

Precalculus Honors
Unit Circle
Toolkit

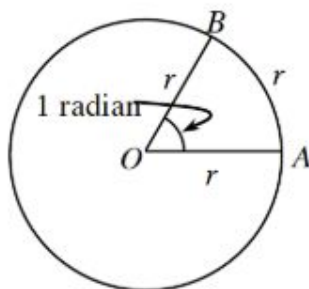
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Radians



A radian is a unit of angle measure. If the length of radius \overline{OB} equals the length of \widehat{AB} , then $\angle AOB$ has a *measure* of 1 **radian**. In addition, $m\widehat{AB}$ also equals 1 radian. The length of \widehat{AB} depends on the radius.

There are 2π radians in a full circle. Therefore:

$$2\pi \text{ radians} = 360^\circ \quad \text{or} \quad \pi \text{ radians} = 180^\circ$$

Sine, Cosine, and Tangent in the Unit Circle

For any angle θ , the **sine of θ** , denoted $\sin(\theta)$, is the y -coordinate of the point on the unit circle reached by a rotation of θ radians from **standard position** (counterclockwise starting from the positive x -axis).

The **cosine of θ** , denoted $\cos(\theta)$, is the x -coordinate of the point on the unit circle reached by a rotation of θ radians from standard position.

The **tangent of θ** , denoted by $\tan(\theta)$, is the slope of the terminal ray of an angle by a rotation of θ radians from standard position.

The **Pythagorean Identity**, $\sin^2(\theta) + \cos^2(\theta) = 1$, describes the relationship between the side lengths of a right triangle formed in a unit circle with the radius as the hypotenuse.

