

2. The transverse wave equation for a wave traveling on a string is  $\frac{\partial^2 y}{\partial x^2} = \frac{1}{c^2} \frac{\partial^2 y}{\partial t^2}$ . Show by direct substitution that  $y = \left(t \pm \frac{x}{c}\right)^2$  is or is not a solution to the wave equation.

$$\frac{\partial y}{\partial t} = 2\left(t + \frac{x}{c}\right)$$

$$\frac{\partial^2 y}{\partial t^2} = 2$$

$$\frac{\partial y}{\partial x} = 2\left(t + \frac{x}{c}\right) \frac{1}{c}$$

$$\frac{\partial^2 y}{\partial x^2} = 2 \frac{1}{c^2}$$

$$2 \frac{1}{c^2} = \frac{1}{c^2} 2 \quad \checkmark$$

$$\therefore y = \left(t \pm \frac{x}{c}\right)^2 \quad \text{Is A SOLUTION}$$