

general

$$y(x,t) = y_m \sin(kx - \omega t + \phi)$$

can be found from the initial conditions.



In this case $y(0,0) = 0$

$$y(0,0) = y_m \sin \phi = 0 \Rightarrow \sin \phi = 0$$

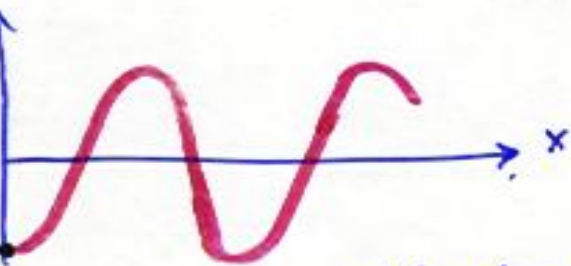
$$\Rightarrow \boxed{\phi = 0}$$



In this case $y(0,0) = y_m$

$$y(0,0) = y_m \sin \phi = y_m \Rightarrow \sin \phi = 1$$

$$\Rightarrow \boxed{\phi = \frac{\pi}{2}}$$



In this case $y(0,0) = -y_m$

$$y(0,0) = y_m \sin \phi = -y_m \Rightarrow \sin \phi = -1$$

$$\Rightarrow \boxed{\phi = -\frac{\pi}{2}}$$