Wave Equation

- $y(x,t) = A\sin(kx - \omega t)$ (displacement)
- $v(x,t) = \dfrac{\partial y}{\partial t} = -\omega A\cos(kx - \omega t)$ (velocity)
- $a(x,t) = \dfrac{\partial^2 y}{\partial t^2} = -\omega^2 A\sin(kx - \omega t)$ (acceleration)
- $\dfrac{\partial y}{\partial x} = kA\cos(kx - \omega t)$ (slope of wave form)
- $\dfrac{\partial^2 y}{\partial x^2} = -k^2 A\sin(kx - \omega t)$ (curvature of wave form)
- $\dfrac{\partial^2 y/\partial t^2}{\partial^2 y/\partial x^2} = \dfrac{\omega^2}{k^2} = c^2$ (ratio of second derivatives)
- Wave equation: $\dfrac{\partial^2 y}{\partial t^2} = c^2\,\dfrac{\partial^2 y}{\partial x^2}$