

## Physics 1135: Homework for Recitation #26: Waves

1. A traveling wave is described by the equation  $y(x,t) = 3 \text{ cm} \sin(2\pi x/2.4\text{m} - 2\pi t/0.2\text{s})$ . Find period, frequency, wave length, wave number, and wave speed. Is the wave traveling in the positive or negative  $x$ -direction? What is the maximum transverse speed of a particle?
2. A string of mass  $M$  and length  $L$  is under tension  $T$ . A wave on this string has wavelength  $\lambda$  and amplitude  $A$ . Find the maximum transverse speed of a particle on the string.
3. Train A is moving at 30m/s and sounding its whistle which emits sound of a frequency of 280Hz. Train B is traveling in the opposite direction at 20m/s.
  - a) What frequency is heard by a passenger on train B while the trains are approaching one another?
  - b) What frequency is heard by a passenger on train B after the trains have passed, and are receding from, one another?
4. The most common bat species in Missouri is the little brown bat which emits ultrasound of a frequency of 45kHz. If a little brown bat is flying towards a cliff wall with a speed of 8.0m/s, what is the frequency of the reflected sound the bat hears?