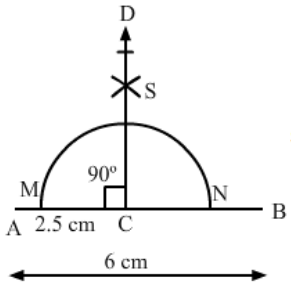


1. Draw a line BX and take a point A, such that AB is equal to 4.5 cm.
2. Draw ∠ABP = 60° with the help of protractor.
3. With A as the centre and a radius of 5 cm, draw an arc cutting PB at C.
4. Draw AC.
5. Now, draw ∠BCY = 60°.
6. Then, draw ∠ABW, such that ∠ABW is equal to ∠CAX, which cut the ray CY at D.
7. Draw BD.

When we measure BD and CD, we have:
BD = 5 cm and CD = 4.5 cm

Q10

Answer :



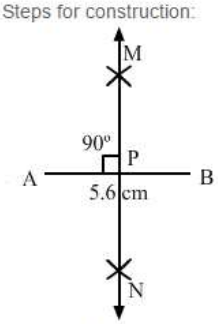
Steps of constructions

1. Draw a line segment AB, which is equal to 6 cm.
2. Take a point C on AB such that AC is equal to 2.5 cm.
3. With C as the centre, draw an arc cutting AB at M and N.
4. With M as the centre and radius more than half of MN, draw an arc.
5. With N as the centre and the same radius as before, draw another arc cutting the perviously drawn arc at S.
6. Draw SC and produce it to D.

Q11

Answer :

Steps for construction:

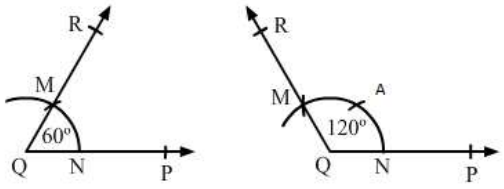


1. Draw a line segment AB, which is equal to 5.6 cm.
2. With A as the centre and radius more than half of AB, draw arcs, one on each side of AB.
3. With B as the centre and the same radius as before, draw arcs cutting the perviously drawn arcs at M and N, respectively.
4. Draw MN, meeting AB at R.

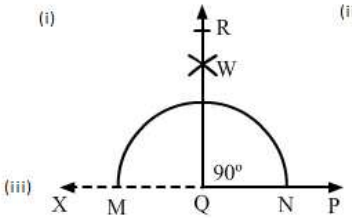
Constructions
Exercise 14B

Q1

Answer :



(i) (i) (ii)



Steps for construction:

1. Draw a ray QP.
2. With Q as the centre and any convenient radius, draw an arc cutting QP at N.
3. With N as the centre and the same radius as before, draw another arc to cut the previous arc at M.
4. Draw QM and produce it to R.

$\angle$ PQR is the required angle of 60°

(ii)

Steps for construction:

1. Draw a ray QP.
2. With Q as the centre and any convenient radius, draw an arc cutting QP at N.
3. With N as the centre and the same radius, cut the arc at A. Again, with A as the centre and the same radius, cut the arc at M.
4. Draw QM and produce it to R.

$\angle PQR$ is the required angle of 120°.

(iii)

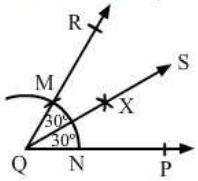
Steps for construction:

1. Draw a line PX.
2. Take a point Q on AC. With Q as the centre and any convenient radius, draw an arc cutting AX at M and N.
3. With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at W.
5. Draw QW produce it to R.

Q2

Answer :

Constructions steps:



1. Draw a ray QP.
2. Wth Q as the centre and any convenient radius,draw an arc cutting QP at N.
3. With N as the centre and radius same as before, draw another arc to cut the previous arc at M.
4. Draw QM and produce it to R.

$\angle PQR$ is an angle of 60°.

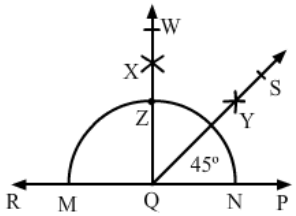
5. With M as the centre and radius more than half of MN, draw an arc.
6. With N as the centre and radius same as in step (5), draw another arc, cutting the previously drawn arc at point X.
7. Draw QX and produce it to point S.

Ray QS is the bisector of $\angle PQR$.

Q3

Answer :

Construction steps:



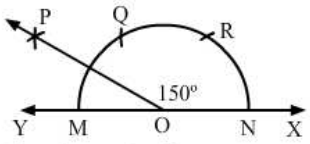
1. Draw a line PR.
2. Take a point Q on PR. With Q as the centre and any convenient radius, draw an arc cutting AC at M and N.
3.With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at X.
5. Draw QX, meeting the arc at Z. Produce it to W.
6. With Z as the centre and radius more than half of ZN, draw an arc.
7. With N as the centre and the same radius as in step (6), draw another arc, cutting the previously drawn arc at a point Y.
8. Draw QY and produce it to point S.

$\angle POS$ is the required angle of 45°.

Q4

Answer :

(i)

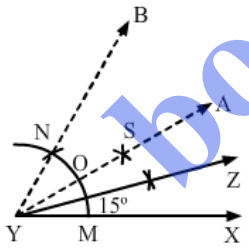


Steps for construction:

1. Draw a line XY and take a point O.
2. With O as the centre and any suitable radius, draw an arc cutting XY at M and N.
3.With N as the centre and the same radius,draw an arc cutting MN at R.
4.With R as the centre and the same radius as before, draw another arc cutting MN at Q .
5. With Q as the centre and radius less than MQ draw an arc.
6. With M as the centre and the same radius draw another arc cutting the previously drawn arc at P
5. Join PO.

$\therefore \angle XOP = 150^\circ$

(ii)

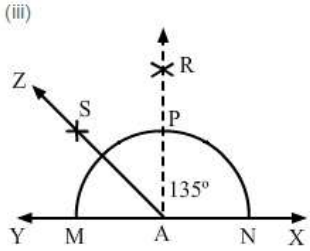


Steps for construction:

1. Draw a ray XY.
2. With X as the centre and any convenient radius, draw an arc cutting XY at M.
3. With M as the centre and the same radius, draw an arc cutting the previously drawn arc at N.
4. Draw YN and produce it to B.
4. Draw the bisector AY of $\angle XYB$.
5. Again, draw the bisector YZ of $\angle XYA$.

$\therefore \angle XYZ = 15^\circ$

(iii)

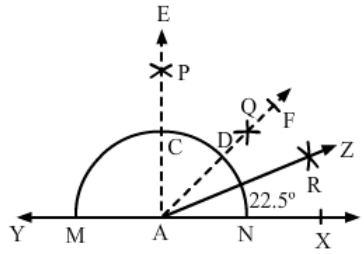


Steps for construction:

1. Draw a line XY and take a point A.
2. With A as the centre and any convenient radius, draw an arc cutting XY at M and N.
3. With N as the centre and the same radius, draw an arc.
4. With M as the centre and the same radius as before, draw another arc cutting the previously drawn arc at R.
5. Draw RA.
6. Draw draw the bisector ZA of ∠YAR.

∴ ∠XAZ = 135°

(iv)

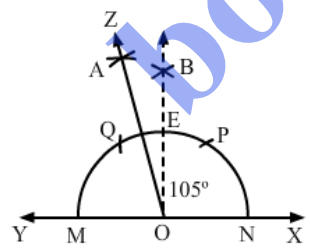


Steps for construction:

1. Draw a line XY.
2. Take a point A on XY. With A as the centre and any convenient radius, draw an arc cutting XY at M and N.
3. With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at P.
5. Draw PA meeting the arc at C. Produce it to E.
6. With C as the centre and radius more than half of CN, draw an arc.
7. With N as the centre and the same radius as in step (6), draw another arc cutting the previously drawn arc at a point Q.
8. Draw AQ and produce it to point F.
9. Draw the bisector ZA of ∠XAF.

∴ ∠XAZ = 22.5°

(v)

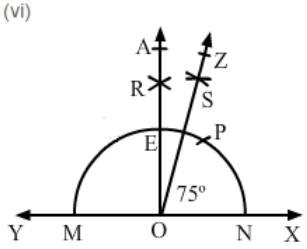


Steps for construction:

1. Draw a line XY.
2. Take a point O on XY. With O as the centre and any convenient radius, draw an arc cutting XY at M and N. Draw arcs with the same radius cutting MN at P and Q.
3. With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at B.
5. Draw BO meeting the arc at E.
6. With Q as the centre and radius more than half of PE, draw an arc.
7. With E as the centre and the same radius as in step (6), draw another arc cutting the previously drawn arc at a point A.
8. Draw AO and produce it to point Z.

∴ ∠XOZ = 105°

(vi)

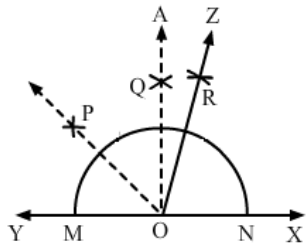


Steps for construction:

1. Draw a line XY.
2. Take a point O on XY. With O as the centre and any convenient radius, draw an arc cutting XY at M and N. Draw arcs with the same radius cutting MN at P.
3. With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at R.
5. Draw RO meeting the arc at E. Produce it to A.
6. With P as the centre and radius more than half of PE, draw an arc.
7. With E as the centre and the same radius as in step (6), draw another arc cutting the previously drawn arc at a point S.
8. Draw OS and produce it to point Z.

$\therefore \angle XOZ = 75^\circ$

(vii)

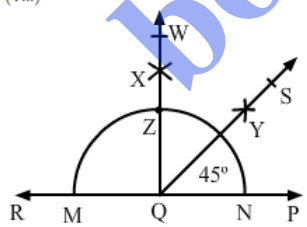


Steps for construction:

1. Draw a line XY and take a point O.
2. With O as the centre and any convinient radius, draw an arc cutting XY at M and N.
3. With N as the centre and the same radius, draw an arc.
4. With M as the centre and the same radius as before, draw another arc cutting the previously drawn arc at Q.
5. Draw QO.
6. Draw PO bisector of $\angle YOA$.
7. Draw ZO bisector of $\angle POX$.

$\therefore \angle XAZ = 67.5^\circ$

(viii)



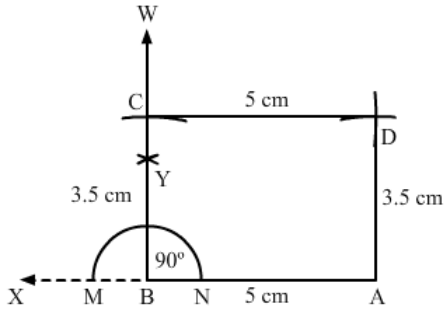
Steps for construction:

1. Draw a line PR.
2. Take a point Q on PR. With Q as the centre and any convenient radius, draw an arc cutting AC at M and N.
3. With N as the centre and radius more than half of MN, draw an arc.
4. With M as the centre and the same radius as before, draw another arc to cut the previous arc at X.
5. Draw QX, meeting the arc at Z. Produce it to W.
6. With Z as the centre and radius more than half of ZN, draw an arc.
7. With N as the centre and the same radius as in step (6), draw another arc cutting the previously drawn arc at a point Y.
8. Draw QY and produce it to point S.

Q5

Answer :

Construction steps:



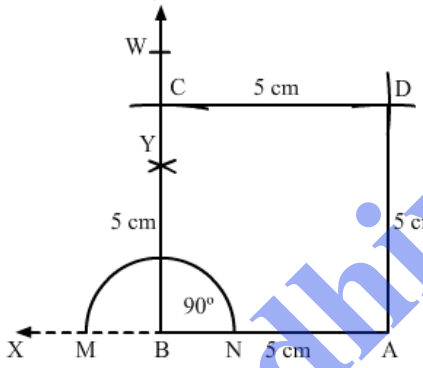
1. Draw a ray AX.
2. With A as the centre, cut the ray AX at B such that AB is equal to 5 cm.
3. With B as the centre and any convenient radius, draw an arc cutting AX at M and N.
4. With N as the centre and radius more than half of MN, draw an arc.
5. With M as the centre and the same radius as before, draw another arc to cut the previous arc at Y.
6. Draw BY and produce it to W.
7. With B as the centre and a radius of 3.5 cm, cut ray BW at point C.
8. With C as the centre and a radius of 5 cm, draw an arc on the right side of BC.
9. With A as the centre and a radius of 3.5 cm, draw an arc cutting the previous arc at D.
10. Join CD and AD.

ABCD is the required rectangle.

Q6

Answer :

Construction steps:



1. Draw a ray AX.
2. With A as centre cut the ray AX at B such that AB=5 cm
3. With B as centre and any convenient radius,draw an arc cutting AX at M and N.
4. With N as centre and radius more than half of MN draw an arc.
5. With M as centre and the same radius as before,draw another arc to cut the previous arc at Y.
6. Join BY and produced it to W.
7. With B as centre and radius 5 cm cut ray BW at point C.
8. With C as centre and radius 5 cm draw an arc on right side of BC.
9. With A as centre and radius 5 cm draw an arc cutting the previous arc at D.
10. Join CD and AD.

ABCD is required square.