Revision:

Triponometric Functions:

$$tam x = \frac{sinx}{cosx}$$

$$cot x = \frac{cosx}{sinx} = \frac{1}{tamx}$$

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

Secant
$$CSC x = \frac{1}{50x}$$

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

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

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

$$\frac{d}{dx}(tanx) = \frac{1}{\cos^2 x} = \sec^2 x = 1 + \tan^2 x$$

$$\frac{d}{dx}(\omega t x) = \frac{-1}{\sin^2 x} = -\csc^2 x = -(1+\cot^2 x)$$

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

$$= \sec x \cdot \tan x$$

$$= \frac{\sin x}{\cos x} \cdot \frac{1}{\cos x} = \sec x \cdot \tan x$$

$$\frac{d}{dx}(\csc x) = -\csc x \cdot \cot x$$

Trigonometric Identities:

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

 $\tan^2 x + 1 = \sec^2 x$
 $\cot^2 x + 1 = \csc^2 x$
 $\sin(2x) = 2 \sin x \cos x$

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

$$sin x = \pm \sqrt{1 - \omega s^2 x}$$

$$tan x = \pm \sqrt{sec^2 x - 1}$$

$$cos^2 x = \frac{1 + \cos(ax)}{a}$$

$$sin^2 x = \frac{1 - \cos(ax)}{a}$$

$$sin(a+b) = sina cosb + cosa sinb$$

 $sin(a-b) = sina cosb - cosa sinb$
 $cos(a+b) = cosa cosb - sina sinb$
 $cos(a-b) = cosa cosb + sina sinb$

Cofunction Identities:

$$Sin\left(\frac{\pi}{2}-x\right)=\cos x$$

$$\cos\left(\frac{\pi}{2} - \kappa\right) = \sin \kappa$$

$$tan\left(\frac{\pi}{2} - x\right) = \cot x$$

$$\cot\left(\frac{\pi}{2} - \kappa\right) = \tan\kappa$$

Sec
$$\left(\frac{\pi}{\lambda} - \kappa\right) = CSC \kappa$$

$$CSC\left(\frac{\pi}{2} - \kappa\right) = SCK$$

Even Odd Identities:

$$sin(-x) = - sin x$$

$$tan(-x) = -tan x$$

$$\cot(-x) = -\cot x$$

$$CSC(-x) = -(SCX$$

$$Sec(-x) = Sec x$$

Inverse Trigonometric Functions:

•
$$y = \sin^{-1}x = \arcsin x$$
 is the angle in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ such

$$\frac{\text{Cx:}}{\text{Sin}^{-1}}\left(\frac{1}{2}\right) = \frac{11}{6}$$

•
$$y = \cos^{-1}x = \arccos x$$
 is the angle in $[0, \pi]$ such

•
$$y = tan^{-1}x = aictan x$$
 is the angle in $\int -\frac{\pi}{2}, \frac{\pi}{2}$ (such

$$\frac{d}{dx}\left(\sin^{-1}u\right) = \frac{u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dr}\left(\cos^{-1}u\right) = \frac{-u'}{\sqrt{1-u^2}}$$

$$\frac{d}{dx}\left(\tan^{-1}u\right) = \frac{u'}{1+u^{2}}$$

ex:
$$y = tan^{-1}(ax+1)$$

$$\frac{dy}{dx} = \frac{2}{1+(2x+1)^2}$$

$$\lim_{x \to \infty} \tan^{1} x = \frac{\pi}{2}$$

$$\lim_{X \to -\infty} \tan^{-1} x = \frac{\pi}{2}$$

$$ex: tan^{-1}(1) = \frac{\pi}{4}$$

$$tan^{-1}(\sqrt{3}) = \frac{\pi}{3}$$