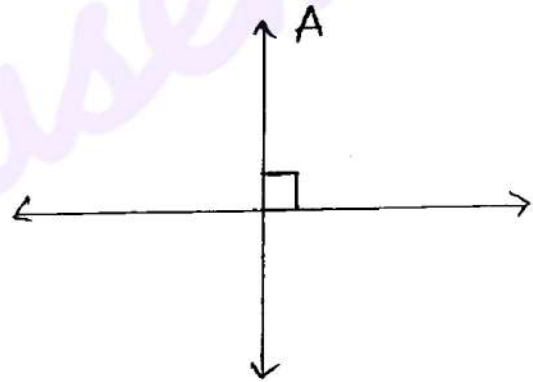


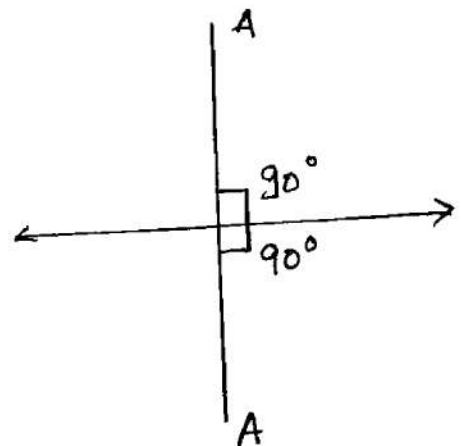
Exercise 19.2

Q.1 How many lines can be drawn which are perpendicular to a given line and pass through a given point lying (i) outside it (ii) on it.

Solution: As we know that perpendicular is the shortest distance between point and a line. Therefore from outside point there is only one perpendicular can be drawn.

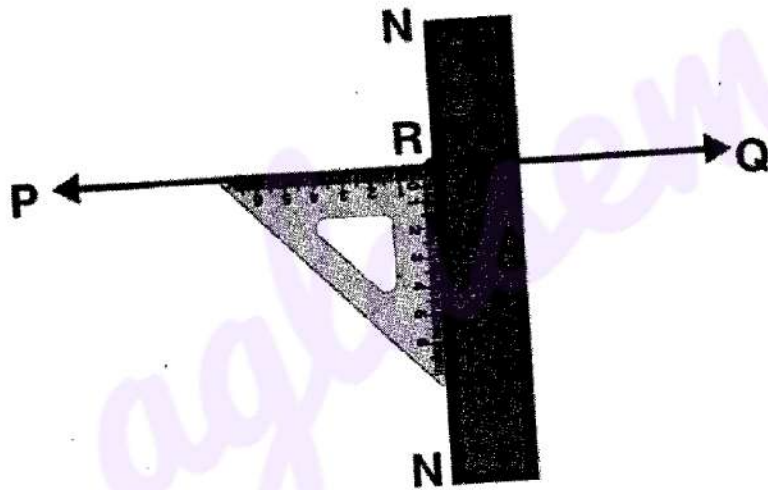


(ii) we can draw only one perpendicular line from any point on the line



Q.2 Draw a line PQ. Take a point R on it. Draw a line perpendicular to PQ and passing through R.
(using (i) ruler and a set square
(ii) ruler and compasses)

Solution: Construct a line PQ and mark a point R on it. Now, here MN is the required line which is perpendicular to PQ through the point R.

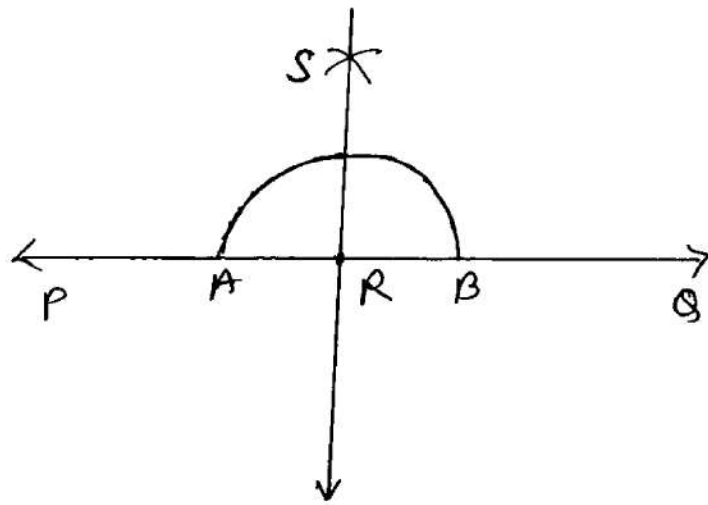


(ii) Construct a line PQ and mark a point R on it. Consider R as centre and measuring convenient radius, draw an arc which intersects the line PQ at A and B.

Now taking A and B as centre and radius greater than AR draw arcs which cut each other at point S. RS is the required line which is

(5)

which is perpendicular to PS through the point R .



Q.3 Draw a line l . Take a point A , not lying on l . Draw a line m such that $m \perp l$ and passing through A . (using (i) Ruler and set square (ii) ruler and compasses.)

Solution: (i) Construct a line l and mark a point A outside it.

Now place the set square PSR with its one arm PS of the right angle along the line l .

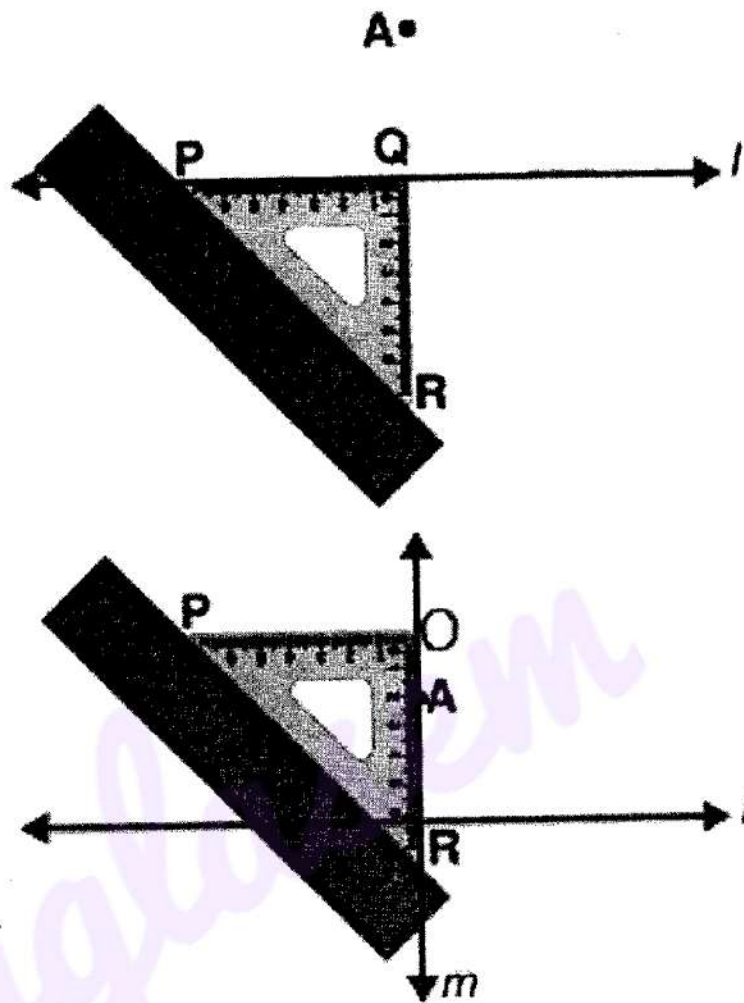
Place the ruler along the edge PR without disturbing the position of set square.

Slide the set square along the ruler until its arm SR reaches A without disturbing the position of the ruler.

Draw a line m

(6)

Here line m is the required line which is perpendicular to the line l .

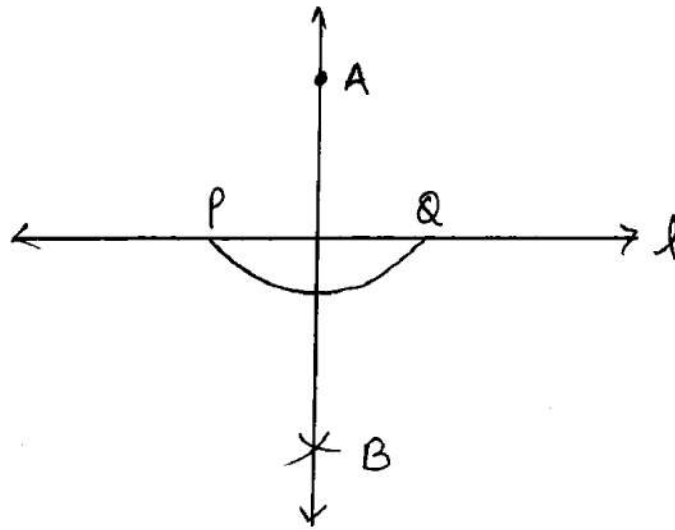


(ii) Considering A as centre, construct an arc PS which intersects the line l at P and S .

By taking P and S as centre draw two arcs which intersect at B .

Join AB

Here AB is the required line.



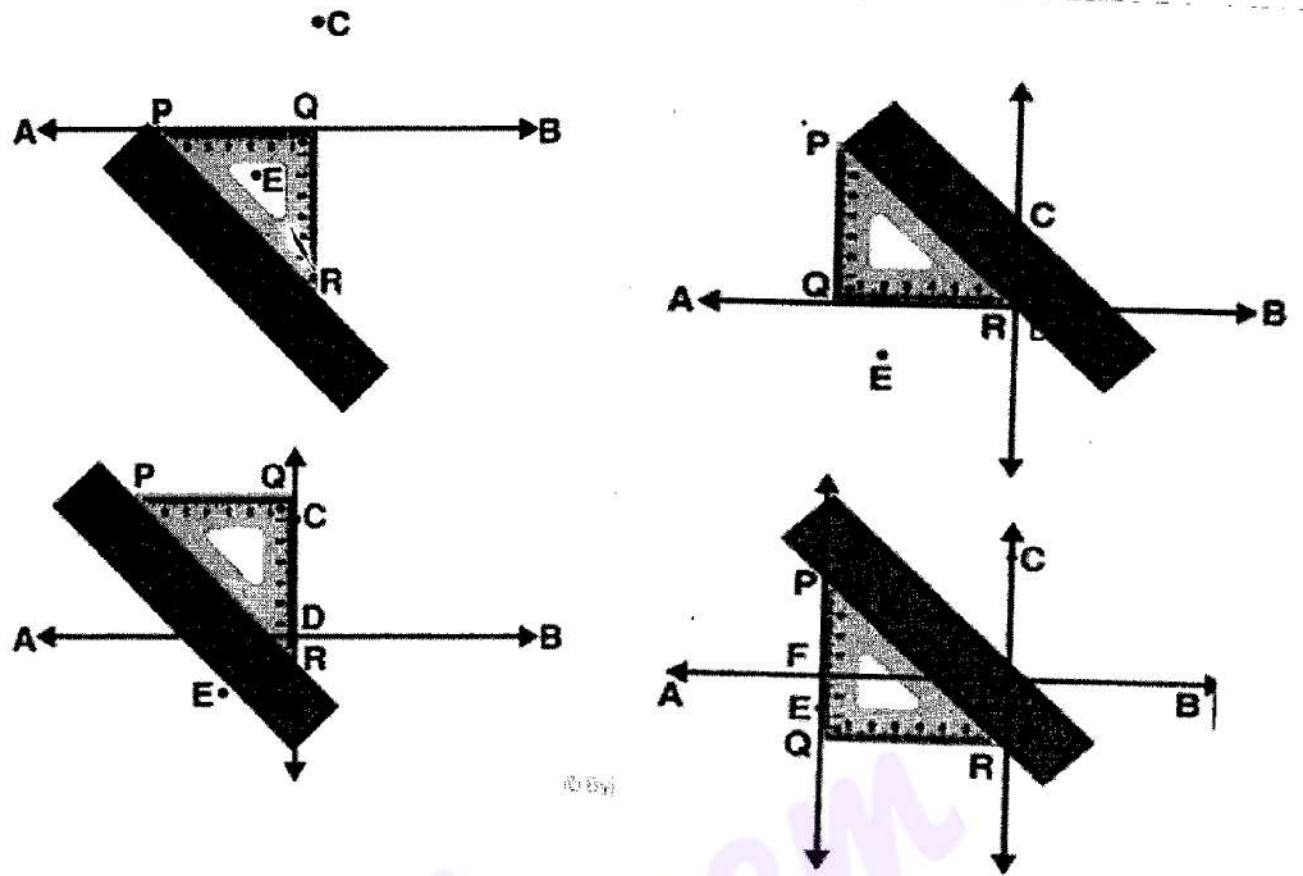
Q4 Draw a line AB and take two points C and E on opposite sides of AB. Through C, draw $CD \perp AB$ and through E draw $EF \perp AB$
 (Using (i) ruler and set squares
 (ii) ruler and compasses)

Solution: Construct a line AB and mark two points C and E on opposite sides of AB.

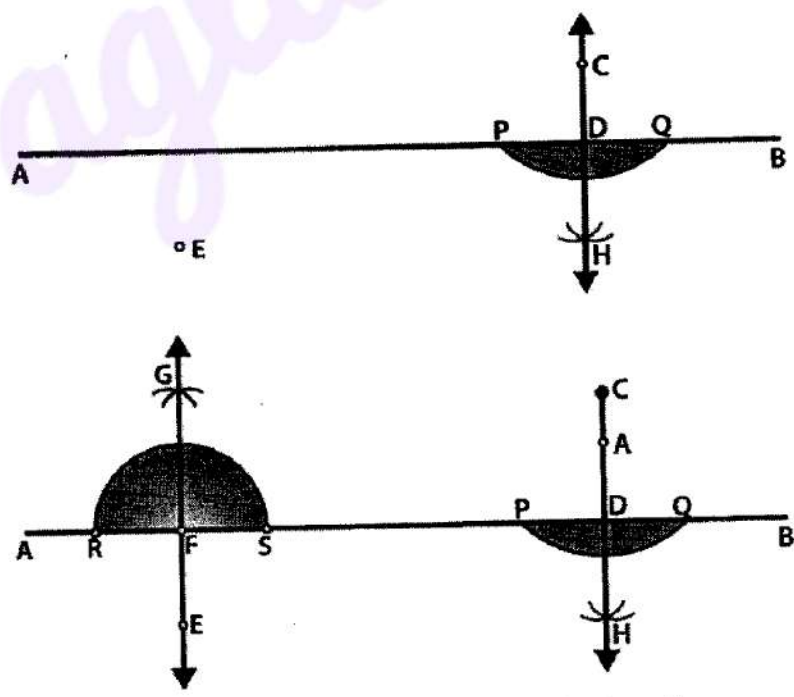
Place the set square PQR on the side E with its one arm PQ of the right angle along the line AB. Place the ruler along the edge PR.

Slide the set square along the ruler until the arm QR reaches C.

Construct a line CD where D is a point on the line AB. Here CD is the required line where $CD \perp AB$.



(ii) By using ruler and compasses.

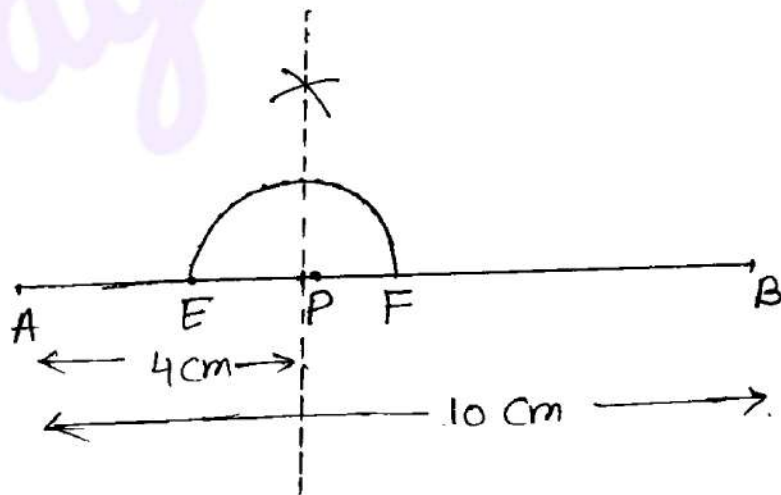


Q.5 Draw a line segment AB of length 10 cm . Mark a point P on AB such that $AP = 4\text{ cm}$. Draw a line through P perpendicular to AB .

Solution: Draw a line AB of length 10 cm . Mark a point P which is 4 cm from the point A .

Now taking P as a centre and any fixed radius draw an arc which intersects AB at point E and F . Now taking E and F as centre and radius more than EP draw two arcs which intersect each other at point R .

Thus PR is the required line



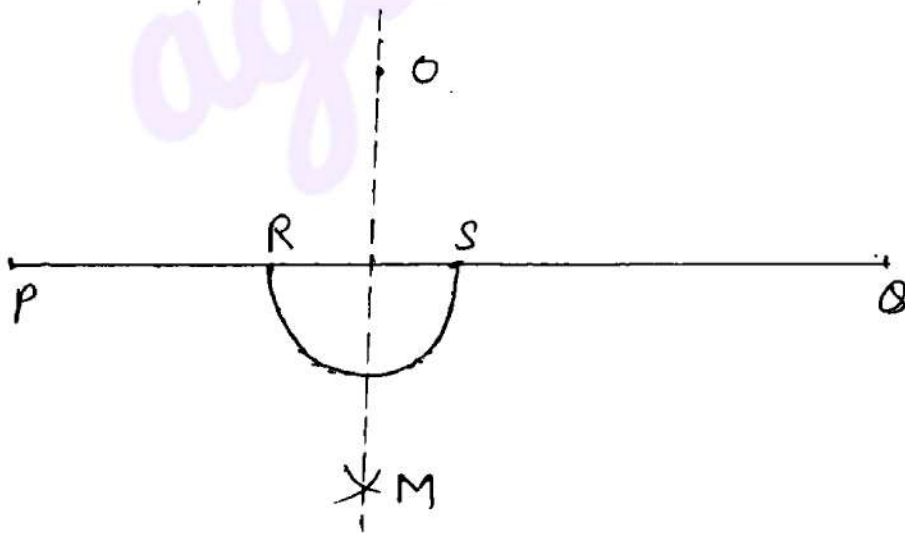
Q6 Draw a line segment PS of length 12cm . Mark a point O outside this segment. Draw a line through O perpendicular to PS .

Solution: Let Draw a line PS of length 12cm . Mark a point O outside PS .

from point O cut an arc which intersect the line PS at two points R and S .

Now By R and S as centre and length of arc more than half of length RS cut two arcs which meet each other at point M .

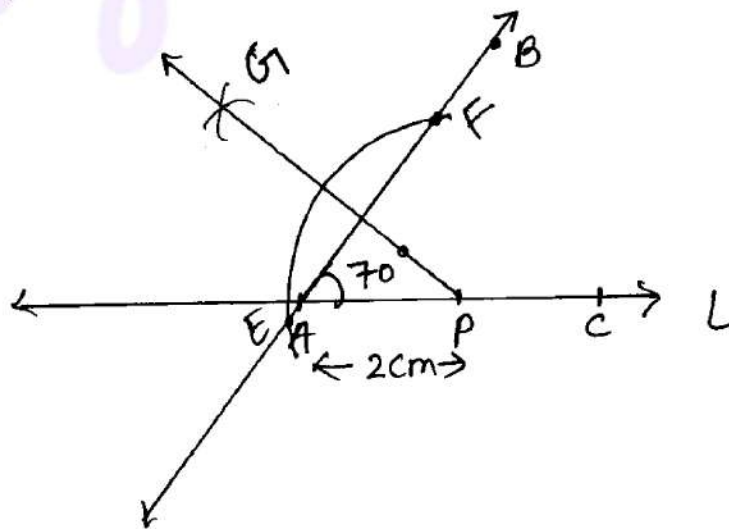
Thus OM is the required perpendicular.



- ⑦ Using a protractor, draw $\angle BAC$ of measure 70° .
 On side AC , take a point P , such that $AP = 2\text{ cm}$.
 From P draw a line perpendicular to AB .

Solution: (i) Construct a line ^{Segment} AC on the line L .

- (ii) By using protractor draw an angle $\angle BAC = 70^\circ$.
 (iii) Measure 2 cm from the point A on the line segment AC and Mark P .
 (iv) Taking P as centre, construct an arc which intersects the line L at E and F .
 (v) Considering the same radius and the points E and F as centres, draw two arcs which intersect at G on the other side.
 (vi) Join the points P and G .



Q.8 Draw a line segment AB of length 8 cm. At each end of this line segment, draw a line perpendicular to AB. Are these two lines parallel?

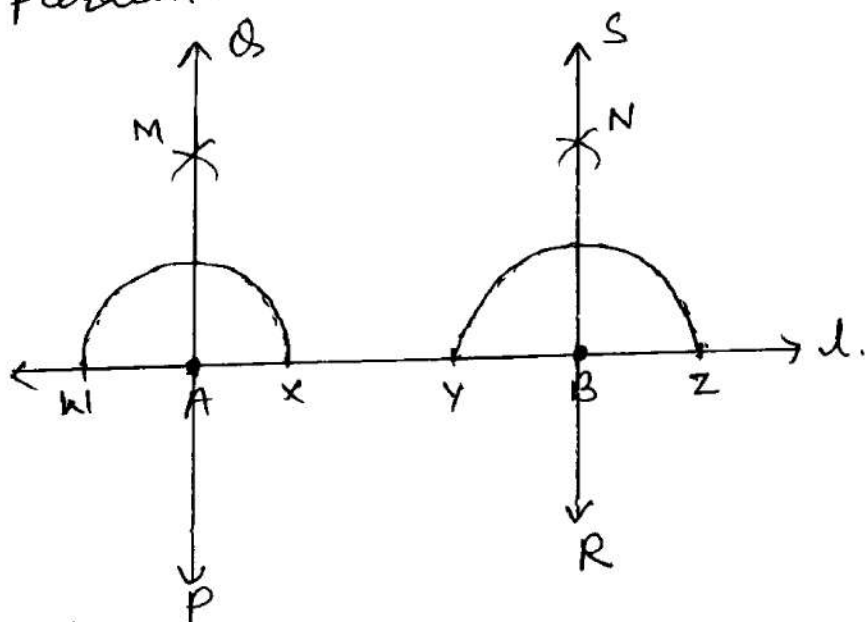
Solution: (i) Draw a line segment AB of length 8 cm.

(ii) Taking A as centre and any radius cut an arc which intersects the line at W and X.

(iii) Taking W and X as centre and radius which is greater than AW, draw two arcs which intersect each other at the point M.

(iv) Similarly draw a perpendicular RS passing through B.

We know that $\angle QAB = \angle ABR = 90^\circ$ are alternate interior angles. Hence lines PQ and RS are parallel.

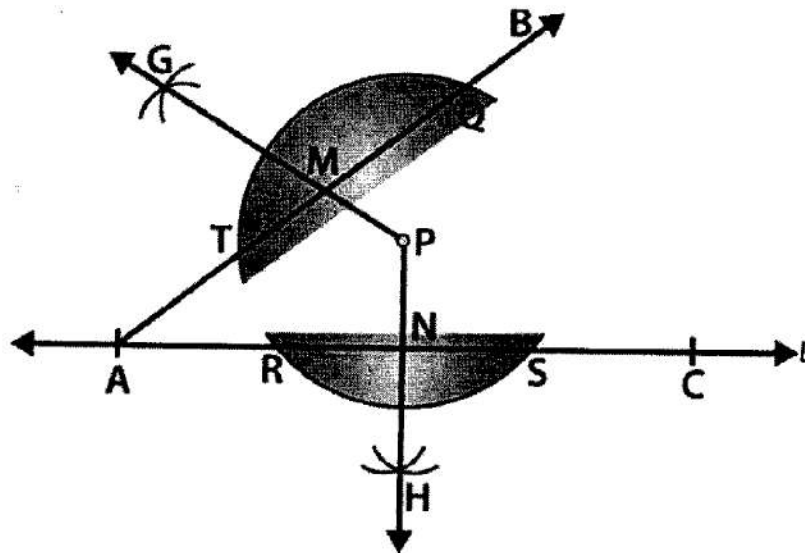


Q.9 Using a protractor, draw $\angle BAC$ of measure 45° . Take a point P in the interior of $\angle BAC$. From P draw line segments PM and PN such that $PM \perp AB$ and $PN \perp AC$, Measure $\angle MPN$.

Solution: Construct a line segment AC on the line L .

- (i) Make an angle $\angle BAC = 45^\circ$ using protractor.
- (ii) Mark a point P in the interior of $\angle BAC$
- (iv) Taking P as centre and convenient radius draw an arc which intersects the line segment AB at points T and Q and AC at points R and S
- (v) Taking T and Q as centres and same radius draw two arcs which intersect at a point G on the other side.
- (vi) Taking R and S as centre and same radius, draw two arcs which intersect at point H on the other side.
- (vii) Now join the points PG and PH which intersect the line segments AB and AC at points M and N .

Thus $\angle MPN = 135^\circ$



Q.10 Draw an angle and label it as $\angle BAC$.
 Draw its bisector ray AX and take a point P on it.
 From P draw line segments PM and PN , such that $PM \perp AB$ and $PN \perp AC$, where M and N are respectively points on rays AB and AC . Measure PM and PN . Are the two lengths equal.

Solution (i) Draw an $\angle BAC$ on the line segment AC .

(ii) Draw a ray AX which is angle bisector of $\angle BAC$.

(iii) Now mark a point P on ray AX .

(iv) Now draw $PM \perp AB$, $PN \perp AC$ as done in 8.9.

(v) By measuring PM and PN , we got to know that they both are equal in length.

