3.3 Derivatives of Trig Functions

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

Proof (of first one):

The above two derivatives should be memorized since the rest of the trig derivatives can be obtained from these two.

$$\frac{d}{dx}\tan x$$

$$\frac{d}{dx}\csc x$$

$$\frac{d}{dx}\sec x$$

$$\frac{d}{dx}\cot x$$

Ex3.2) 1. $y = \frac{3}{x} + 5\sin x$

2. $y = x^2 \cot x - \frac{1}{x^2}$

3. $f(x) = (\sin x + \cos x)\sec x$

4. $y = \frac{\cos x}{e^x + \sin x}$

5. $y = \frac{\cos x}{x} + \frac{x}{\cos x}$

3.4 The Chain Rule

The Chain Rule: If $f(x) = g(h(x))$, then $f'(x) = g'(h(x)) \cdot h'(x)$.

In other words, given $f(u)$ where $u = g(x)$, $\frac{df}{dx} = \frac{df}{du} \cdot \frac{du}{dx}$.

Also note that $\frac{d}{dx}(a^x) = a^x \ln a$.

Ex3.3) 1. $y = (4-3x)^9$

2. $y = \left(\frac{x}{2} - 1\right)^{10}$

3. $f(x) = \cot\left(\pi - \frac{1}{x}\right)$

4. $y = \sin\left(4x + \sqrt{x}\right)$

5. $g(x) = \cos^4\left(3x^4 + 2x\right)$

6. $y = \sin^2(\cos 3x)$

7. $y = \sin(e^t) + e^{\sin t}$

8. $y = e^{-2t}\cos(4t)$

Continue with 3.4 ODDS