Mth 113 Weds. 1-9-13 Class Notes

PI $\Rightarrow$ $\sin^2\theta + \cos^2\theta = 1$

tan ID $\Rightarrow$ $\frac{\sin\theta}{\cos\theta} = \tan\theta$

$\frac{\frac{O}{H}}{\frac{a}{H}} = \frac{O}{H} \cdot \frac{H}{a}$

$\frac{\sin^2\theta}{\cos^2\theta} + \frac{\cos^2\theta}{\cos^2\theta} = \frac{1}{\cos^2\theta}$

$\tan^2\theta + 1 = \sec^2\theta$ *

$\frac{\sin^2\theta}{\sin^2\theta} + \frac{\cos^2\theta}{\sin^2\theta} = \frac{1}{\sin^2\theta}$

$1 + \cot^2\theta = \csc^2\theta$ *

ID = ID

TRIG IDENTITIES

① Pg 30

$$\frac{1}{\sec^2\theta} + \frac{1}{\csc^2\theta}$$

$$\cos^2\theta + \sin^2\theta$$

$$\boxed{1}$$

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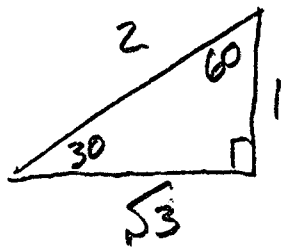
② $1 - \sin^2\beta$

$\boxed{\cos^2\beta}$

$\sin^2\beta + \cos^2\beta = 1$

$\cos^2\beta = 1 - \sin^2\beta$

③ Verify $\sin^2\theta + \cos^2\theta = 1$ for $\theta = 60^\circ$



$\theta = 60$ $\sin 60 = \frac{\sqrt{3}}{2}$, $\cos 60 = \frac{1}{2}$

$$\sin^2(60) + \cos^2(60) \stackrel{?}{=} 1$$

$$\left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 = 1$$

$$\frac{3}{4} + \frac{1}{4} \stackrel{?}{=} 1 \quad \checkmark$$

(Ex 1) Pg 30

$$\cot\alpha\left(\sin\alpha - \tan\alpha\right)$$

$$\frac{\cos\alpha}{\sin\alpha}\left(\sin\alpha - \frac{\sin\alpha}{\cos\alpha}\right)$$

$$\cos\alpha - \frac{\cos\alpha\sin\alpha}{\sin\alpha\cos\alpha}$$

$$\boxed{\cos\alpha - 1}$$

(Ex 2)

$$\sec\theta\left(\cos\theta - \cot\theta\right)$$

$$\frac{1}{\cos\theta}\left(\cos\theta - \frac{\cos\theta}{\sin\theta}\right)$$

$$\boxed{1 - \csc\theta}$$

Ex 1 pg 29

$\csc\theta \sin\theta$ Simplify

$\frac{1}{\sin\theta} \cdot \sin\theta$

$= 1$

Ex 2

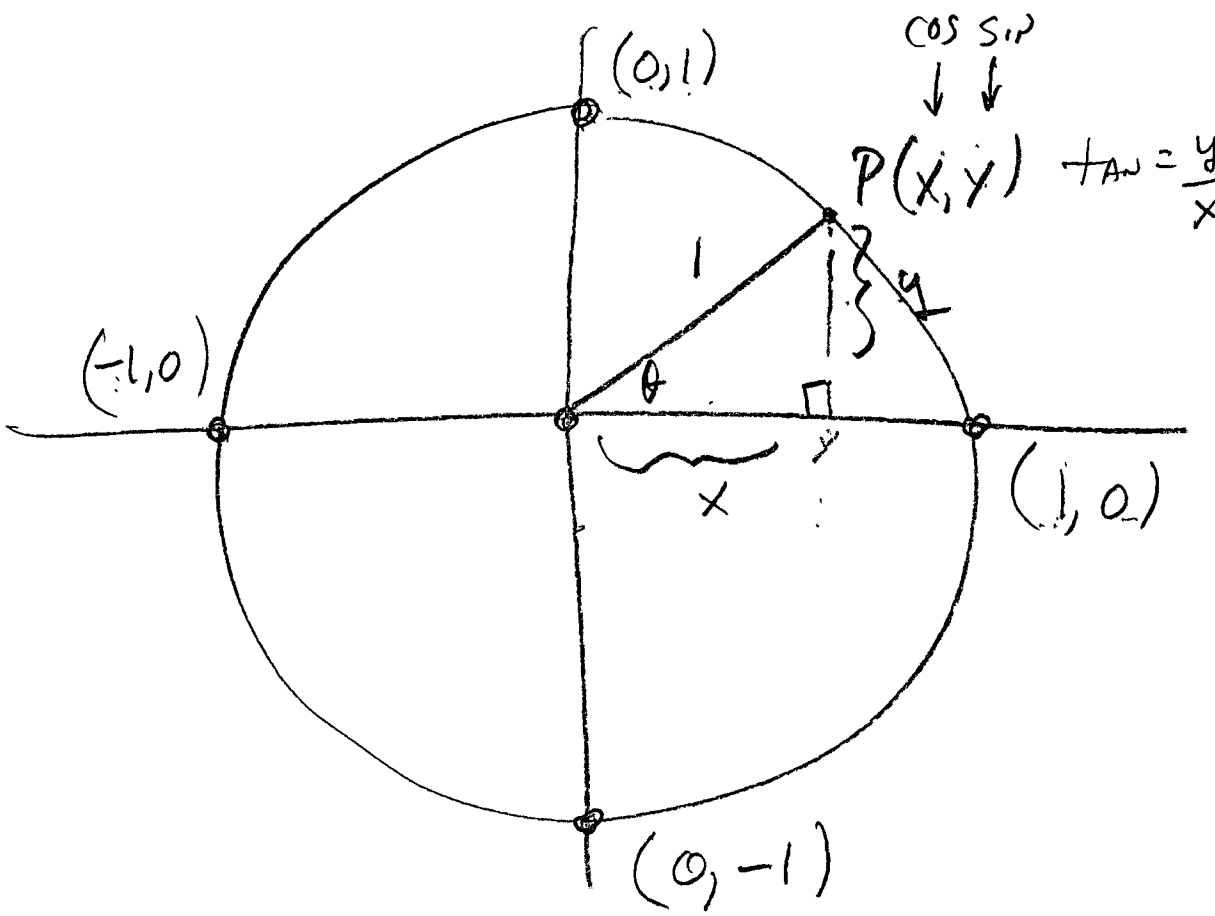
$\frac{1-\csc\theta}{\csc\theta}$ or $\frac{1}{\csc\theta} \cdot (1-\csc\theta)$

$\frac{1}{\csc\theta} - \frac{\csc\theta}{\csc\theta}$

$\sin\theta - 1$

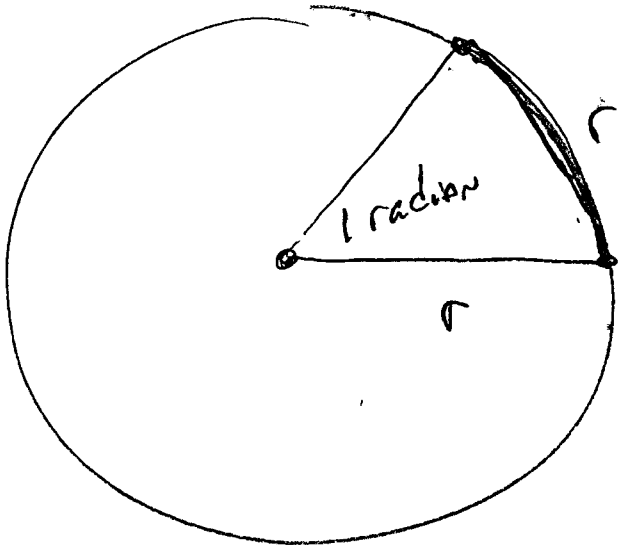
Exact Trig Ratios

30°, 45°, 60°, or Quadrantal Angle



Unit circle ⇒ use for quadrantal angles.

$C = 2\pi r$



DEFINITION OF RADIAN

$$\frac{360\ \text{deg}}{2\pi\ \text{rad}} = \frac{180\ \text{deg}}{\pi\ \text{rad}} \text{ or } \frac{\pi\ \text{rad}}{180\ \text{deg}}$$

(Ex) $60\ \text{deg} \cdot \dfrac{\pi\ \text{rad}}{180\ \text{deg}} = \dfrac{\pi}{3}\ \text{rad}$

(Ex) $\dfrac{\pi}{6}\ \text{rad} \cdot \dfrac{180\ \text{deg}}{\pi\ \text{rad}} = 30\ \text{deg}$

CONVERTING BETWEEN RADIANS / DEGREES