

Name: _____ Date: _____ Hour: _____ Assignment # _____

WAVE PRACTICE PROBLEMS

Below is a list of the basic formulas (as well as how they can be rearranged) in order to solve for period, frequency, velocity, or wavelength. Use any of the formulas below to solve for problems when needed.

Period and frequency. $T = 1/f$ $f = 1/T$

T = period, f = frequency, 1 represents the number of waves in the formula for frequency.

Velocity, wavelength, and frequency. $V = \lambda f$ $\lambda = V/f$ $f = V/\lambda$

V = velocity (speed), f = frequency, λ = wavelength

Velocity, wavelength and period. $V = \lambda/T$ $\lambda = VT$ $T = \lambda/V$

V = velocity (speed), T = period, λ = wavelength

SAMPLE PROBLEM: The musical note 'A' above middle 'C' has a frequency of 440 Hz. If the speed of sound is known to be 350 m/s, what is the wavelength of this note?

1. Identify the given and unknown values.

Given: frequency, $f = 440$ Hz

wave speed, $v = 350$ m/s

Unknown: wavelength, $\lambda = ?$ m

2. Choose the correct formula to solve for wavelength, λ , when frequency and velocity are given.

$$\lambda = V/f$$

3. Insert the known values into the equation, and solve.

$$\text{SETUP} \rightarrow \lambda = \frac{350 \text{ m/s}}{440 \text{ Hz}}$$

$$\text{ANSWER} \rightarrow \lambda = 0.80 \text{ m}$$

SOLVE THE FOLLOWING:

1. A guitar string makes 80 vibrations in one second.

What is the **frequency**?

What is the **period**?

SETUP $\rightarrow$

ANSWER $\rightarrow$

SETUP $\rightarrow$

ANSWER $\rightarrow$

2. A drum vibrates 180 times in 2 seconds. The speed of sound is 340 m/s.

What is the **frequency**?

What is the **period**?

What is the **wavelength**?

SETUP→

SETUP→

SETUP→

ANSWER→

ANSWER→

ANSWER→

3. A butterfly flaps its wings 100 times in 10 seconds.

What is the **frequency**?

What is the **period**?

SETUP→

ANSWER→

SETUP→

ANSWER→

4a) A 10 m long rope is used to create standing waves. The rope makes 240 vibrations in one minute.

What is the **frequency**?

What is the **period**?

SETUP→

ANSWER→

SETUP→

ANSWER→

4b) If the waves in **4a** from above are traveling 12 m/s, what is the **wavelength** of the waves?

SETUP→

ANSWER→

5. A vibrating source with a frequency of 20.0 Hz produces water waves that have a wavelength of 3.0 meters. Calculate the **speed** of the waves.

SETUP→

ANSWER→

6. What is the **period** of a wave that travels through a spring at 2.5 m/s and has a wavelength of 1.3 meters?

SETUP→

ANSWER→

7. A wave travels at 10.0 m/s. The wavelength is 0.10 m.

What is the **frequency**?

What is the **period**?

SETUP→

ANSWER→

SETUP→

ANSWER→

8. Velocity = 335 m/s. Frequency = 67 Hz. What is the **wavelength**?

SETUP→

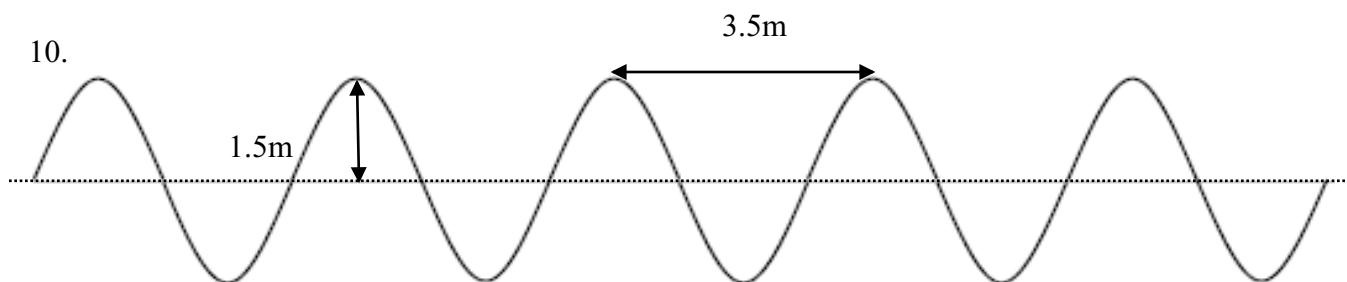
ANSWER→

9. What is the **velocity** of a wave with a frequency of 760 Hz and a wavelength of 0.45 m?

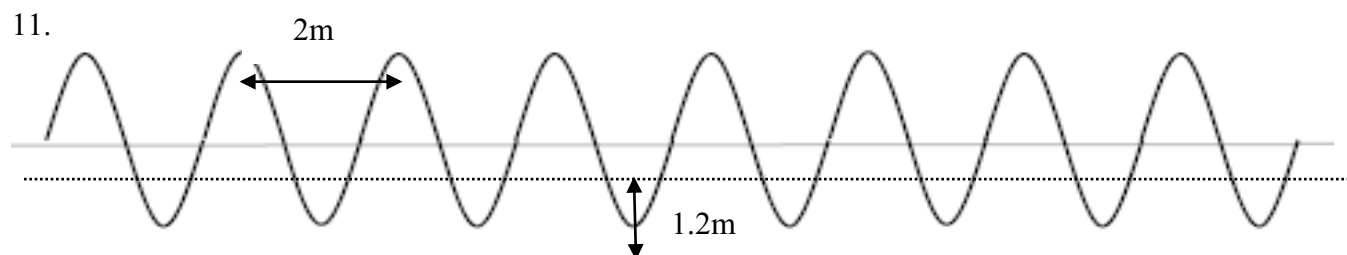
SETUP→

ANSWER→

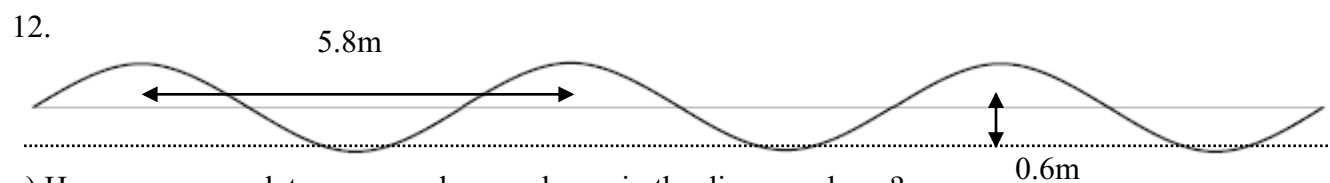
For #'s 10-15, use the information in the diagrams to answer the questions. The period for all of the diagrams is 1 second.



- a) How many complete wave cycles are shown in the diagram above? _____
- b) What is the wavelength? _____ c) What is the frequency? _____
- d) What is the amplitude? _____
- e) What is the speed of the waves? SETUP→ ANSWER→

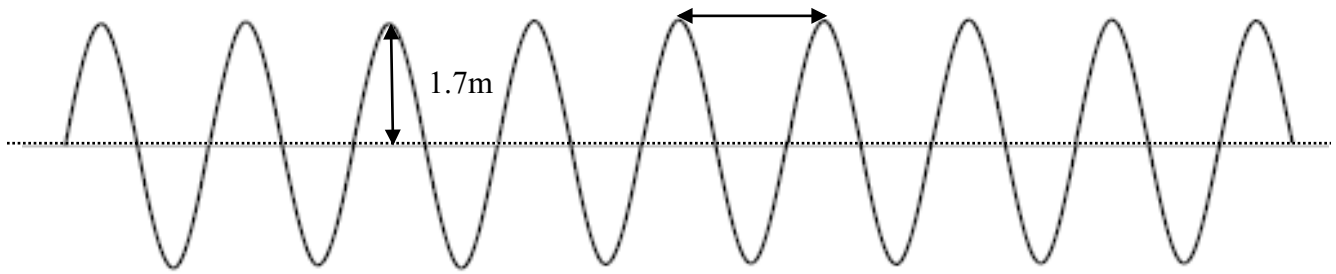


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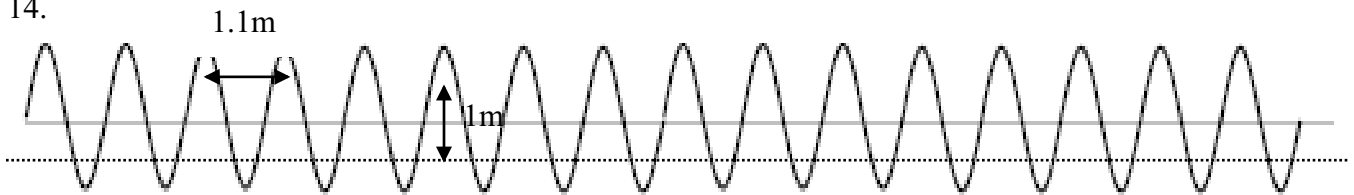
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- b) What is the wavelength? _____ c) What is the frequency? _____
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13. 2m



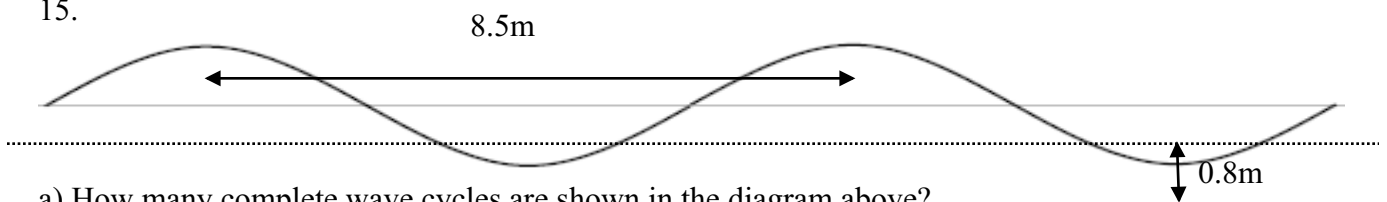
- a) How many complete wave cycles are shown in the diagram above? _____
- b) What is the wavelength? _____ c) What is the frequency? _____
- d) What is the amplitude? _____
- e) What is the speed of the waves? SETUP→ ANSWER→

14.



- a) How many complete wave cycles are shown in the diagram above? _____
- b) What is the wavelength? _____ c) What is the frequency? _____
- d) What is the amplitude? _____
- e) What is the speed of the waves? SETUP→ ANSWER→

15.



- a) How many complete wave cycles are shown in the diagram above? _____
- b) What is the wavelength? _____ c) What is the frequency? _____
- d) What is the amplitude? _____
- e) What is the speed of the waves? SETUP→ ANSWER→