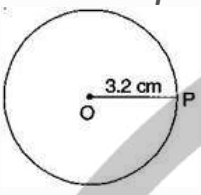
NCERT SOLUTIONS FOR CLASS 6 MATHS

Chapter 14 : Practice Geometry

Exercise 14.1

Question 1.Draw a circle of radius 3.2 cm.

***Answer: Steps of construction**:*



(a) Open the compass for the required radius of 3.2 cm.

(b) Make a point with a sharp pencil where we want the centre of circle to be.

(c) Name it O.

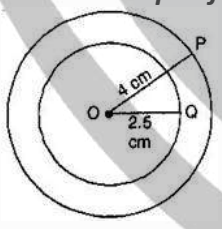
(d) Place the pointer of compasses on O.

(e) Turn the compasses slowly to draw the circle.

It is required circle.

Question 2.With the same centre O, draw two circles of radii 4 cm and 2.5 cm.

***Answer: Steps of construction**:*



(a) Marks a point 'O' with a sharp pencil where we want the centre of the circle.

(b) Open the compasses 4 cm.

(c) Place the pointer of the compasses on O.

(d) Turn the compasses slowly to draw the circle.

(e) Again open the compasses 2.5 cm and place the pointer of the compasses on D.

(f) Turn the compasses slowly to draw the second circle.

It is the required figure.

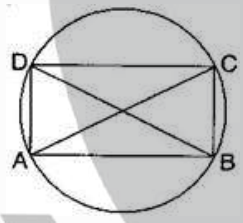
Question 3.Draw a circle and any two of its diameters. If you join the ends of these diameters, what is the figure obtained if the diameters are perpendicular to each other? How do you check your answer?

Answer:

(i) By joining the ends of two diameters, we get a rectangle. By

measuring, we find AB = CD = 3 cm, BC = AD = 2 cm, i.e., pairs of opposite sides are equal and also ∠A = ∠B = ∠C = ∠D = 90 ,90∘, , i.e. each angle is of 90 .90∘.

Henc,e it is a rectangle.



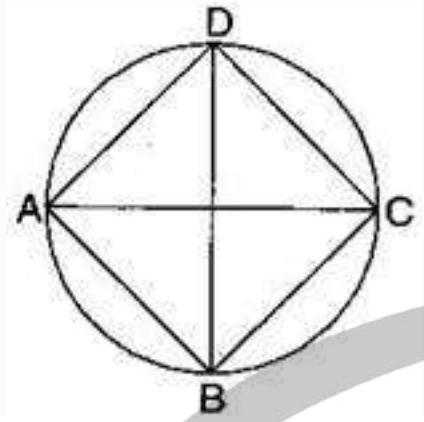
(ii) If the diameters are perpendicular to each other, then by

joining the ends of two diameters, we get a square.

By measuring, we find that AB = BC = CD = DA = 2.5 cm, i.e., all four sides are equal.

Also ∠A = ∠B = ∠C = ∠D = 90 ,90∘, , i.e. each angle is of 90 .90∘.

Hence, it is a square.



Question 4.Draw any circle and mark points A, B and C such that:

(a) A is on the circle.

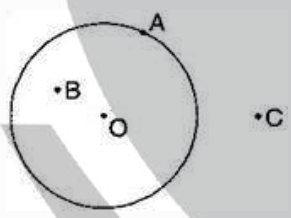
(b) B is in the interior of the circle.

(c) C is in the exterior of the circle.

Answer:

(i) Mark a point 'O' with sharp pencil where we want centre of the circle.

(ii) Place the pointer of the compasses at 'O'. Then move the compasses slowly to draw a circle.



(a) Point A is on the circle.

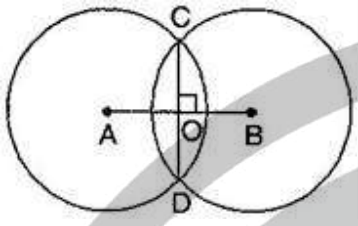
(b) Point B is in interior of the circle.

(c) Point C is in the exterior of the circle.

Question 5.Let A, B be the centres of two circles of equal radii; draw them so that each one of them passes through the centre of the other. Let them intersect at C and D. Examine whether AB $\bar{AB}$ *and* CD $\bar{CD}$ *are at right angles.*

Answer: *Draw two circles of equal radii taking A and B as their centre such that one of them passes through the centre of the other. They intersect at C and D. Join AB and CD.*

Yes, AB and CD intersect at right angle as $\angle COB$ *is* 90 $.90^{\circ}$.



Exercise 14.2

Question 1.Draw a line segment of length 7.3 cm, using a ruler.

Answer: Steps of construction:

(i) Place the zero mark of the ruler at a point A.

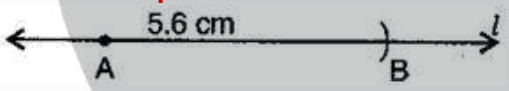
(ii) Mark a point B at a distance of 7.3 cm from A.

(iii) Join AB.

AB——$\bar{AB}$ is the required line segment of length 7.3 cm.

Question 2.Construct a line segment of length 5.6 cm using ruler and compasses.

Answer: Steps of construction:



(i) Draw a line 'l'.'l'. Mark a point A on this line.

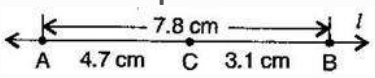
(ii) Place the compasses pointer on zero mark of the ruler. Open it to place the pencil point up to 5.6 cm mark.

(iii) Without changing the opening of the compasses. Place the pointer on A and cut an arc 'l''l' at B.

AB——$\bar{AB}$ is the required line segment of length 5.6 cm.

Question 3.Construct $\overline{AB}$——AB^- of length 7.8 cm. From this cut off $\overline{AC}$——AC^- of length 4.7 cm. Measure $\overline{BC}$——.BC^-.

Answer: Steps of construction:



(i) Place the zero mark of the ruler at A.

(ii) Mark a point B at a distance 7.8 cm from A.

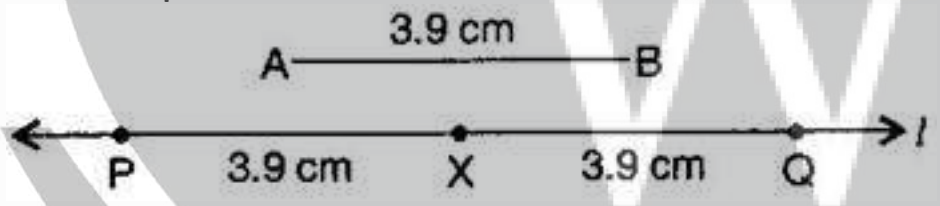
(iii) Again, mark a point C at a distance 4.7 from A.

By measuring $\overline{BC}$——BC^-, we find that BC = 3.1 cm

Question 4.Given $\overline{AB}$——AB^- of length 3.9 cm, construct $\overline{PQ}$——PQ^- such that the length $\overline{PQ}$——PQ^- is twice that of $\overline{AB}$——AB^-. Verify by measurement.

(**Hint**: Construct $\overline{PX}$——PX^- such that length of $\overline{PX}$——PX^- = length of $\overline{AB}$——AB^-; then cut off $\overline{XQ}$——XQ^- such that $\overline{XQ}$——XQ^- also has the length of $\overline{AB}$——AB^-.

Answer: Steps of construction:



(i) Draw a line 'l'.'l'.

(ii) Construct $\overline{PX}$——PX^- such that length of $\overline{PX}$——PX^- = length of $\overline{AB}$——AB^-

(iii) Then cut of $\overline{XQ}$——XQ^- such that $\overline{XQ}$——XQ^- also has the length of $\overline{AB}$——.AB^-.

(iv) Thus the length of $\overline{PX}$——PX^- and the length of $\overline{XQ}$——XQ^- added together make twice the length of $\overline{AB}$——.AB^-.

Verification:

By measurement we find that PQ = 7.8 cm

= 3.9 cm + 3.9 cm = $\overline{AB}$ + $\overline{AB}$ = 2 x $\overline{AB}$

Question 5.Given $\overline{AB}$ of length 7.3 cm and $\overline{CD}$ of length 3.4 cm, construct a line segment $\overline{XY}$ such that the length of $\overline{XY}$ is equal to the difference between the lengths of $\overline{AB}$ and $\overline{CD}$. Verify by measurement.

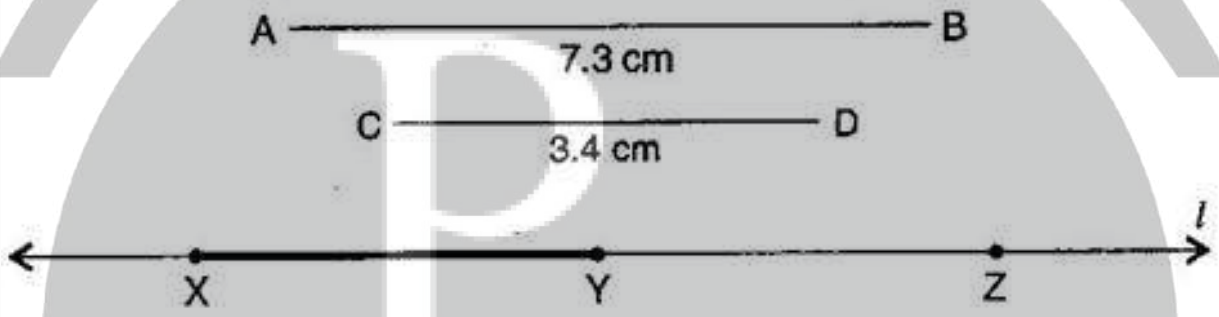
Answer: Steps of construction:

(i) Draw a line 'l''l' and take a point X on it.

(ii) Construct $\overline{XZ}$ such that length $\overline{XZ}$ = length of $\overline{AB}$ = 7.3 cm

(iii) Then cut off $\overline{ZY}$ = length of $\overline{CD}$ = 3.4 cm

(iv) Thus the length of $\overline{XY}$ = length of $\overline{AB}$ – length of $\overline{CD}$



Verification:

By measurement we find that length of $\overline{XY}$ = 3.9 cm

= 73. Cm – 3.4 cm = $\overline{AB}$ – $\overline{CD}$

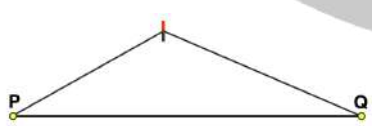
Exercise 14.3

1. Draw any line segment $\overline{PQ}$. Without measuring $\overline{PQ}$, construct a copy of $\overline{PQ}$.

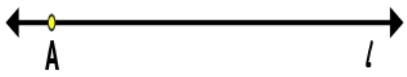
Solutions:

(1) Let the given line segment be $\overline{PQ}$

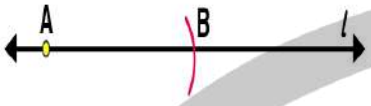
(2) Adjust the compasses up to the length of $\overline{PQ}$



(3) Draw any line l and mark a point A on it



(4) Place the pointer on point A, without changing the setting of compasses, draw an arc to cut the line segment at B point.



$\overline{AB}$
is the required line segment

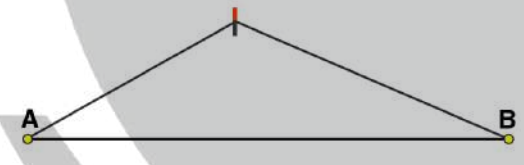
2. Given some line segment $\overline{AB}$, whose length you do not know, construct $\overline{PQ}$ such that the length of $\overline{PQ}$ is twice that of $\overline{AB}$.

Solutions:

Following steps are followed to construct a line segment $\overline{PQ}$
such that the length of $\overline{PQ}$
is twice that of $\overline{AB}$

(1) Let the given line segment be $\overline{AB}$

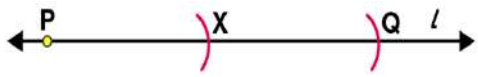
(2) Adjust the compasses up to the length of $\overline{AB}$



(3) Draw a line l and mark a point P on it

(4) Place the pointer on P, draw an arc to cut the line segment at point X, without changing the setting of compasses

(5) Again with same radius as before, by placing the pointer on point X, draw an arc to cut the line l at point Q



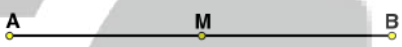
$\overline{PQ}$ is the required line segment.

Exercise 14.4

1. Draw any line segment $\overline{AB}$. Mark any point M on it. Through M, draw a perpendicular to $\overline{AB}$. (use ruler and compasses)

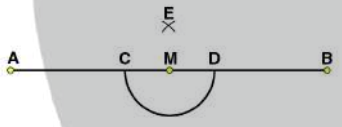
Solutions:

(1) Draw a line segment $\overline{AB}$
and mark a point M on it.

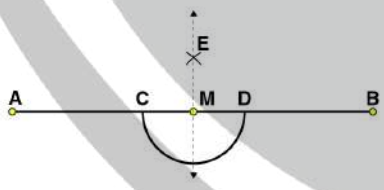


(2) Taking M as centre and a convenient radius, construct an arc intersecting the line segment $\overline{AB}$ at points C and D respectively.

(3) By taking centres as C and D and radius greater than CM, construct two arcs such that they intersect each other at point E.



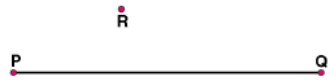
(4) Join EM. Now
$\overline{EM}$ is perpendicular to $\overline{AB}$



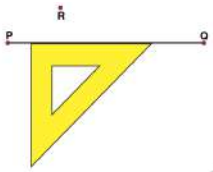
2. Draw any line segment $\overline{PQ}$. Take any point R not on it. Through R, draw a perpendicular to $\overline{PQ}$. (use ruler and set-square)

Solutions:

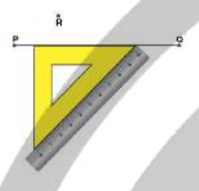
(1) Draw a given line segment $\overline{PQ}$
and mark a point R outside the line segment $\overline{PQ}$



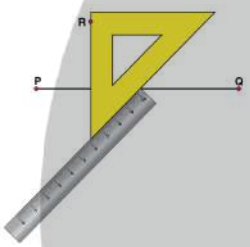
(2) Place a set square on $\overline{PQ}$
such that one of its right angles arm aligns along $\overline{PQ}$



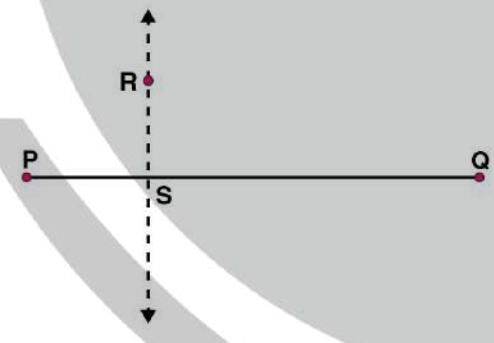
(3) Now, place the ruler along the edge opposite to right angle of set square.



(4) Hold the ruler fixed. Slide the set square along the ruler such that the point R touches the other arm of set square.



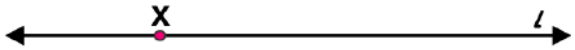
(5) Draw a line along this edge of set square which passes through point R. Now, it is the required line perpendicular to $\overline{PQ}$



3. Draw a line l and a point X on it. Through X, draw a line segment $\overline{XY}$ perpendicular to l. Now draw a perpendicular to XY at Y. (use ruler and compasses)

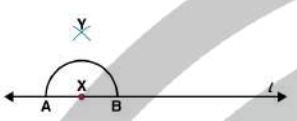
Solutions:

(1) Draw a line l and mark a point X on it.

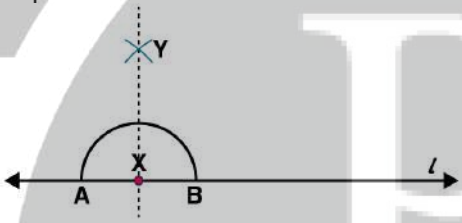


(2) By taking X as centre and with a convenient radius, draw an arc intersecting the line l at points A and B respectively.

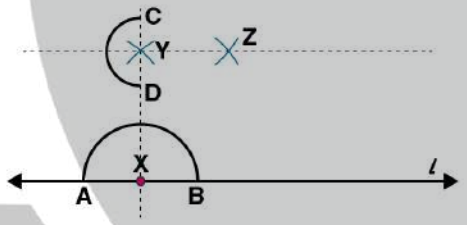
(3) With A and B as centres and a radius more than AX, construct two arcs such that they intersect each other at point Y.



(4) Join XY. Here $\overline{XY}$ is perpendicular to l



Similarly, by taking C and D as centres and radius more than CY, construct two arcs intersecting at point Z. Join ZY. The line $\overline{ZY}$ is perpendicular to $\overline{XY}$ at Y

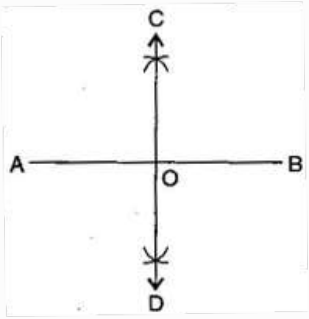


Exercise 14.5

Question 1.Draw AB $\bar{}$ *of length 7.3 cm and find its axis of symmetry.*

Answer: *Axis of symmetry of line segment* AB $\bar{}$ *will be the perpendicular bisector of* AB $\bar{}$*. So, draw the perpendicular bisector of AB.*

Steps of construction:



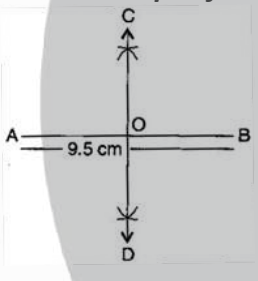
(i) Draw a line segment AB $\bar{AB}$ = 7.3 cm

(ii) Taking A and B as centres and radius more than half of AB, draw two arcs which intersect each other at C and D.

(iii) Join CD. Then CD is the axis of symmetry of the line segment AB.

Question 2.Draw a line segment of length 9.5 cm and construct its perpendicular bisector.

***Answer: Steps of construction**:*



(i) Draw a line segment AB $\bar{AB}$ = 9.5 cm

(ii) Taking A and B as centres and radius more than half of AB, draw two arcs which intersect each other at C and D.

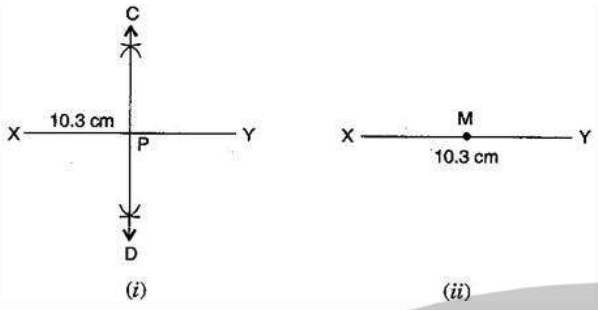
(iii) Join CD. Then CD is the perpendicular bisector of AB $\bar{AB}$

Question 3.Draw the perpendicular bisector of XY $\bar{XY}$ whose length is 10.3 cm.

(a) Take any point P on the bisector drawn. Examine whether PX = PY.

(b) If M is the mid-point of XY $\bar{XY}$, what can you say about the lengths MX and XY?

***Answer: Steps of construction**:*



(i) Draw a line segment XY XY^{-} = 10.3 cm

(ii) Taking X and Y as centres and radius more than half of AB, draw two arcs which intersect each other at C and D.

(iii) Join CD. Then CD is the required perpendicular bisector of XY XY^{-}.

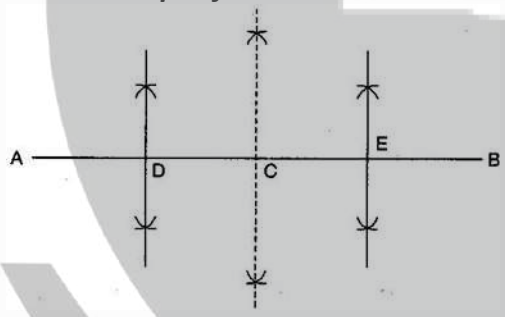
Now:

(a) Take any point P on the bisector drawn. With the help of divider we can check that PX $=PY$ $PX^{-}=PY^{-}$.

(b) If M is the mid-point of XY ,XY^{-}, then MX $=12XY$ $MX^{-}=12XY^{-}$.

Question 4.Draw a line segment of length 12.8 cm. Using compasses, divide it into four equal parts. Verify by actual measurement.

***Answer: Steps of construction**:*



(i) Draw a line segment AB = 12.8 cm

(ii) Draw the perpendicular bisector of AB AB^{-} which cuts it at C. Thus, C is the mid-point of AB .AB^{-}.

(iii) Draw the perpendicular bisector of AC AC^{-} which cuts it at D. Thus D is the mid-point of .

(iv) Again, draw the perpendicular bisector of CB $\overline{CB}$ which cuts it at E. Thus, E is the mid-point of CB $\overline{CB}$.

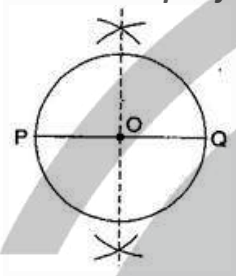
(v) Now, point C, D and E divide the line segment AB $\overline{AB}$ in the four equal parts.

(vi) By actual measurement, we find that

$AD = DC = CE = EB = 3.2$ $\overline{AD}=\overline{DC}=\overline{CE}=\overline{EB}=3.2$ cm

Question 5.With PQ $\overline{PQ}$ of length 6.1 cm as diameter, draw a circle.

Answer: Steps of construction:



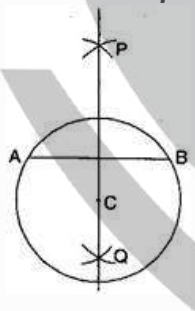
(i) Draw a line segment PQ $\overline{PQ}$ = 6.1 cm.

(ii) Draw the perpendicular bisector of PQ which cuts, it at O. Thus O is the mid-point of PQ $\overline{PQ}$.

Taking O as centre and OP or OQ as radius draw a circle where diameter is the line segment PQ $\overline{PQ}$.

Question 6.Draw a circle with centre C and radius 3.4 cm. Draw any chord AB $\overline{AB}$. Construct the perpendicular bisector AB $\overline{AB}$ and examine if it passes through C.

Answer: Steps of construction:



(i) Draw a circle with centre C and radius 3.4 cm.

(ii) Draw any chord AB $\overline{AB}$.

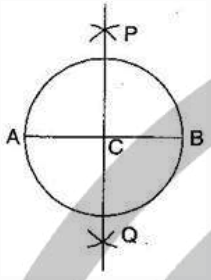
(iii) Taking A and B as centers and radius more than half of AB ,$\bar{AB}$, draw two arcs which cut each other at P and Q.

(iv) Join PQ. Then PQ is the perpendicular bisector of AB .$\bar{AB}$.

This perpendicular bisector of AB $\bar{AB}$ passes through the centre C of the circle.

Question 7.Repeat Question 6, if AB $\bar{AB}$ happens to be a diameter.

***Answer: Steps of construction**:*



(i) Draw a circle with centre C and radius 3.4 cm.

(ii) Draw its diameter AB $\bar{AB}$.

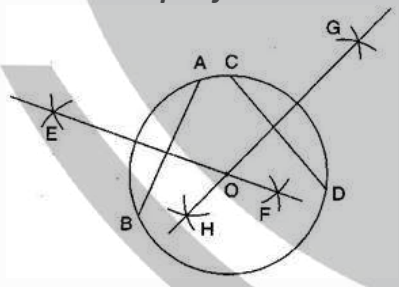
(iii) Taking A and B as centers and radius more than half of it, draw two arcs which intersect each other at P and Q.

(iv) Join PQ. Then PQ is the perpendicular bisector of AB $\bar{AB}$.

We observe that this perpendicular bisector of AB $\bar{AB}$ passes through the centre C of the circle.

Question 8.Draw a circle of radius 4 cm. Draw any two of its chords. Construct the perpendicular bisectors of these chords. Where do they meet?

***Answer: Steps of construction**:*



(i) Draw the circle with O and radius 4 cm.

(ii) Draw any two chords AB $\bar{AB}$ and CD $\bar{CD}$ in this circle.

(iii) Taking A and B as centers and radius more than half AB, draw two arcs which intersect each other at E and F.

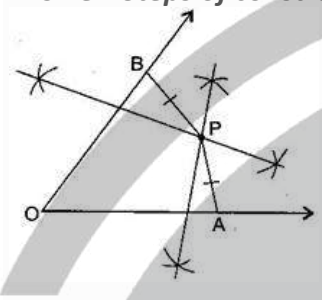
(iv) Join EF. Thus EF is the perpendicular bisector of chord CD CD¯.

(v) Similarly draw GH the perpendicular bisector of chord CD CD¯.

These two perpendicular bisectors meet at O, the centre of the circle

Question 9.Draw any angle with vertex O. Take a point A on one of its arms and B on another such that OA = OB. Draw the perpendicular bisectors of ***OA*** ***OA¯*** *and* ***OB*** ***.OB¯.*** *Let them meet at P. Is PA = PB?*

Answer: Steps of construction:



(i) Draw any angle with vertex O.

(ii) Take a point A on one of its arms and B on another such that

(iii) Draw perpendicular bisector of OA OA¯ and OB .OB¯.

(iv) Let them meet at P. Join PA and PB.

With the help of divider, we check that PA $=PB$.