7.2 Drawing and Dividing Angles

What are you going to learn?

- To draw angles
- To divide an angle into two congruent angles

A Drawing Angles

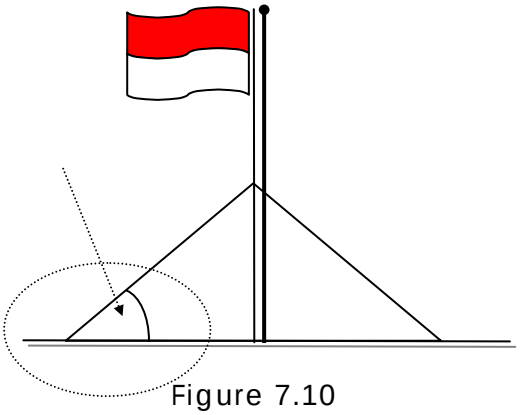
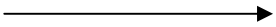


Figure 7.10

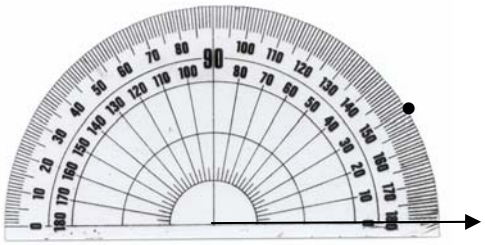
Look at the flagpole on the Figure 7.10 above. The angle formed by the rope with the ground is 30°. Now draw a 30° angle.

To draw a 30° angle, you can use a protractor and ruler by following the steps below.

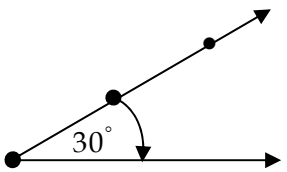
1. Draw a ray.



2. Place the centre of the protractor on a line, and then mark the position of number 30 on the protractor.



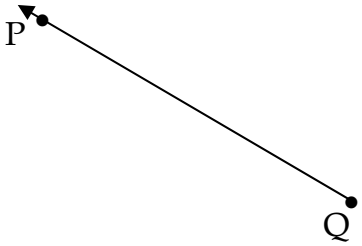
3. Draw a line from the centre of the protractor and the marking point. It will form a 30° angle.



PROBLEM 13

Draw a 65° angle.

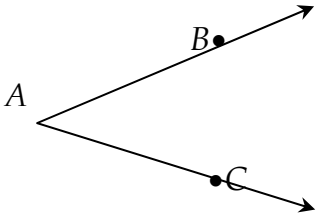
PROBLEM 14

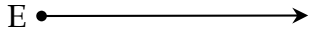


Draw the ray QR so that $\angle PQR = 125°$.

To draw an angle equal to a given angle without knowing the measure of the angle can be done using *a compass* and *a ruler*. The steps to draw an angle are given in the following activities.

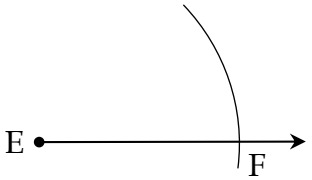
1. Draw ∠A.





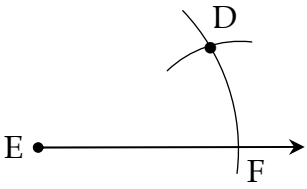
2. Draw a ray with a vertex E.

3. Using a compass, draw an arc with its centre at A so that the arc intersects the sides of the angle at B and C.

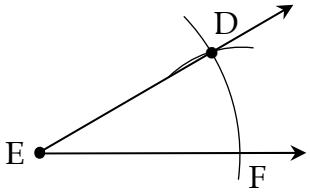


4. Without changing the radius of arch on step 3, draw an arc at E and intersect the ray at F.

5. Place the tip of the compass at C and the pencil part of the compass at B.

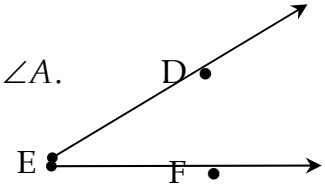


6. Without changing the radius of arc in step 5, place the tip of the compass at F and get to point D.



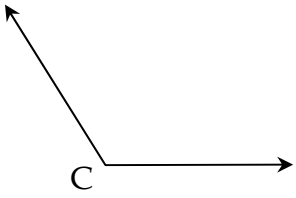
Draw the ray $\overline{ED}$ using a ruler.

7. Therefore, the measure of $\angle E$ is $\angle A$.



Now repeat the activity to make you understand more.

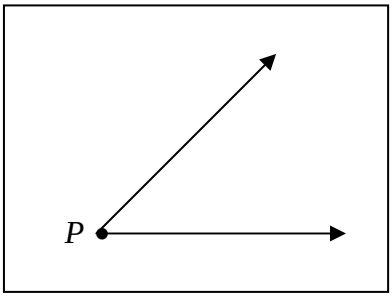
Try This



Draw $\angle H$ which is equal to $\angle C$ as shown in the figure on the left using a compass and a ruler. (Draw each of the steps.)

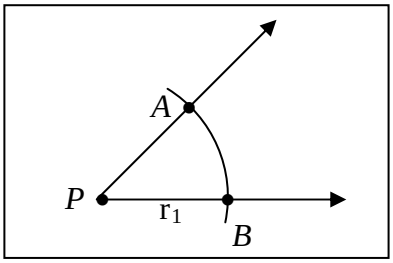
B Dividing an Angle into Two Equal Parts

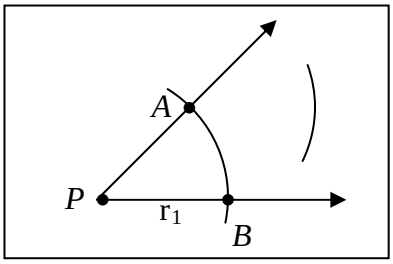
How can you divide $\angle$ P in the figure on the right into two equal parts?



To answer the above question, we need to do the following steps.

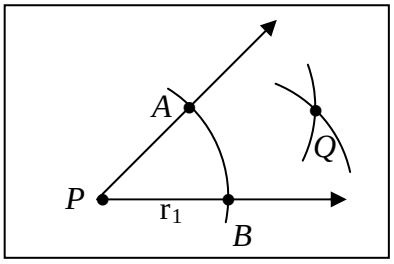
1. Draw an arc with P as the centre and the radius r_1. The arc intersects the sides of angle P at A and B.





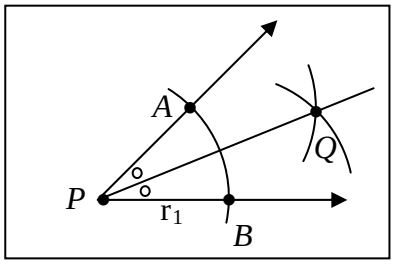
2. Draw an arc with A as the centre and any radius.

3. Draw an arc with B as the centre having the same radius as step 2. Mark the intersection as Q.



4. Draw a line passing through P and Q. Name it line s.

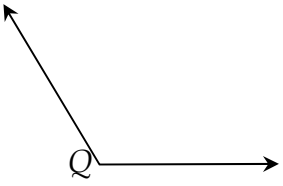
   So, line s is angle bisector of angle P.



Repeat the activity to make you understand more.

Try This

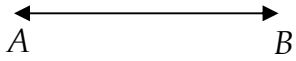
Divide $\angle Q$ on the figure on the right into two equal parts.



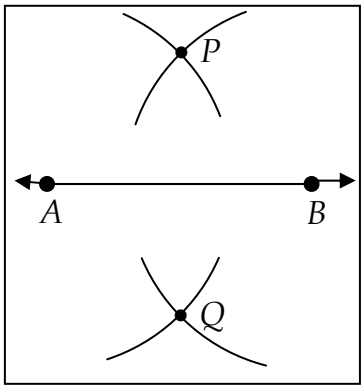
C *Drawing angles of 30°, 45°, 60°, 90°, 150°, 180°, 270°, and 360°*

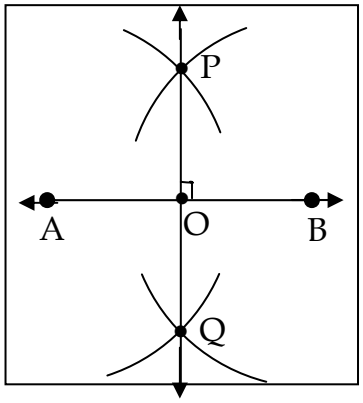
1. Drawing a 90° angle.

i) Draw line $\overline{AB}$.



ii) Draw two arcs above and below $\overline{AB}$ with A and B as the centres and its radius is r. The pair of arcs above segment AB has P as the common point and the pair of arcs below has Q as the common point.

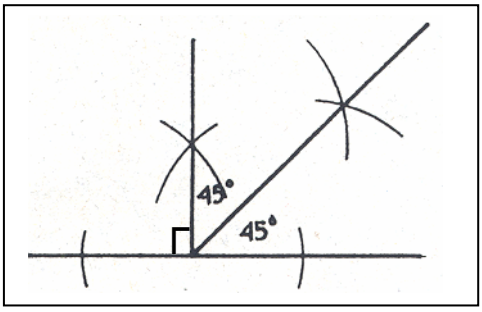




iii) Draw a line through P and Q. $\overline{PQ}$ is perpendicular to $\overline{AB}$ and O is the common point. Then $\angle POB$=90°. Angle BOQ is 90°.

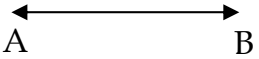
2. Drawing a 45° angle.

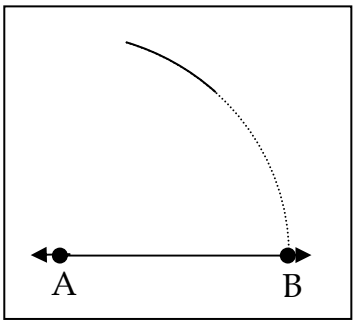
A 45° angle can be obtained by dividing a 90° angle into two equal parts.



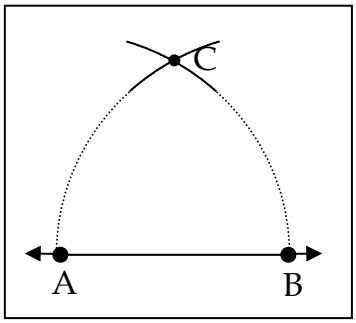
3. *Drawing a 60° angle.*

i) Draw $\overline{AB}$.

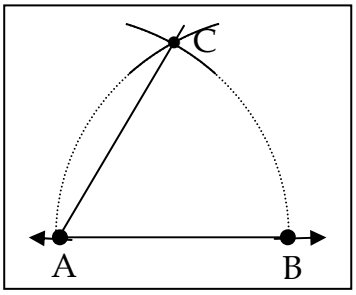




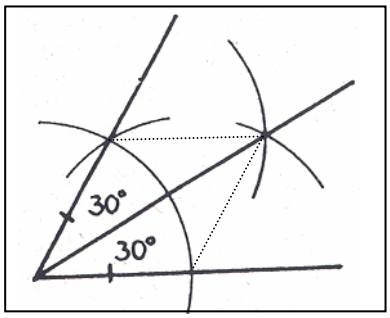
ii) Draw an arc having its centre at *A* and its radius *AB*.



iii) Draw an arc having its centre at B and its radius *AB*. Those two arcs have the common point at *C*.



iv) Draw a ray from A through C, then $\angle BAC = 60°$.

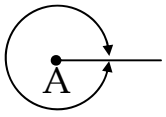


4. Drawing a 30° angle.

   A 30° angle can be obtained by dividing a 60° angle into two equal parts.

5. Drawing a 360° angle.

   Drawing a 360° angle is equivalent to drawing a circle.



CHECK YOUR UNDERSTANDING

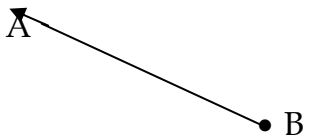
Draw 150°, 180°, dan 270° angles.

Task 7.2

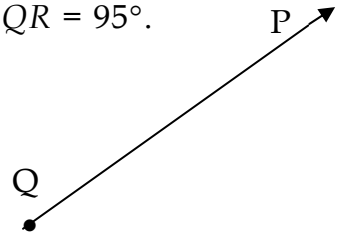
1. Draw the following angles.

a. 30°	b. 45°	c. 80°
d. 130°	e. 175°	f. 180°
g. 220°	h. 260°	i. 315°

2. a. Draw ray BC so that $\angle ABC = 75°$.

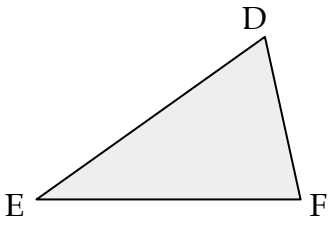


b. Draw line QR so that $\angle PQR = 95°$.



3. Draw $\angle A$ which is an acute angle. Then draw $\angle Y$ which is exactly equal to $\angle A$ using your compass and ruler. (Write each of the steps.)

4. Draw ΔDEF as shown in the figure on the right in your book using your compass and ruler. Then, write the steps.



5. a. Draw $\overline{PQ}$ having the length of 4 cm.
   b. Then draw $\angle PQR = 60°$ and $\angle PQS = 30°$.