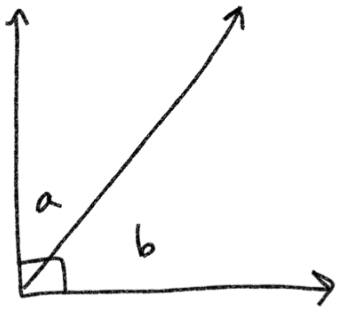
MTH-PT Trigonometry Session 7 2/16

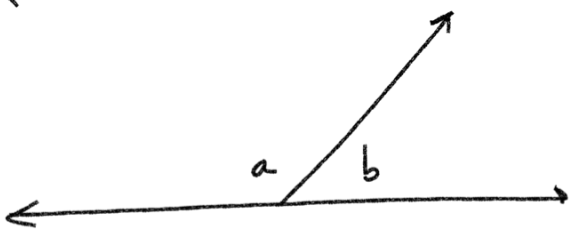
Complementary Angles



$\measuredangle a + \measuredangle b = 90°$

$a = 18°$ $b = 72°$

Supplemental Angles (Linear pair)



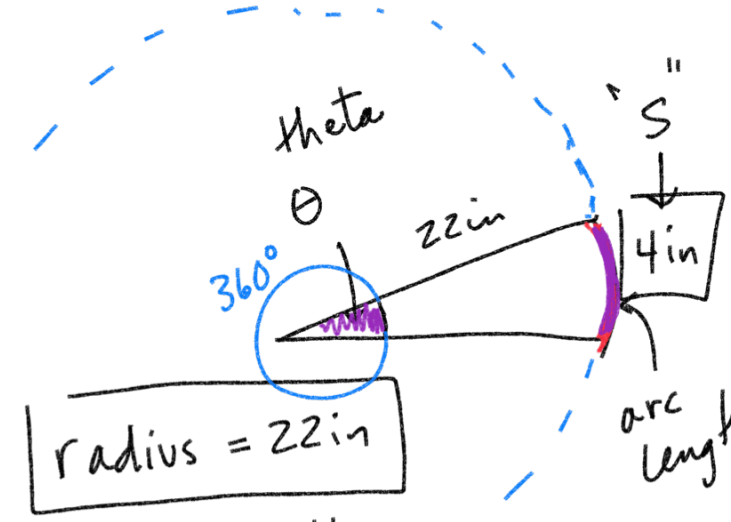
$\measuredangle a + \measuredangle b = 180°$

$\measuredangle a = 116°$ $\measuredangle b = 64°$

Circumference of Circle

$C = 2\pi r$ $C = \pi d$

π is the number of times the diameter can wrap around the circumference of a circle $\pi = \frac{C}{d}$

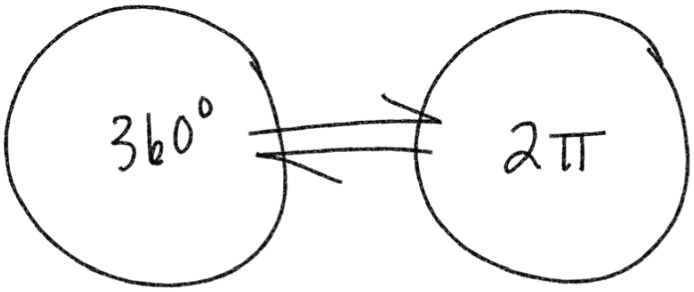


$$\frac{\text{arc length}}{\text{circumference}} = \frac{\theta}{360°}$$

$$\frac{4\text{ in}}{2\pi(22\text{ in})} = \frac{\theta}{360°}$$

$$\frac{(4\text{ in})(360°)}{44\pi\text{ in}} = \frac{(44\pi\text{ in})\theta}{44\pi\text{ in}}$$

$$\frac{360°}{11\pi} = \theta = 10.4°$$



$180^\circ \rightleftharpoons \pi$

$$\frac{\text{arc length}}{\text{circumference}} = \frac{\theta}{2\pi}$$

$$\left[\frac{4\text{ in}}{2\pi(22\text{ in})} = \frac{\theta}{2\pi}\right] \qquad \frac{8\pi}{44\pi} = \frac{(44\pi)\theta}{44\pi}$$

$$\frac{8}{44} = \theta = \boxed{\frac{2}{11} \text{ radians}}$$

Interior Angle

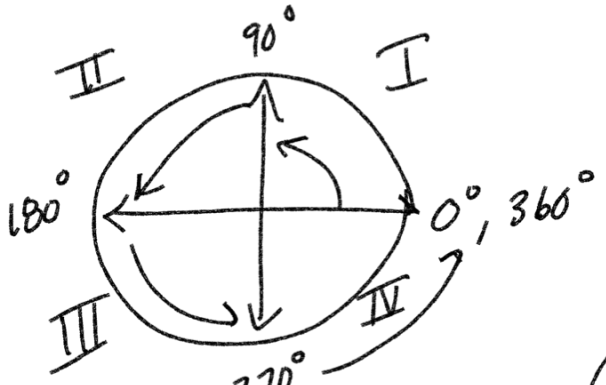
$$\text{arc length} = (\text{radius})(\text{central angle})$$

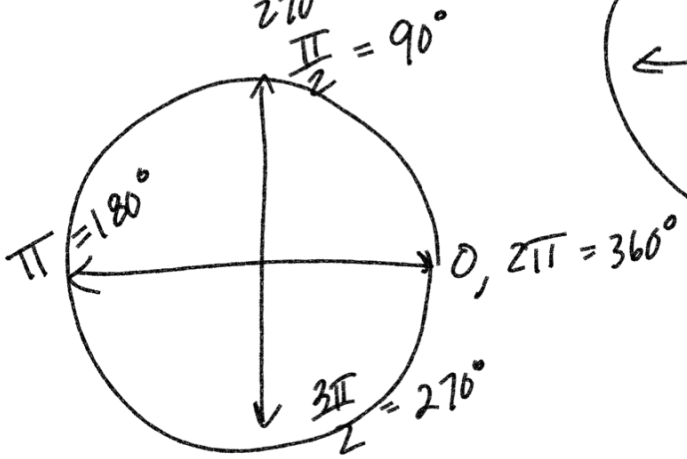
$$\boxed{s = r\theta}$$

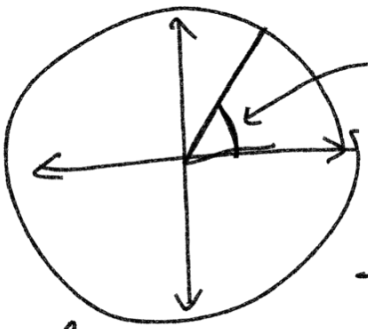
$$\frac{s}{2\pi r} \neq \frac{\theta}{2\pi}$$

$$2\pi s = 2\pi r\theta$$

$$\boxed{s = r\theta}$$







Reference Angles

$$\begin{array}{r} 60^\circ \\ +360 \\ \hline 420^\circ \\ -300^\circ \end{array}$$

Dimensional Analysis

① $\frac{180^\circ}{\pi}$ or ② $\frac{\pi}{180^\circ}$

$30^\circ \rightarrow$ ____ radians

$$30^\circ * \frac{\pi}{180^\circ} = \frac{30\pi}{180} \begin{matrix}\div 30 \\ \div 30\end{matrix} = \boxed{\frac{\pi}{6}}$$

$$\frac{\pi}{4} * \frac{180^\circ}{\pi} = \frac{180^\circ}{4} = 45^\circ$$

$$315^\circ * \frac{\pi}{180^\circ} = \frac{315\pi}{180} \begin{matrix}\div 45 \\ \div 45\end{matrix} = \boxed{\frac{7\pi}{4}}$$

radians → degrees

$$\frac{7\pi}{6} * \frac{180^\circ}{\pi} = \boxed{210^\circ}$$

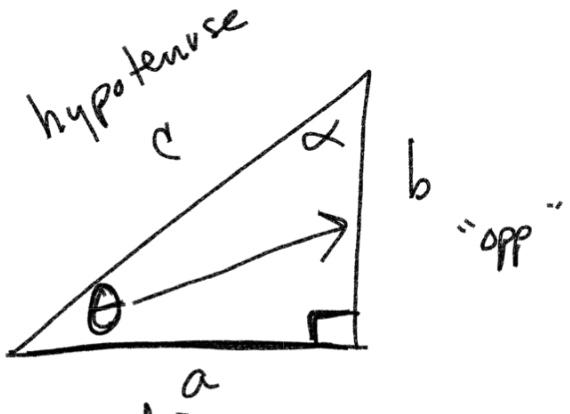
(30 over 1)

Arc Lengths $s = r\theta$

$\theta = \frac{\pi}{8}$ $\quad s = 6 * \frac{\pi}{8} = \boxed{\frac{3\pi}{4} \text{ in}}$

$r = 6 \text{ in}$

Trigonometric Ratios...



Right Triangle

$$\sin\theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\sin\theta = \frac{b}{c}$$

$$\cos\theta = \frac{\text{adjacent}}{\text{hypotenuse}} = \cos\theta = \frac{a}{c}$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{\frac{\text{opp}}{\cancel{\text{hyp}}}}{\frac{\text{adj}}{\cancel{\text{hyp}}}} = \frac{\text{opposite}}{\text{adjacent}} = \frac{b}{a}$$

SOH CAH TOA

$\sin = \frac{\text{opp}}{\text{hyp}}$ $\cos = \frac{\text{adj}}{\text{hyp}}$ $\tan = \frac{\text{opp}}{\text{adj}}$

$$\csc\theta = \frac{1}{\sin\theta}$$ "cosecant"

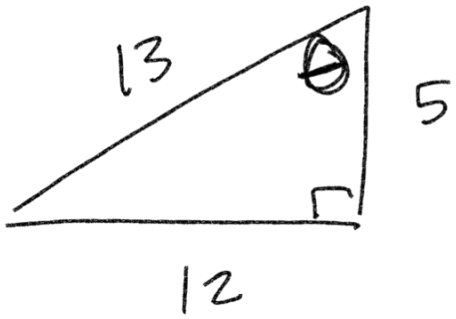
$$\sec\theta = \frac{1}{\cos\theta}$$ secant

$$\cot\theta = \frac{1}{\tan\theta}$$ cotangent

$\sin\theta = \frac{12}{13}$

$\cos\theta = \frac{5}{13}$

$\tan\theta = \frac{12}{5}$



$\sec\theta = \frac{hyp}{adj} = \frac{13}{5}$

$\csc\theta = \frac{hyp}{opp} = \frac{13}{12}$

$\cot\theta = \frac{adj}{opp} = \frac{5}{12}$

$\cos\theta = \frac{adj}{hyp} = \frac{24}{25}$

$\sin\theta = \frac{7}{25}$

$\tan\theta = \frac{7}{24}$

$\csc\theta = \frac{25}{7}$

$\sec\theta = \frac{25}{24}$

$\cot\theta = \frac{24}{7}$