Travelling Waves and Wave Equation

Reading: Sections 16.1 though 16.5

At time t the displacement of y at position x is

$$y(x,t) = y_m \sin(kx \pm \omega t)$$

So, for a wavelength of lambda you have a wave number of

$$k = \frac{2\pi}{\lambda}$$

Therefore, by fixing the position at $ x = 0 $ we observe the motion

$$y(0,t) = -y_m \sin(\omega t)$$
$$y(0,t) = y_m \cos\left(\omega t - \frac{\pi}{2}\right)$$

Which is the form of SHM.