

Activity 9

OBJECTIVE

To prepare a model to illustrate the values of sine function and cosine function for different angles which are multiples of $\frac{\pi}{2}$ and π .

MATERIAL REQUIRED

A stand fitted with 0° - 360° protractor and a circular plastic sheet fixed with handle which can be rotated at the centre of the protractor.

METHOD OF CONSTRUCTION

1. Take a stand fitted with 0° - 360° protractor.
2. Consider the radius of protractor as 1 unit.

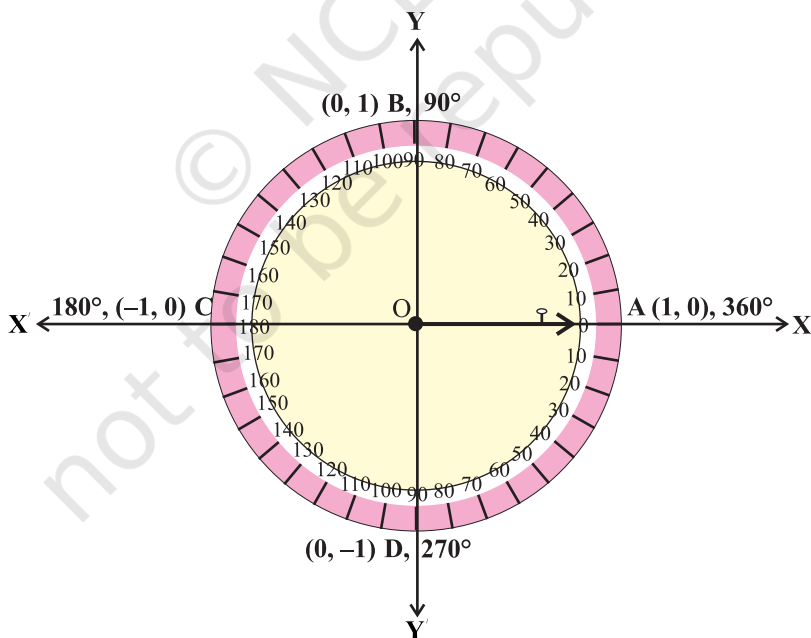


Fig. 9

3. Draw two lines, one joining 0° - 180° line and another 90° - 270° line, obviously perpendicular to each other.
4. Mark the ends of 0° - 180° line as $(1,0)$ at 0° , $(-1, 0)$ at 180° and that of 90° - 270° line as $(0,1)$ at 90° and $(0, -1)$ at 270°
5. Take a plastic circular plate and mark a line to indicate its radius and fix a handle at the outer end of the radius.
6. Fix the plastic circular plate at the centre of the protractor.

DEMONSTRATION

1. Move the circular plate in anticlock wise direction to make different angles like 0 , $\frac{\pi}{2}$, π , $\frac{3\pi}{2}$, 2π etc.
2. Read the values of sine and cosine function for these angles and their multiples from the perpendicular lines.

OBSERVATION

1. When radius line of circular plate is at 0° indicating the point A $(1,0)$, $\cos 0 = \underline{\hspace{2cm}}$ and $\sin 0 = \underline{\hspace{2cm}}$.
2. When radius line of circular plate is at 90° indicating the point B $(0, 1)$, $\cos \frac{\pi}{2} = \underline{\hspace{2cm}}$ and $\sin \frac{\pi}{2} = \underline{\hspace{2cm}}$.
3. When radius line of circular plate is at 180° indicating the point C $(-1,0)$, $\cos \pi = \underline{\hspace{2cm}}$ and $\sin \pi = \underline{\hspace{2cm}}$.
4. When radius line of circular plate is at 270° indicating the point D $(0, -1)$ which means $\cos \frac{3\pi}{2} = \underline{\hspace{2cm}}$ and $\sin \frac{3\pi}{2} = \underline{\hspace{2cm}}$
5. When radius line of circular plate is at 360° indicating the point again at A $(1,0)$, $\cos 2\pi = \underline{\hspace{2cm}}$ and $\sin 2\pi = \underline{\hspace{2cm}}$.

Now fill in the table :

Trigonometric function	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$	2π	$\frac{5\pi}{2}$	3π	$\frac{7\pi}{2}$	4π
sin θ	–	–	–	–	–	–	–	–	–
cos θ	–	–	–	–	–	–	–	–	–

APPLICATION

This activity can be used to determine the values of other trigonometric functions for angles being multiple of $\frac{\pi}{2}$ and π .