



2. (20 pts.) A transverse wave traveling along a string is given by

$$y(x, t) = 0.05 \sin(1382t + 12.6x)$$

where  $x$  and  $y$  are measured in meters, and  $t$  is measured in seconds.

- a. (5 pts.) What is the wavelength?

$$k = 12.6 = \frac{2\pi}{\lambda} \Rightarrow \lambda = \frac{2\pi}{12.6} = \boxed{0.499 \text{ m}}$$

- b. (5 pts.) What is the frequency?

$$\omega = 1382$$

$$f = \frac{\omega}{2\pi} = \boxed{220 \text{ Hz}}$$

- c. (5 pts.) What is the wave speed? Be sure to include the sign.

$$v = -\frac{\omega}{k} = -\frac{1382}{12.6} = \boxed{-109.7 \text{ m/s}}$$

Not sign above has  $\omega t + kx$ . This means  $v$  is negative.

- d. (5 pts.) What is the maximum transverse speed of a particle on the string?

$$v_y = \frac{\partial y}{\partial t} = \underbrace{(1382)(0.05)}_{\text{MAX value}} \cos(\omega t + kx)$$

$$\boxed{\text{max } v_y = 69.1 \text{ m/s}}$$

