Two rays share a common vertex from an angle. We denote initial side, terminal side to indicate direction of notation.

\[
\text{Initial side} \quad \text{Initial side}
\]

We identify an angle by the amount and direction of notation.

CCW: Counterclockwise: positive notation
CW: Clockwise: negative notation

\[ \theta, \alpha, \beta, \gamma \]
Assume positive rotation unless indicated.

1 degree \[ \Delta \frac{1}{360} \]

1 radian \[ \Delta \frac{1}{2\pi} \]

\[ \text{A sector's measure of radian because it intersects the arc of } \frac{\pi}{2} \text{ length } r. \]

\[ 360^\circ = 2\pi \text{ radians.} \]

\[ \frac{360^\circ}{2\pi} \div \frac{180^\circ}{\pi} = 1 \text{ radian.} \]

1 degree \( \Delta \frac{\pi}{180} \text{ radians.} \)

\[ 225^\circ = \frac{\pi}{2} \text{ radians.} \]

\[ 3\Delta \frac{\pi}{2} = \frac{\pi}{2} \]

Fermi side lies within an arc of.

When the TS lies on the axis, we call the angle quadrantal.
Arc length

Ratio of the central angles is equal to ratio of the intersected arc lengths.

\[
\frac{\theta_1}{\theta_2} = \frac{s_1}{s_2}
\]

Central angle \( L \) to the arc length \( \frac{L}{\theta_1} = \frac{s_1}{s_1} \)

\( \theta_1 = \frac{\pi}{4} \text{ radian} \)

\( s_1 = 2 \)

\( \theta_1 = 1 \text{ radian} \)

\( s_1 = 2 \)

\( s_2 = \pi \text{ radian} \)

ex: Find the length of arc of a circle with

\( r = 2 \text{ m} \) subtends a central angle measuring 0.25 radians.

\( s = 12 \)

\( s = (2)(0.25) \)

\( s = 0.5 \text{ m} \)
Area of a sector of circle
\[ \frac{\theta}{2\pi} = \frac{A}{\pi r^2} \]
\[ A = \frac{\theta}{2\pi} \pi r^2 \]
\[ A = \frac{1}{2} r^2 \theta \]

Linear speed
\[ v = \frac{s}{t} \]
Angular speed
\[ \omega = \frac{\theta}{t} \]

\[ v = \frac{s}{t} = \frac{r\theta}{t} = r(\frac{\theta}{t}) = r\omega \]

Rock on a sling that is 20 ft long, rotating at 180 revolutions per min.
Find the angular speed.
Find v at the moment it is released.
\[ 180 \times 2\pi = 360 \pi \text{ radians/min} \]

\[ \omega = 360 \pi \]

\[ v = \frac{360 \pi}{30} \text{ m/s} \]

\[ 2 \cdot 2 \times 360 = 220 \pi \text{ rad} \]