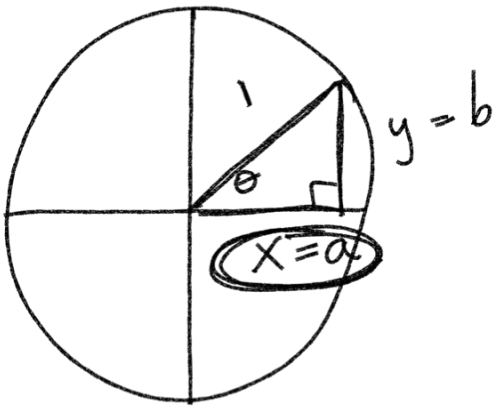
MTH-PT Trigonometry Session 16 3/20



$\sin\theta = \frac{y}{1}$

$\sin\theta = y$

$\cos\theta = \frac{x}{1}$

$\cos\theta = x$

$\cos^2 x = (\cos x)^2$

Pythagorean Theorem

$a^2 + b^2 = c^2$

$x^2 + y^2 = 1^2$

$x^2 + y^2 = 1$

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

$\frac{\pi}{6} \rightarrow \left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$

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

$\frac{3}{4} + \frac{1}{4} = 1$

$\frac{4}{4} = 1$ ✓

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

Trig Identities

$\frac{\sin}{\cos} = \tan$

$\frac{\cos}{\sin} = \frac{1}{\tan\theta} = \cot\theta$

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

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

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

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

$-1 \qquad -1$

$$\tan^2\theta = \sec^2\theta - 1$$

Even / Odd Function

$f(-x) = f(x)$ Even

$f(-x) = -f(x)$ odd

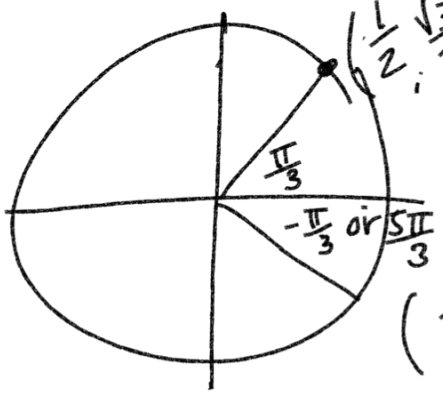
$\cos\theta$

$\cos\frac{\pi}{3} \quad \cos\frac{-\pi}{3}$

$\frac{1}{2} = \frac{1}{2}$

even → $\cos\theta$

$\cos -X = \cos X$



$\sin\theta$

$\sin\frac{\pi}{3} \quad \sin\frac{-\pi}{3}$

$\downarrow \quad \downarrow$

$\frac{\sqrt{3}}{2} \quad -\frac{\sqrt{3}}{2}$

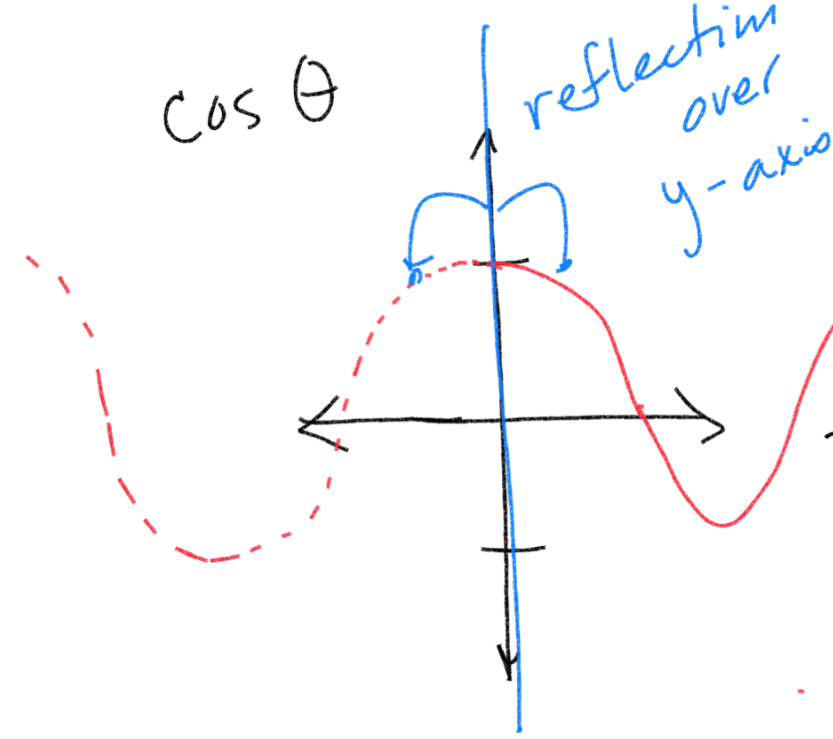
$\sin\frac{\pi}{3} = -\sin\frac{\pi}{3}$

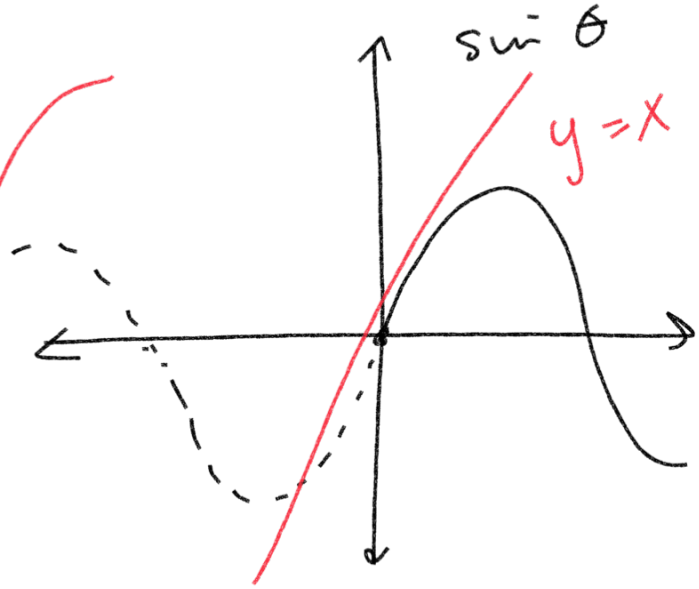
$\frac{\sqrt{3}}{2} = -\left(-\frac{\sqrt{3}}{2}\right)$

$\sin\theta \rightarrow$ odd

$\sin -X = -\sin X$

$\cos\theta$





Calc & Trig Name_____ ID: 1

Assignment

Date_____ Period____

Verify each identity.

1) $\cos^2 x \tan x \sec x = \sin x$

$(\cos^2 x)(\tan x)(\sec x) = \sin x$

$(\cancel{\cos^2 x})\left(\frac{\sin x}{\cancel{\cos x}}\right)\left(\frac{1}{\cancel{\cos x}}\right) = \sin x$

2) $\csc x \cos x = \cot x$

3) $\dfrac{\sin x}{\cos^2 x} = \dfrac{\sec x}{\cot x}$

4) $\sec^2 x - 1 = \dfrac{\tan x}{\cot x}$

5) $\dfrac{\tan x}{\csc x} = \dfrac{\sin x}{\cot x}$

$$\tan x \sin x + \cos x = \sec x$$

$$\left(\frac{\sin x}{\cos x}\right)(\sin x) + \cos x = \frac{1}{\cos x}$$

1. Change to sin/cos
2. Look for $\sin^2 x + \cos^2 x = 1$

$$\frac{\sin^2 x}{\cos x} + (\cos x)\frac{\cos x}{\cos x}$$

$$\frac{1}{3} + \frac{2}{3} = \frac{1+2}{3}$$

$$\frac{\sin^2 x}{\cos x} + \frac{\cos^2 x}{\cos x}$$

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

$(\sin x - \cos x)^2 - 1 = -2\sin x \cos x$

FOIL

$(\sin x - \cos x)(\sin x - \cos x) - 1$

$\sin^2 x - \sin x \cos x - \sin x \cos x + \cos^2 x - 1$

$\sin^2 x - 2\sin x \cos x + \cos^2 x - 1$

$\sin^2 x + \cos^2 x - 2\sin x \cos x - 1$

$1 - 1 - 2\sin x \cos x$

$-2\sin x \cos x$

$\cos x \sec x \cot^2 x = \csc^2 x - 1$

$(\cos x)\left(\frac{1}{\cos x}\right)\left(\frac{\cos^2 x}{\sin^2 x}\right) = \frac{1}{\sin^2 x} - 1$

$\frac{3-1}{4} = \frac{3}{4} - \frac{1}{4}$

$\frac{2}{4}$

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

$-\sin^2 x \qquad -\sin^2 x$

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

$\frac{\cos^2 x}{\sin^2 x} = \frac{1}{\sin^2 x} - 1$

$\frac{1 - \sin^2 x}{\sin^2 x} = \frac{1}{\sin^2 x} - \frac{\sin^2 x}{\sin^2 x}$

$\frac{1}{\sin^2 x} - 1$