Quiz 10

Name:_____

1. A mass m at the end of a spring oscillates with a frequency of 0.83 Hz. When an additional 780-g mass is added to m, the frequency is 0.60 Hz. What is the value of m? The spring constant is the same regardless of what mass is attached to the spring.

2. A sound wave in air has a frequency of 282 Hz and travels with a speed of 343 m/s. How far apart are the wave crests (compressions)?
The distance between wave crests is the wavelength of the wave.

3. A stone is dropped from the top of a cliff. The splash it makes when striking the water below is heard 2.7 s later. How high is the cliff?
The total time T is the time for the stone to fall plus the time for the sound to come back to the top of the cliff Use constant-acceleration relationships for an object dropped from rest that falls a distance h in order to find with down as the positive direction. Use the constant speed of sound to find for the sound to travel a distance h.

This is a quadratic equation for the height. This can be solved with the quadratic formula, but be sure to keep several significant digits in the calculations.

The larger root is impossible since it takes more than 2.7 s for the rock to fall that distance, so

4. You are trying to decide between two new stereo amplifiers. One is rated at 75 W per channel and the other is rated at 120 W per channel. In terms of dB, how much louder will the more powerful amplifier be when both are producing sound at their maximum levels? Compare the two power output ratings using the definition of decibels.

This would barely be perceptible.

5. A bat at rest sends out ultrasonic sound waves at 50.0 kHz and receives them returned from an object moving directly away from it at 27.5 m/s. What is the received sound frequency?
The moving object can be treated as a moving “observer” for calculating the frequency it receives and reflects. The bat (the source) is stationary.

Then the object can be treated as a moving source emitting the frequency and the bat as a

stationary observer.