

Date:

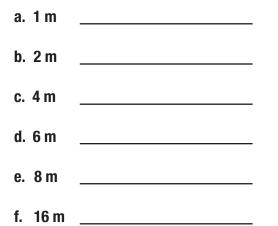
Name:

Work each of the following problems. SHOW ALL WORK.

**1.** Draw the first four harmonics of standing waves on a string.

2. If the length of the string in question one is 2 m, what are the wavelengths of the first four harmonics?

3. Choose the possible wavelengths of standing waves on a string that is 4 m long. State which harmonic corresponds to each possible wavelength.





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Work each of the following problems. SHOW ALL WORK.

4. Draw the first four harmonics of standing waves in an open-ended tube.

5. If the length of the tube in question four is 1 m, what are the wavelengths of the first four harmonics?

- 6. Choose the possible wavelengths of standing waves in an open-ended tube that is 3 m long. State which harmonic corresponds to each possible wavelength.
  - a. 1 m \_\_\_\_\_\_ b. 1.5 m \_\_\_\_\_\_ c. 2 m \_\_\_\_\_\_ d. 3 m \_\_\_\_\_\_ e. 5 m \_\_\_\_\_\_ f. 6 m



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Work each of the following problems. SHOW ALL WORK.

7. Draw the first three harmonics of standing waves in a closed-ended tube (n = 1, 3, 5).

8. If the length of the tube in question seven is 2 m, what are the wavelengths of the first three harmonics?

- 9. Choose the possible wavelengths of standing waves in a closed-ended tube that is 15 m long. State which harmonic corresponds to each possible wavelength.

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