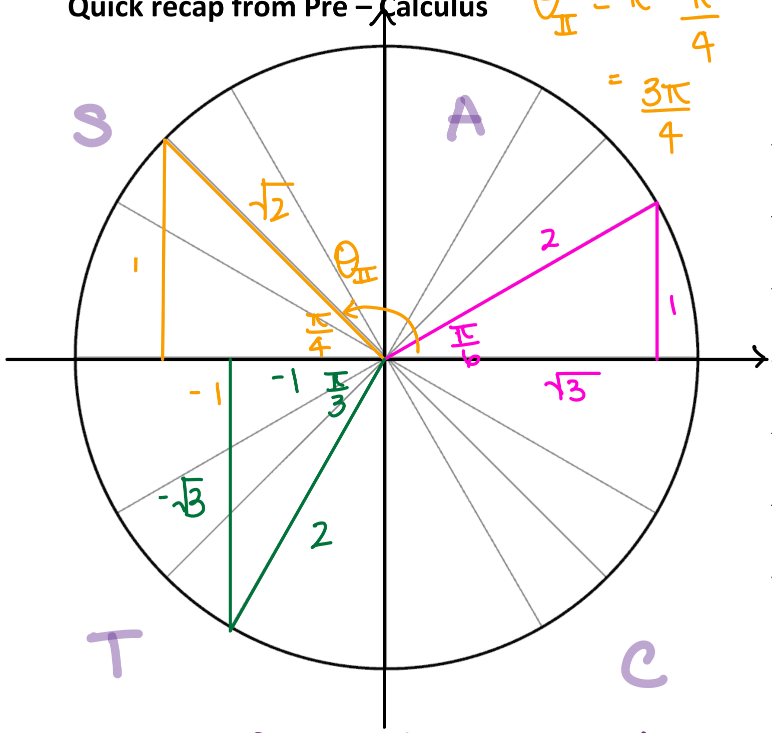
Name: ___________________________ Date: ____________________

Learning Goal 3.2	Applying derivatives to trigonometric and exponential functions.

Quick recap from Pre – Calculus

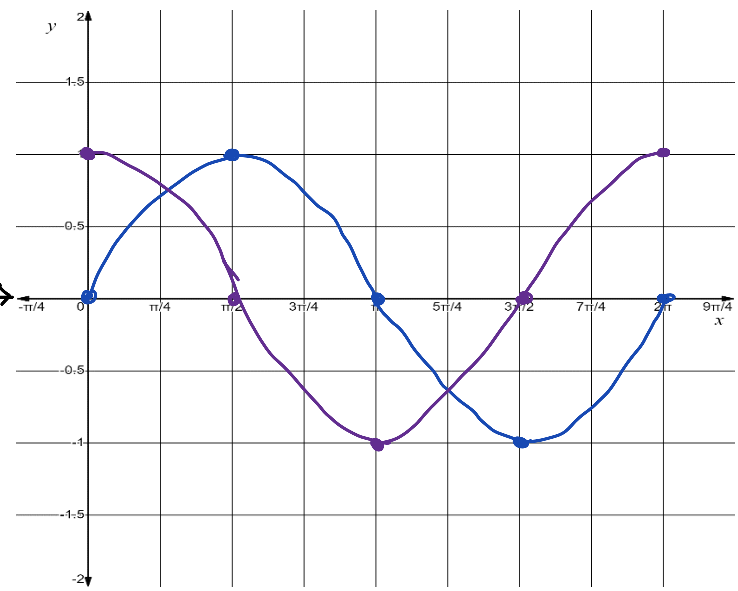
$\theta_{II} = \pi - \frac{\pi}{4}$

$= \frac{3\pi}{4}$



Special angle Δs

axial coordinates



Quick recap from Limits

$\lim_{x \to 0} \sin x = 0$ $\lim_{x \to 0} \frac{\sin x}{x} = 1$ $\lim_{x \to 0} \frac{\cos x - 1}{x} = 0$

a. $\lim_{x\to 0} \frac{\sin 2x}{\sin 4x}$ b. $\lim_{x\to 0} \frac{\tan 2x}{x}$ c. $\lim_{x\to 0} \frac{\cos 7x - 1}{x}$

Why is $\frac{d}{dx}(\sin x) = \cos x$?

$\frac{d}{dx}(\sin x) = \lim_{h \to 0} \frac{\sin(x+h) - \sin x}{h}$ formula

$= \lim_{h \to 0} \frac{(\sin x \cos h + \cos x \sin h) - \sin x}{h}$

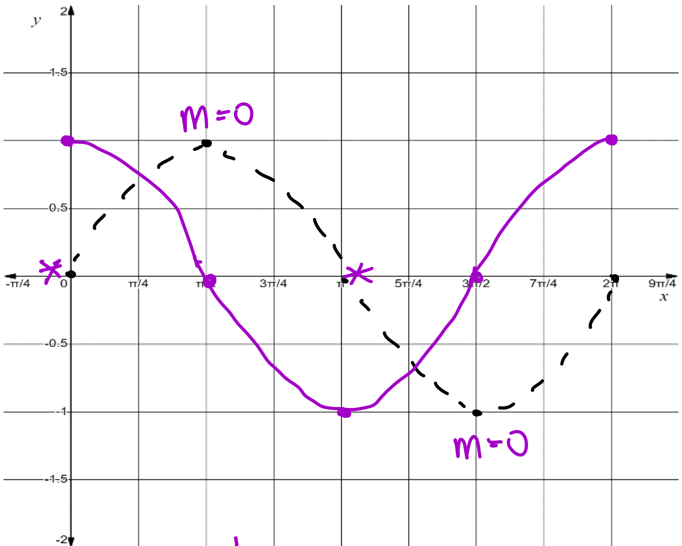
$= \lim_{h \to 0} \sin x \left(\frac{\cos h - 1}{h}\right) + \lim_{h \to 0} \frac{\cos x \sin h}{h}$

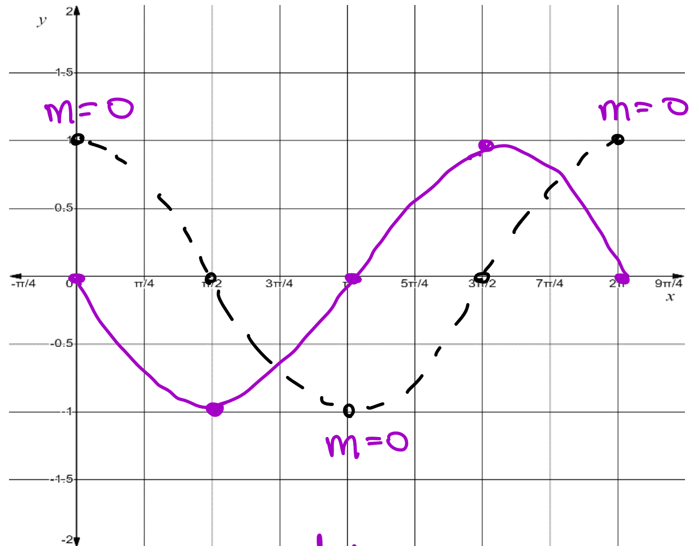
$= \sin x \lim_{h \to 0} \frac{\cancel{\cos h - 1}}{\cancel{h}} + \cos x \lim_{h \to 0} \frac{\cancel{\sin h}}{\cancel{h}}$ 0 1

Assignment # 1 – 15, 21, 23, 29, 35 – 43, 47 Quiz Next Day!

$= \cos x$

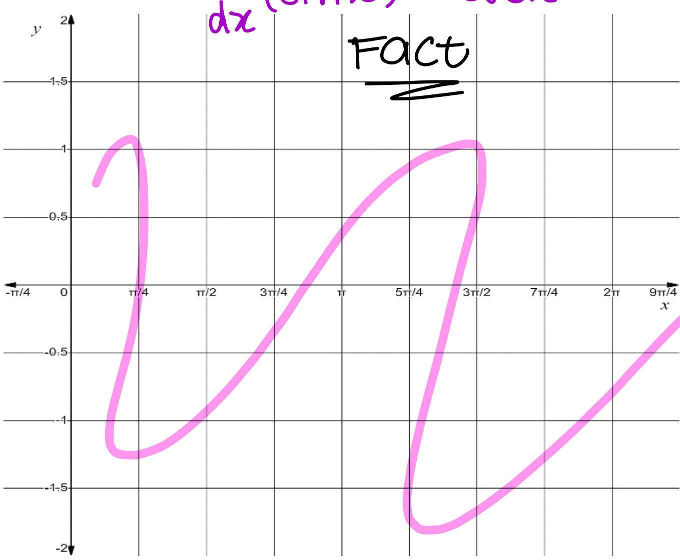
The Derivative of Sine and Cosine Graphically

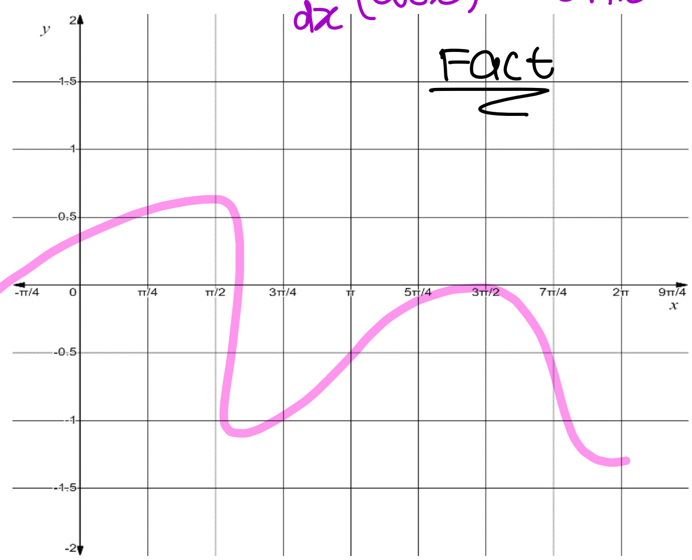




$\frac{d}{dx}(\sin x) = \cos x$ Fact

$\frac{d}{dx}(\cos x) = -\sin x$. Fact





Example Use the quotient rule to find the derivative of $y = \tan x$. $= \frac{\sin x}{\cos x}$

$$\frac{dy}{dx} = \frac{\cos x \overset{\cos x}{(\sin x)'} - \sin x \overset{-\sin x}{(\cos x)'}}{\cos^2 x}$$

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

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

Assignment $= \sec^2 x$ # 1 – 15, 21, 23, 29, 35 – 43, 47 Quiz Next Day!