

Name: _____ Date: _____ Period: _____

Graded problems are worth 2 points each. This assignment is graded out of **12** points.

- 1) Which of the following is TRUE?
 - a) A sound wave is an example of a transverse wave
 - b) A sound wave is an example of a longitudinal wave
 - c) "Compression wave" is another term for "transverse wave"
 - d) Sound waves travel faster through cold air than through warm air

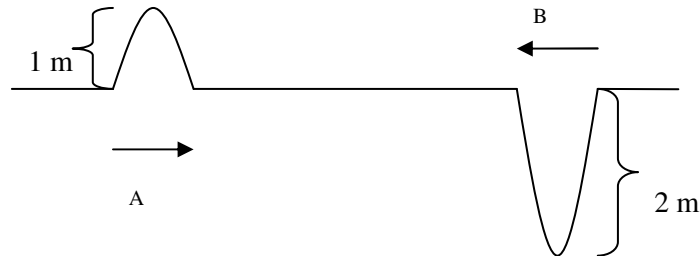
- 2) The **intensity** of a sound wave is a measure of the sound wave's ____
 - a) amplitude
 - b) wavelength
 - c) frequency
 - d) period

- 3) The timbre of a sound depends on which of the following three things?
 - I. the quality of the sound
 - II. the frequencies of the overtones produced
 - III. the intensity of only the fundamental overtone
 - a) I only
 - b) II only
 - c) I and III
 - d) II and III

- 4) Sally sings a beautiful, long note. One of Kenny's guitar strings (he's just holding the guitar, not playing it) starts to vibrate. The vibration of the string in this scenario is an example of ____.
 - a) reverberation
 - b) resonance
 - c) an overtone (or a harmonic)
 - d) a fundamental frequency

- 5) Sound **intensity** is measured in what units?
 - a) Hertz
 - b) decibels
 - c) loudness
 - d) amplitude

- 6) Two wave pulses are moving toward each other on a rope. Pulse A has an amplitude of 1 m. Pulse B has an amplitude of 2 m in the other direction. (See drawing.) Draw a picture of what the rope looks like when the two pulses interfere with each other. Include the amplitude of the wave during the interference.



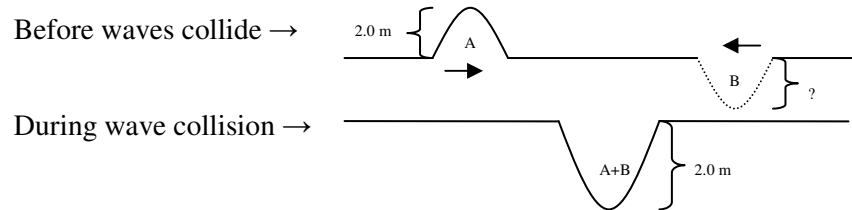
Your answer here.

- 7) **Graded.** Two wave pulses are moving toward each other on a rope. Pulse A has an amplitude of 1 m. Pulse B has an amplitude of 2 m in the same direction. (See drawing.) Draw a picture of what the rope looks like when the two pulses interfere with each other. Include the amplitude of the wave during the interference.



Your answer here.

- 8) **Graded.** In the diagrams below (NOTE THAT THE DIAGRAMS MAY NOT BE DRAWN TO SCALE), the first diagram shows two wave pulses, A and B, moving toward each other. The second diagram shows the result of the two wave pulses interfering with each other. What is the amplitude of wave pulse B before the interference?



Please type your responses to the following questions and attach your answers to this assignment.

- 1) **Graded.** Explain the superposition principle of waves. Provide annotated examples (sketches or other images), and discuss how this is related to timbre (for instance, explain why two instruments of the same type from the same maker not not sound exactly alike).
- 2) **Graded.** Imagine a bell ringing inside a sealed jar. Hypothesize what will happen as the air inside the jar is removed by a vacuum pump, and offer a detailed explanation as to why you think your hypothesis will happen.
- 3) **Graded.** Imagine that you have three black boxes made of different materials. Design an experimental procedure using sound to sort the boxes in order of increasing density. The steps of the experiment should be detailed, step-by-step instructions. (Write them for your younger sibling to follow.)
- 4) **Graded.** Explain how the Doppler effect can be used to track the motion of clouds on earth.