

EXERCISE 14.6

PAGE NO: 291

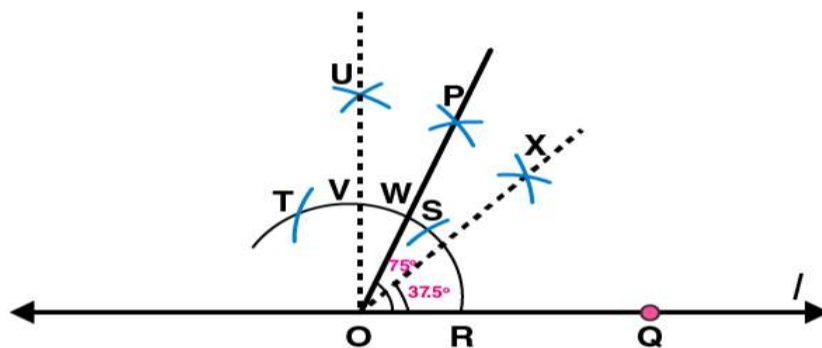
1. Draw $\angle POQ$ of measure 75° and find its line of symmetry.

Solutions:

Following steps are followed to construct an angle of 75° and its line of symmetry

- Draw a line l and mark two points O and Q on it. Draw an arc of convenient radius, while taking centre as O . Let this intersect line l at R
- Taking R as centre and with same radius as before, draw an arc such that it is intersecting the previously drawn arc at S
- By taking same radius as before and S as centre, draw an arc intersecting the arc at point T as shown in figure
- Take S and T as centre, draw an arc of same radius such that they intersect each other at U
- Join OU . Let it intersect the arc at V . Now, take S and V as centres draw arcs with radius more than $1/2 SV$. Let these intersect each other at P . Join OP . Now OP is the ray making 75° with the line l .
- Let this ray intersect our major arc at point W . By taking R and W as centres, draw arcs with radius more than $1/2 RW$ in the interior angle of 75° . Let these intersect each other at point X . Join OX

OX is the line of symmetry for the $\angle POQ = 75^\circ$



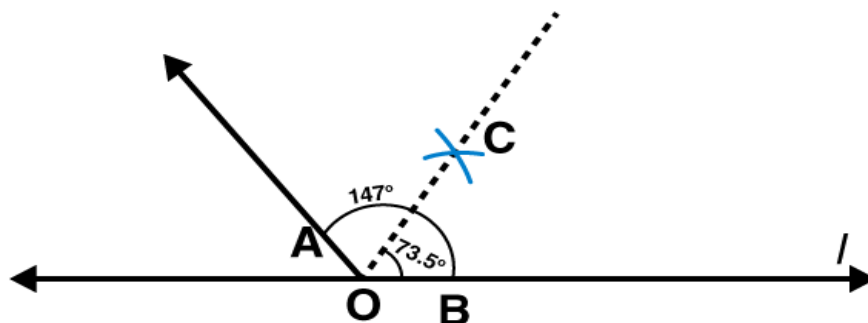
2. Draw an angle of measure 147° and construct its bisector.

Solutions:

Following steps are followed to construct an angle of measure 147° and its bisector

- Draw a line l and mark point O on it. Place the centre of protractor at point O and the zero edge along line l
- Mark a point A at an angle of measure 147° . Join OA . Now OA is the required ray making 147° with line l
- By taking point O as centre, draw an arc of convenient radius. Let this intersect both rays of angle 147° at points A and B .
- By taking A and B as centres draw arcs of radius more than $1/2 AB$ in the interior angle of 147° . Let these intersect each other at point C . Join OC .

OC is the required bisector of 147° angle



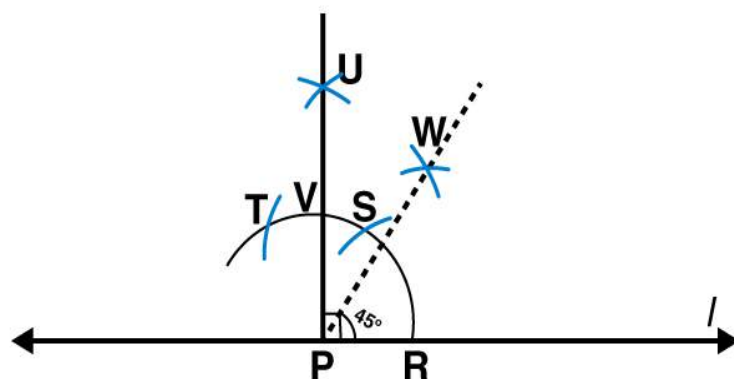
3. Draw a right angle and construct its bisector.

Solutions:

Following steps are followed to construct a right angle and its bisector.

- (i) Draw a line l and mark a point P on it. Draw an arc of convenient radius by taking point P as centre. Let this intersect line l at R
- (ii) Draw an arc by taking R as centre and with the same radius as before such that it is intersecting the previously drawn arc at S
- (iii) Take S as centre and with the same radius as before, draw an arc intersecting the arc at T as shown in figure
- (iv) By taking S and T as centres draw arcs of same radius such that they are intersecting each other at U .
- (v) Join PU . PU is the required ray making a right angle with the line l . Let this intersect major arc at point V .
- (vi) Now take R and V as centres, draw arcs with radius more than $1/2 RV$ to intersect each other at point W . Join PW .

PW is the required bisector of this right angle.



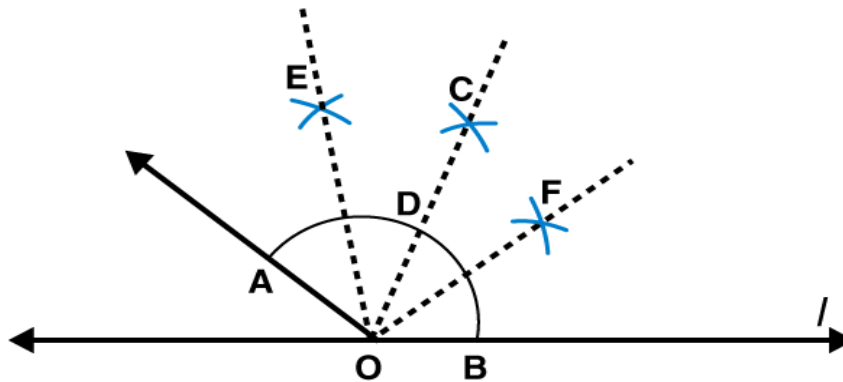
4. Draw an angle of measure 153° and divide it into four equal parts.

Solutions:

Following steps are followed to construct an angle of measure 153° and its bisector

- (i) Draw a line l and mark a point O on it. Place the centre of protractor at point O and the zero edge along line l
- (ii) Mark a point A at the measure of angle 153° . Join OA . Now OA is the required ray making 153° with line l

- (iii) Draw an arc of convenient radius by taking point O as centre. Let this intersect both rays of angle 153° at points A and B.
- (iv) Take A and B as centres and draw arcs of radius more than $1/2 AB$ in the interior of angle of 153° . Let these intersect each other at C. Join OC
- (v) Let OC intersect major arc at point D. Draw arcs of radius more than $1/2 AD$ with A and D as centres and also D and B as centres. Let these intersect each other at points E and F respectively. Now join OE and OF
- OF, OC, OE are the rays dividing 153° angle into four equal parts.



5. Construct with ruler and compasses, angles of following measures:

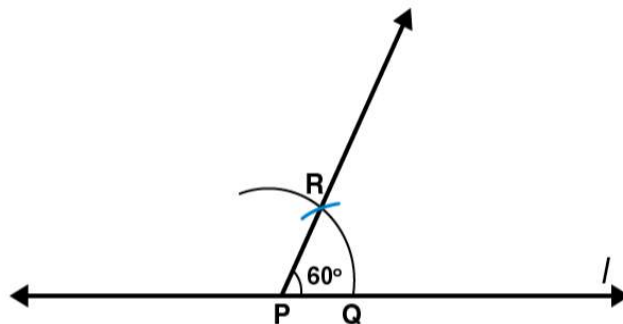
- (a) 60°
- (b) 30°
- (c) 90°
- (d) 120°
- (e) 45°
- (f) 135°

Solutions:

- (a) 60°

Following steps are followed to construct an angle of 60°

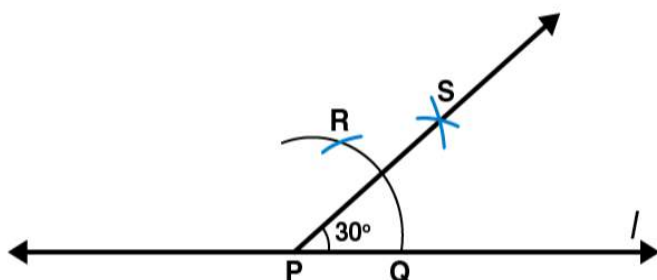
- (i) Draw a line l and mark a point P on it. Take P as centre and with convenient radius, draw an arc of a circle such that it intersects the line l at Q.
- (ii) Take Q as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at point R.
- (iii) Join PR. PR is the required ray making 60° with the line l.



- (b) 30°

Following steps are followed to construct an angle of 30°

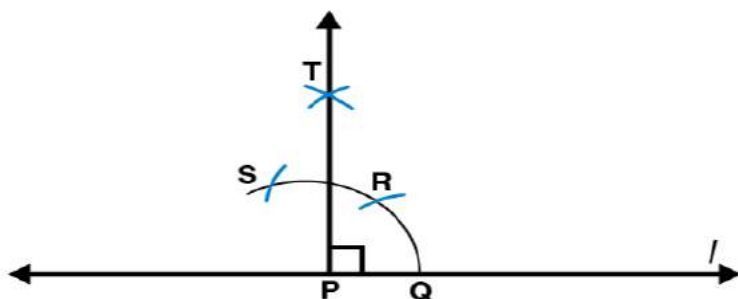
- (i) Draw a line l and mark a point P on it. By taking P as centre and with convenient radius, draw an arc of a circle such that it is intersecting the line l at Q .
- (ii) Take Q as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at point R .
- (iii) By taking Q and R as centres and with radius more than $1/2 RQ$ draw arcs such that they are intersecting each other at S . Join PS which is the required ray making 30° with the line l .



(c) 90°

Following steps are followed to construct an angle of measure 90°

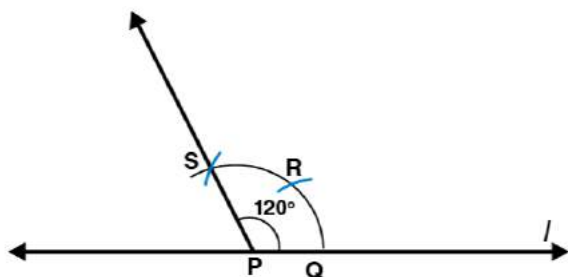
- (i) Draw a line l and mark a point P on it. Take P as centre and with convenient radius, draw an arc of a circle such that it is intersecting the line l at Q .
- (ii) Take Q as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at R .
- (iii) By taking R as centre and with the same radius as before, draw an arc intersecting the arc at S as shown in figure.
- (iv) Now take R and S as centre, draw arc of same radius to intersect each other at T .
- (v) Join PT , which is the required ray making 90° with the line l .



(d) 120°

Following steps are followed to construct an angle of measure 120°

- (i) Draw a line l and mark a point P on it. Taking P as centre and with convenient radius, draw an arc of circle such that it is intersecting the line l at Q .
- (ii) By taking Q as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at R .
- (iii) Take R as centre and with the same radius as before, draw an arc such that it is intersecting the arc at S as shown in figure.
- (iv) Join PS , which is the required ray making 120° with the line l .

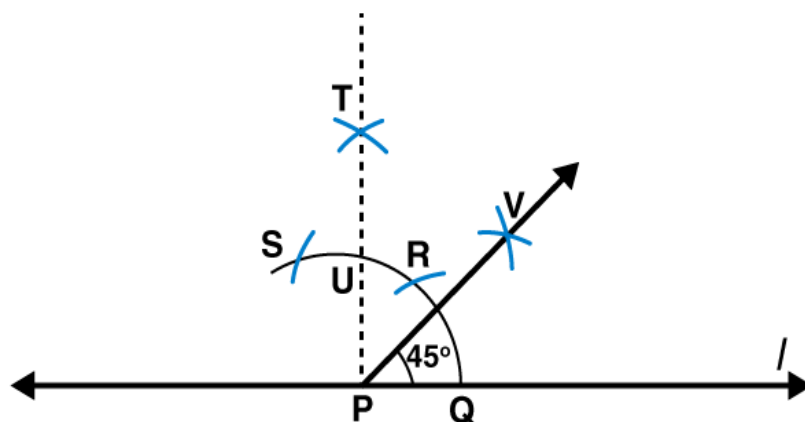


(e) 45°

Following steps are followed to construct an angle of measure 45°

- (i) Draw a line l and mark a point P on it. Take P as centre and with convenient radius, draw an arc of a circle such that it is intersecting the line l at Q .
- (ii) Take Q as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at R .
- (iii) By taking R as centre and with the same radius as before, draw an arc such that it is intersecting the arc at S as shown in figure.
- (iv) Take R and S as centres and draw arcs of same radius such that they are intersecting each other at T .
- (v) Join PT . Let this intersect the major arc at point U .
- (vi) Now take Q and U as centres and draw arcs with radius more than $1/2$ QU to intersect each other at point V . Join PV .

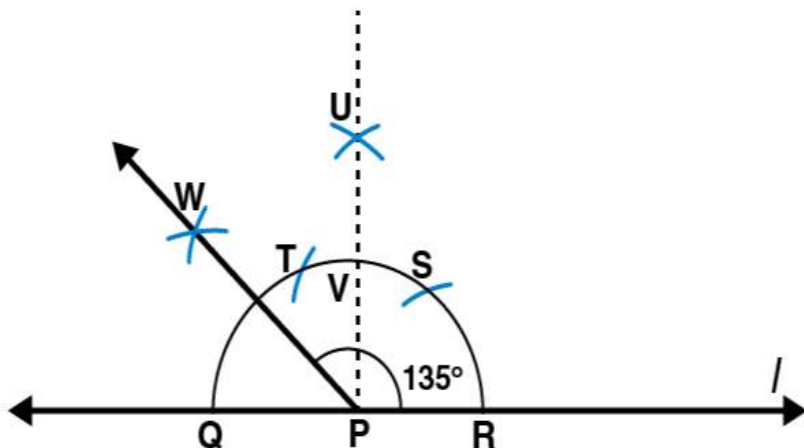
PV is the required ray making 45° with the line l



(f) 135°

Following steps are followed to construct an angle of measure 135°

- (i) Draw a line l and mark a point P on it. Taking P as centre and with convenient radius, draw a semicircle which intersects the line l at Q and R respectively.
- (ii) By taking R as centre and with the same radius as before, draw an arc intersecting the previously drawn arc at S .
- (iii) Taking S as centre and with the same radius as before, draw an arc such that it is intersecting the arc at T as shown in figure.
- (iv) Take S and T as centres, draw arcs of same radius to intersect each other at U .
- (v) Join PU . Let this intersect the arc at V . Now take Q and V as centres and with radius more than $1/2$ QV , draw arcs to intersect each other at W .
- (vi) Join PW which is the required ray making 135° with the line l .

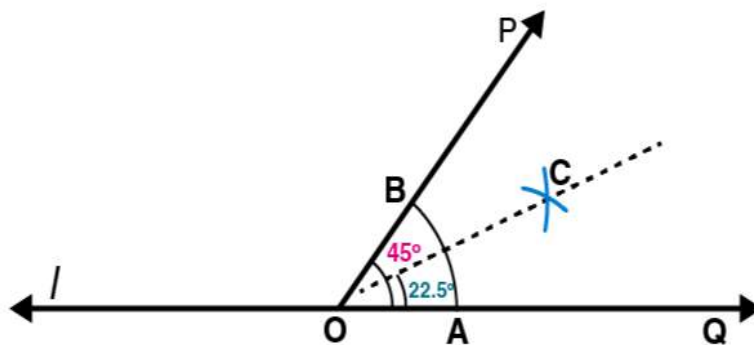


6. Draw an angle of measure 45° and bisect it.

Solutions:

Following steps are followed to construct an angle of measure 45° and its bisector.

- (i) Using the protractor $\angle POQ$ of 45° measure may be formed on a line l
- (ii) Draw an arc of convenient radius with centre as O. Let this intersects both rays of angle 45° at points A and B
- (iii) Take A and B as centres, draw arcs of radius more than $1/2 AB$ in the interior of angle of 45° . Let these intersect each other at C. Join OC
OC is the required bisector of 45° angle

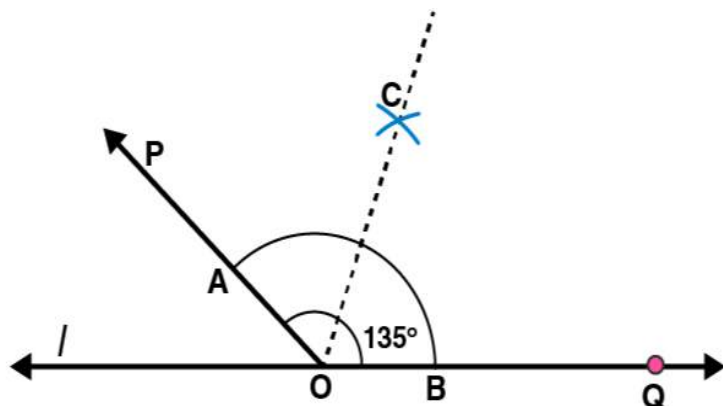


7. Draw an angle of measure 135° and bisect it.

Solutions:

Following steps are followed to construct an angle of measure 135° and its bisector.

- (i) By using a protractor $\angle POQ$ of 135° measure may be formed on a line l
- (ii) Draw an arc of convenient radius by taking O as centre. Let this intersect both rays of angle 135° at points A and B respectively.
- (iii) Take A and B as centres, draw arcs of radius more than $1/2 AB$ in the interior of angle of 135° . Let these intersect each other at C. Join OC.
OC is the required bisector of 135° angle

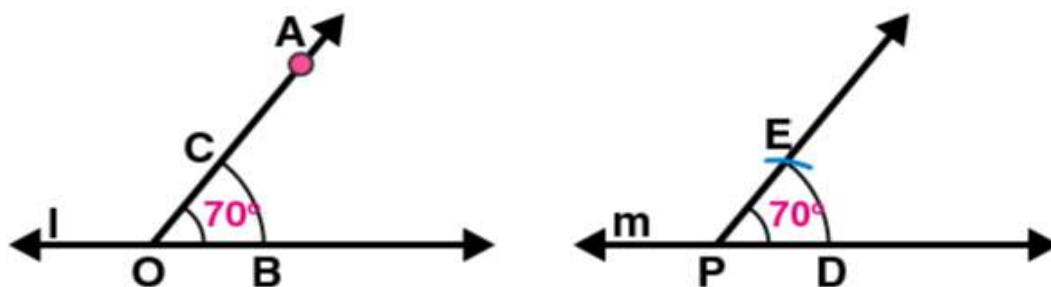


8. Draw an angle of 70° . Make a copy of it using only a straight edge and compasses.

Solutions:

Following steps are followed to construct an angle of measure 70° and its copy.

- Draw a line l and mark a point O on it. Now place the centre of protractor at point O and the zero edge along line l .
- Mark a point A at an angle of measure 70° . Join OA . Now OA is the ray making 70° with line l . With point O as centre, draw an arc of convenient radius in the interior of 70° angle. Let this intersects both rays of angle 70° at points B and C respectively
- Draw a line m and mark a point P on it. Again draw an arc with same radius as before and P as centre. Let it cut the line m at point D
- Adjust the compasses up to the length of BC . With this radius draw an arc taking D as centre which intersects the previously drawn arc at point E .
- Join PE . Here PE is the required ray which makes same angle of measure 70° with the line m



9. Draw an angle of 40° . Copy its supplementary angle.

Solutions:

Following steps are followed to construct an angle of measure 45° and a copy of its supplementary angle

- Draw a line segment \overline{PQ} and mark a point O on it. Place the centre of protractor at point O and the zero edge along line segment \overline{PQ} .
- Mark a point A at an angle of measure 40° . Join OA . Here OA is the required ray making 40° with \overline{PQ} . $\angle POA$ is the supplementary angle of 40°
- With point O as centre, draw an arc of convenient radius in the interior of $\angle POA$. Let this intersects both rays of $\angle POA$ at points B and C respectively.

- (iv) Draw a line m and mark a point S on it. Again draw an arc by taking S as centre with the same radius as used before. Let it cut the line m at point T .
- (v) Now adjust the compasses up to the length of BC . Taking T as centre draw an arc with this radius which will intersect the previously drawn arc at point R .
- (vi) Join RS . Here RS is the required ray which makes same angle with the line m , as the supplementary of 40° [i.e 140°]

