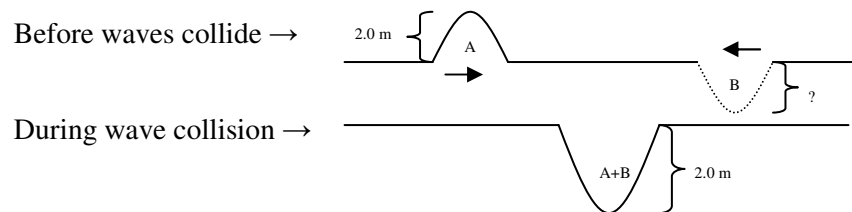


- 5) **Graded.** Two wave pulses are moving toward each other on a rope. Pulse A has an amplitude of 1 m. Pulse B has an amplitude of 2 m in the same direction. (See drawing.) Draw a picture of what the rope looks like when the two pulses interfere with each other. Include the amplitude of the wave during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



Your answer here.

- 6) **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?



- 7) **Graded.** If two sound waves interfere with each other through constructive interference, what happens?
- The volume of the sound increases
 - The volume of the sound decreases
 - The frequency of the sound increases
 - The frequency of the sound decreases
- 8) **Graded.** Give two real-life examples of constructive interference of sound waves.

- 9) **Graded.** A tuning fork is held up against the body of a guitar, and the note can be heard. When the tuning fork is removed from the guitar, the guitar falls silent. Which of the following is TRUE?
- The situation with tuning fork “A” is an example of reverberation, and tuning fork “B” is an example of resonance.
 - The situation with tuning fork “A” is an example of resonance and tuning fork “B” is an example of reverberation.
 - The guitar top reverberates in response to both tuning forks.
 - The guitar top resonates in response to both tuning forks.
- 10) **Graded.** Sally sings a beautiful, long note. It happens to be the same frequency as **the third string** of Kenny’s guitar strings (there are six strings on the guitar; he’s just holding the guitar, not playing it). Which of the following will happen?
- ALL the guitar strings will start to vibrate when she starts to sing, and ALL will stop vibrating when she stops singing.
 - ALL the guitar strings will start to vibrate when she starts to sing, but the third string will continue to vibrate after she stops singing.
 - ONLY the third guitar string will start to vibrate when she starts to sing, and it will stop vibrating when she stops singing.
 - ONLY the third guitar string will start to vibrate when she starts to sing, but it will continue to vibrate when she stops singing.
- 11) **Graded.** The Smiths have a lawnmower that creates noise at 95 dB. The Joneses have one that creates noise at 100 dB. How much more intense is the Joneses’ lawnmower noise than the Smiths’?
- 5 times more intense
 - 100 times more intense
 - 10,000 times more intense
 - 100,000 times more intense
- 12) **Graded.** Using what you know about sound intensity and how sound waves are created and move through the air, explain why the tuning fork’s noise is louder when it is in contact the wall than when it is not touching anything else.

- 13) **Graded: 4 points.** Write a short public service announcement (something that might be read like a commercial over a radio station) explaining why young people should wear earplugs when going to a concert. Many rock concerts have sound levels at least 105 dB; some as high as 120 dB.

Federally Recommended Noise Exposure Limits	
Sound level (dB)	Time Permitted (hours per day)
90	8
95	4
100	2
105	1
110	0.5

Your public service announcement should be informative and truthful (2 points), but should also be creative and convincing (1.5 points). When read aloud, this announcement should take at least 20 seconds, but take no more than 60 seconds (0.5 points). **(If you would like to hand in a digital voice recording instead of writing this out, please email the recording to me at t.yamashita@schoolsofwestfield.org and be sure to give me your name in your email.)**

Selected Answers

3. What is the superposition principle?

See your notes for the answer.

4. *Text of question and diagram not copied here.*

Here, we can consider the A pulse to have a positive amplitude (+1 m) since it is above the rest position, and the B pulse to have a negative amplitude (-2 m) since it is below the rest position. From there, we add the amplitudes together ($1\text{ m} + -2\text{ m} = -1\text{ m}$). Since the answer is negative, we know that the direction of the combined pulse is downward, and the height of it is 1 m.

