1. If a wave source produces 30 pulses every 5 seconds, calculate its period and frequency.

$$f = \frac{30\,pulses}{5\,sec} = 6\frac{pulses}{sec} = 6\,hz$$

$$T = \frac{1}{f} = \frac{1}{6}\,sec$$

2. A wave tank produces a wave every 0.25 seconds with $\lambda = 5$ cm. What is wave speed?

$\lambda = .05m$

$$T = .25s = \frac{1}{4}s$$
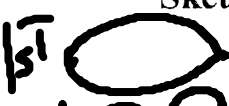
$$f = \frac{1}{T} = 4\,hz = 4s^{-1}$$

$$V = f\lambda = (4s^{-1})(.05m) = .20\,\frac{m}{s}$$

3. A 80 cm-long string fixed at both ends vibrates with a frequency of 440 Hz. Sketch the first three harmonics and calculate the wave speeds of each.

.8m $f =$

1st $\frac{1}{2}\lambda = .8m$ $\lambda = 1.60m$ $V = \lambda f = (1.6m)(440hz) =$

2nd $\lambda = .8m$ $\lambda = .8m$ $V = \lambda f = (.8m)(440hz) = 352.0$

3rd $\frac{3}{2}\lambda = .8m$ $\lambda = .53m$ $V = \lambda f = (.53m)(440hz) =$ $352\frac{m}{s}$

4. In an experiment to calculate the speed of sound, a 480 Hz tuning fork causes resonance in an 18 cm-long closed tube. Calculate the speed of sound.

$$\frac{1}{4}\lambda = .18m$$
$$\lambda = .72m$$

$$V = \lambda f = (.72m)(480hz) = \bigcirc$$

5. Calculate the fundamental frequency (1st harmonic) for an open tube of length 1.25 m. Use v = 340 m/s.

$$\frac{1}{2}\lambda = 1.25m$$
$$\lambda = 2.5m$$

$$V = f\lambda$$

$$f = \frac{V}{\lambda} = \frac{340\frac{m}{s}}{\frac{5}{2}m} = 136\,hz$$