

**Development of Standing Wave Equation**

- Rewrite this standing wave equation:

$$\varphi(x, t) = A[\sin(kx - \omega t)] + A[\sin(kx + \omega t)]$$

- Using the trigonometric identity:

$$\sin(\alpha \pm \beta) = \sin \alpha \cos \beta \pm \cos \alpha \sin \beta$$

- To get this:

$$\varphi(x, t) = 2A \sin kx * \cos \omega t = \varphi(x) * \varphi(t)$$