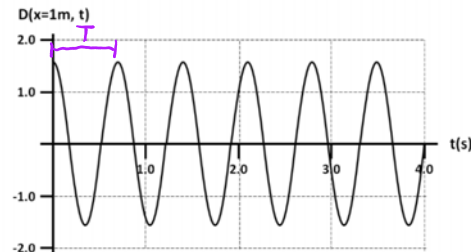
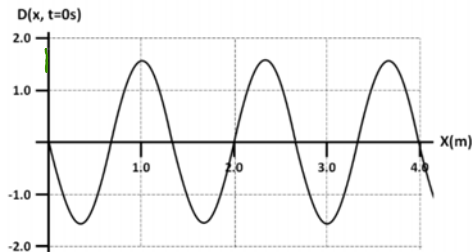


# Week 9 Challenge Homework Solutions

## Question 1

Pictured below are a snapshot and history graph of a travelling wave.

- What is the period of the wave.
- What is the wavenumber of the wave.
- What is the speed of the wave.
- Write an equation for the displacement of the wave as function of position (x) and time (t).
- Can you tell if the wave is a transverse or longitudinal wave? Explain.



(b)  $\Rightarrow 3\lambda \approx 4 \text{ m}$

$$\lambda = \frac{4}{3} \text{ m}$$

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

$$k = \frac{3\pi}{2} \frac{1}{\text{m}}$$

(a)  $\approx 5.75 \text{ T IN } 4 \text{ SF}$

$$T = \frac{4}{5.75} \approx \frac{16}{23} \text{ SEC}$$

(c)  $v = f\lambda$

$$v = \left(\frac{23}{16}\right)\left(\frac{4}{3}\right)$$

$$v = 1.92 \text{ m/s}$$

(d)  $\omega = \frac{2\pi}{T}$

$$\omega = \frac{23\pi}{8} \text{ rad/s}$$

$$D_{\text{max}} = 1.5 \text{ m}$$

$$D(x,t) = D_{\text{max}} \frac{\sin}{\cos} (kx \pm \omega t)$$

$$D(x,t) = 1.5 \text{ m} \sin\left(-\frac{3\pi}{2}x + \frac{23\pi}{8}t\right)$$

With  $t=0$   $D(x,0) \rightarrow \sin(-kx)$

w/  $x=1$   $D(1,t) \rightarrow \sin(-k + \omega t)$

(e) **CAN NOT TELL** GEN EQU FOR TW IS NOT SPECIFIC FOR LONGITUDINAL OR TRANSVERSE WAVE