Section 2.5- derivatives of Trig functions

- $\frac{d}{dx}\sin(x) = \cos(x)$
- $\frac{d}{dx}\cos(x) = -\sin(x)$
- $\sec = \frac{1}{\cos}$
- $\frac{d}{dx}\tan(x) = \sec^2(x)$
- $\frac{d}{dx}\cot(x) = -\csc^2(x)$
- $\csc = \frac{1}{\sin}$
- $\frac{d}{dx}\sec(x) = \sec(x)\tan(x)$
- $\frac{d}{dx}\csc(x) = -\csc(x)\cot(x)$

Examples:

- find the derivative at the point

- $f(\theta) = 2\sin\theta + \cos\theta \quad c = \frac{\pi}{2} \quad f'(x) = 2\cos\theta - \sin\theta \ @ \ \frac{\pi}{2} = -1$

check answer *

- $f(x) = \frac{\sin x}{1+\cos x} \quad c = \frac{5\pi}{6} \quad f'(x) = \frac{\cos(x)(1+\cos x) - \sin x(-\sin x)}{(1+\cos x)^2}$

$= \frac{\cos x + 1}{(1+\cos(x))^2} \ @ \ \frac{5\pi}{6} = \frac{3/2}{(3/2)^2}$

- find y'

- $y = 4\tan\theta + 5\sin\theta \quad y'(x) = 4\sec^2\theta + \cos\theta$
- $y = t^2\tan t \quad y' = 2t(\tan(t)) + 2t\sec^2(x)$
- $y = e^x \sec x \quad y' = e^x\sec(x) + e^x(\sec(x)\tan(x))$
- $y = \frac{\csc x}{x} \quad y' = \frac{(-\csc(x)\cot(x))x - \csc x}{x^2}$
- $y = \tan(x)\cos(x) \quad y' = \sec^2(x)\cos(x) + \sin(x)\tan(x)$

$= \frac{1}{\csc(x)} + \frac{1}{\cos x} \cdot \frac{1}{2\cos x}$