

Unit 7 Introduction to Trigonometry

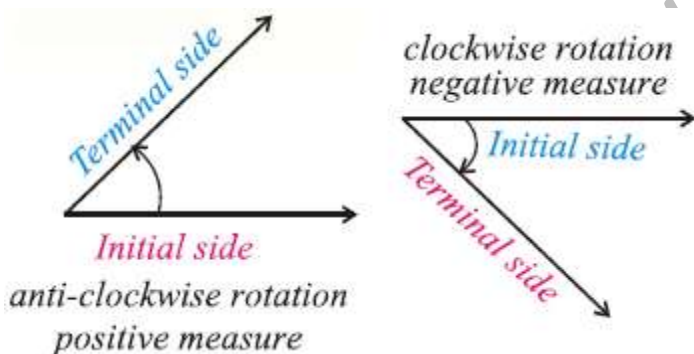
Q: Define an angle. (ALP)

An angle is defined as the union of two non-collinear rays with some common starting point. The rays are called arms of the angle and the common starting point is known as vertex of the angle.

Q: What do you mean by initial side and terminal side of an angle?

When we form an angle in this way, the original position of the ray is called initial side and final position of the ray is called the terminal side of an angle.

Note: If rotation of ray is anti-clockwise the angle has positive measure and if rotation of ray is clockwise the angle has negative measure.



Q: What is the sexagesimal system of measurements? (ALP)

In sexagesimal system of measurements, we find angles in degree, minute and seconds.

$$60'' = 1'$$

$$60' = 1^\circ$$

The symbols 1° , $1'$ and $1''$ are used to denote a degree, a minute, a second respectively.

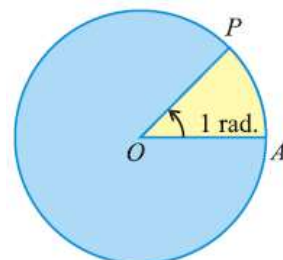
Q: Define degree. (ALP)

If we divide the circumference of a circle into 360 equal arcs, then the angle subtended at the center of the circle by one arc is called one degree and is denoted by 1° .

Q: Define radian measure of an angle. (ALP)

The angle subtended at the center of the circle by an arc, whose length is equal to the radius of the circle is called one radian.

If length of an arc $\widehat{AP}$ is equal to the length of radius $\overline{OA}$, then $m\angle AOP = 1 \text{ radian}$.



Q: Explain relationship between radian and degree measure of an angle.

$$1^\circ = \frac{\pi}{180} \text{ radian}$$

$$1^\circ \approx 0.0175 \text{ radian}$$

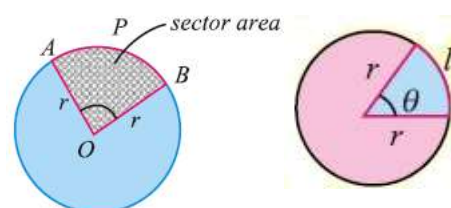
$$1 \text{ radian} = \left(\frac{180}{\pi}\right)^\circ$$

$$1 \text{ radian} \approx 57.295795^\circ = 57^\circ 17' 45''$$

Q: Explain relationship between angle, arc length and radius, also write formula of area of circular sector.

Relation between central angle and arc length of a circle is given by

$$l = r\theta. \text{ Area of circular sector is given by } A = \frac{1}{2}r^2\theta.$$

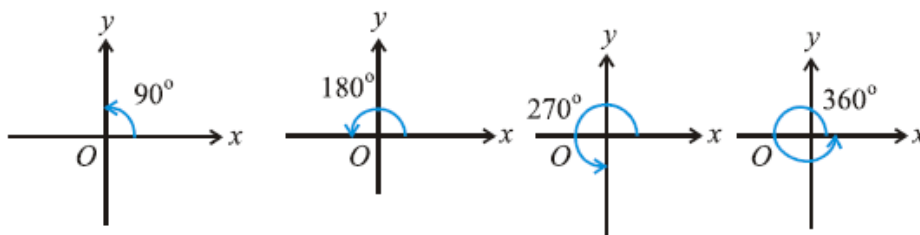


Q: Define conterminal angle.

Two or more than two angles with the same initial and terminal sides are called conterminal angles.

Q: Define quadrantal angle.

An angle is called a quadrantal angle, if its terminal side lies on the x -axis or y -axis. i. e 90° , 180° , 270° , and 360° are quadrantal angles. The quadrantal angles are shown below:

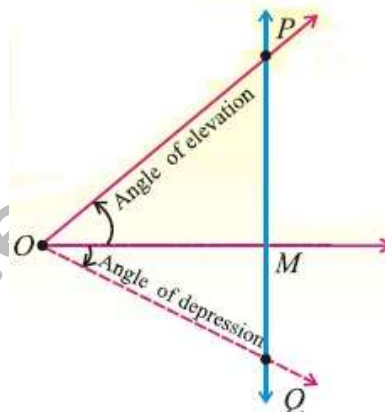


Q: What are the trigonometric ratios?

There are six fundamental trigonometric ratios (function) called sine, cosine, tangent, cotangent, secant, and cosecant.

Q: Differentiate between angle elevation and angle of depression.

The term angle of elevation denotes the angle from the horizontal upward to an object. The $\angle MOP$ is called angle of elevation. The term angle of depression denotes the angle from the horizontal downward to an object. The $\angle MOQ$ is called angle of depression.



Q: What are the trigonometric identities.

- (i) $\sin^2 \theta + \cos^2 \theta = 1$
- (ii) $1 + \tan^2 \theta = \sec^2 \theta$
- (iii) $1 + \cot^2 \theta = \csc^2 \theta$