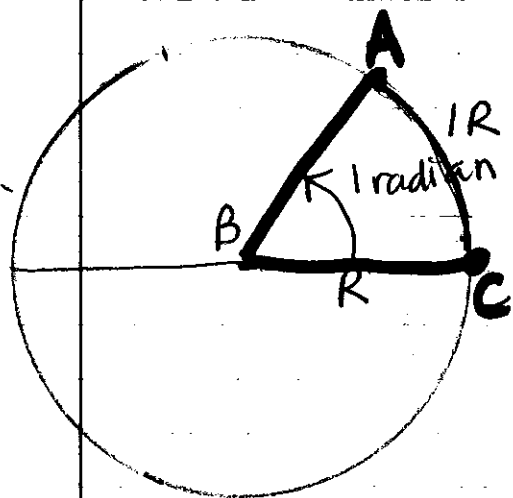


13.3 Radian Measure



$$\pi = 180^\circ$$

$$2\pi = 360^\circ$$

$\angle ABC$ is a central \angle ,
(vertex at the center)

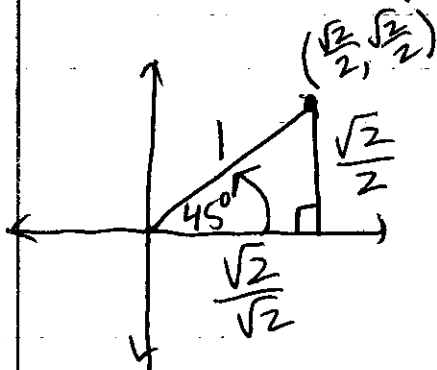
\widehat{AC} is the intercepted
arc of $\angle ABC$.

When a central \angle intercepts an arc that has the same length as the radius of the \odot , the measure of the \angle is defined to be 1 radian.

(ex) Find the $\sin\left(\frac{\pi}{4}\right)$ and $\cos\left(\frac{\pi}{4}\right)$.

Convert $\frac{\pi}{4}$ to degrees: $\frac{\pi}{4} \cdot \frac{180}{\pi}$

$$\frac{\pi}{4} = 45^\circ$$

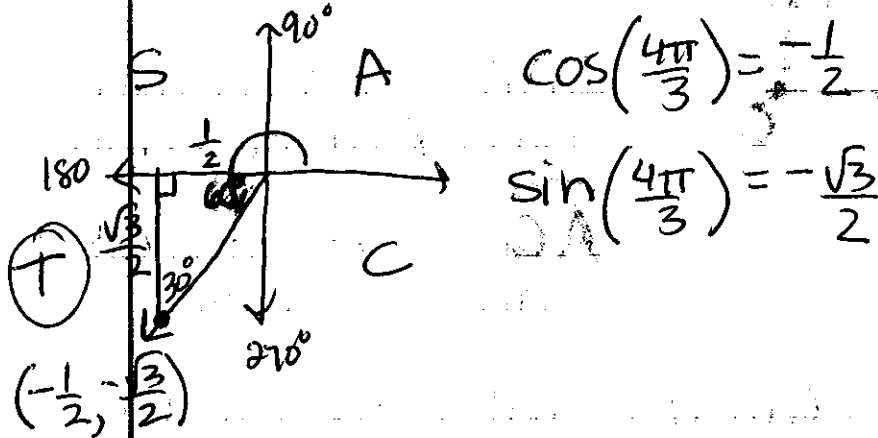


$$\sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

$$\cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}$$

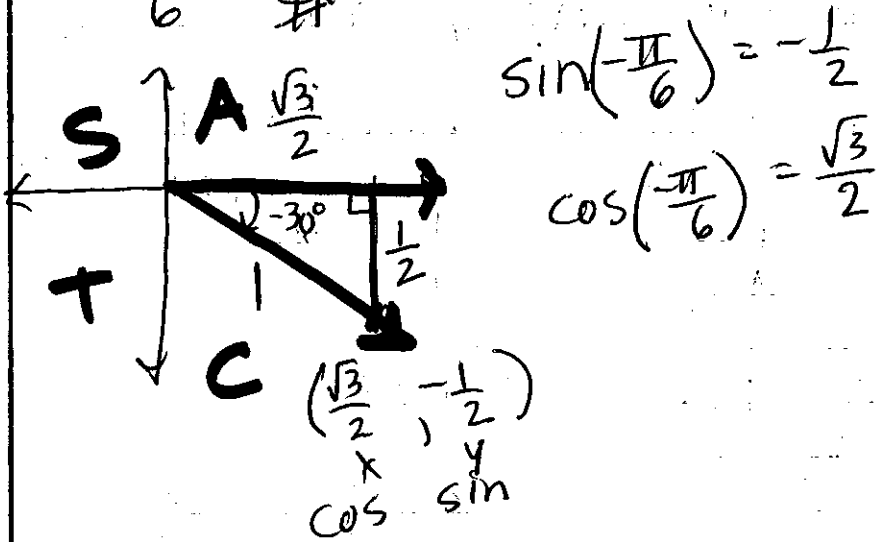
(ex) $\cos\left(\frac{4\pi}{3}\right) + \sin\left(\frac{4\pi}{3}\right)$

$$\frac{4\pi}{3} \cdot \frac{180}{\pi} = 240^\circ$$



(ex) $\sin + \cos$ of $-\frac{\pi}{6}$

$$-\frac{\pi}{6} \cdot \frac{180}{\pi} = -30^\circ$$



13.3

~~13.2~~

Converting Angle Measurements

On the unit circle, the angles are given in degrees. Another way to measure an angle is with radians.
 π Radians = 180. The two unit conversions are as follows:

radians to degrees $\frac{\pi}{180^\circ}$	degrees to radians $\frac{180^\circ}{\pi}$
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Convert the angle from degrees to radians, leaving your answer as a fraction.

Example: 90° Simply multiply. $\frac{90^\circ}{1} \times \frac{\pi}{180^\circ} = \frac{90^\circ \pi}{180^\circ} = \frac{1}{2}\pi$

1. 310° $310 \times \frac{\pi}{180} = \frac{310\pi}{180}$
 $\left(\frac{31\pi}{18}\right)$

2. $150^\circ \times \frac{\pi}{180} = \frac{150\pi}{180} = \left(\frac{5}{6}\pi\right)$

3. 30° $\frac{\pi}{6}$ or $\frac{1}{6}\pi$

4. 420° $\frac{7\pi}{3}$

5. 120° $\frac{2\pi}{3}$

6. 350° $\frac{35\pi}{18}$

Convert from radians to degrees.

Example: $\frac{3}{2}\pi$ Simply multiply. $\frac{3}{2}\pi \times \frac{180^\circ}{\pi} = \frac{540^\circ}{2} = 270^\circ$

1. $\frac{5}{4}\pi$ $\frac{5\pi}{4} \cdot \frac{180}{\pi} = \frac{900}{4} = \left(225^\circ\right)$

2. 4π $4 \cdot \frac{180}{\pi} = \left(720^\circ\right)$

3. $\frac{7}{6}\pi$ 210°

4. $\frac{1}{6}\pi$ 30°

5. $\frac{7}{4}\pi$ 315°

6. $\frac{9}{2}\pi$ 810°

