

Name: _____ Date: _____ Period: _____

Graded problems are worth 2 points each. This assignment is graded out of **14** points.

1) Draw a diagram of a transverse wave and label the following parts:

direction of the disturbance	a crest	a trough	a wavelength (λ)
direction of the wave movement	the rest position	the amplitude	

A buoy in the ocean moves up and down a *total* distance of 4 meters. It reaches its high point 20 times in one minute. Use this information to answer questions 2) through 4).

2) **Graded.** What is the amplitude of the wave passing the buoy?

3) **Graded.** What is the frequency of the wave passing the buoy?

4) **Graded.** What is the period of the wave passing the buoy?

- 5) The frequency of a wave is 95 Hz. The wavelength is 14 m. What is the velocity of the wave?
- 6) The period of a wave is 0.0039 s, and the wavelength is 82 mm. What is the velocity of the wave?
- 7) An ocean wave passes a buoy at a rate of 16 crests every 10 seconds. The distance between wave crests is 7 m. How fast is the wave moving?
- 8) **Graded.** Sally tosses a pebble into a calm lake. The crests of the ripple wave pass a lily pad every 2.5 seconds, and there are 8 cm between crests. How fast is the wave moving?
- 9) A sound wave has frequency of 445 Hz and travels through air at 331 m/s. What is the wavelength?

- 10) A sound wave has a velocity of 1450 m/s through water. If the frequency of the wave is 265 Hz, what is the wavelength?
- 11) A sound wave has a velocity of 1.531 km/s through sea water. The period of the wave is 0.0087 seconds. What is the wavelength of the wave?
- 12) **Graded.** The velocity of a wave through a syrup is 75 cm/s, and the frequency of the wave is 14 Hz. What is the wavelength of the wave?
- 13) The wavelength of a wave is 14 m. The velocity of the wave is 950 m/s. What is the frequency of the wave?
- 14) The distance between troughs in a wave is 11.5 cm. The wave is moving at 5.5 km/s. What is the period of the wave?

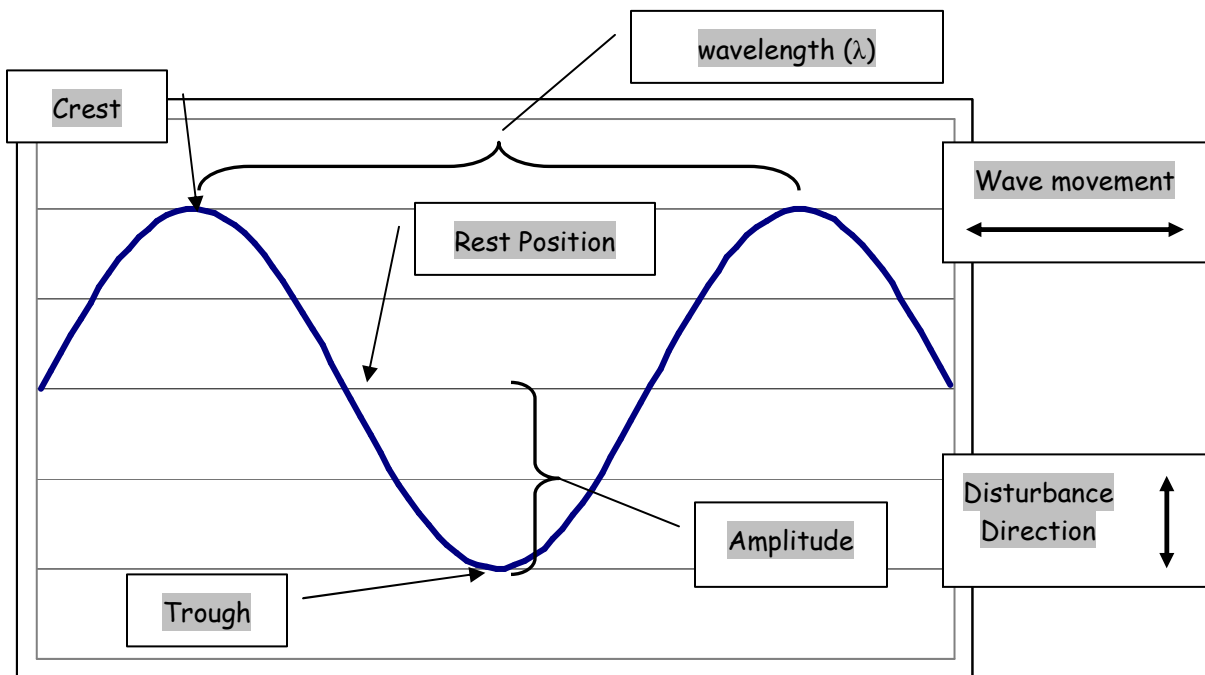
15) **Graded.** The wavelength of a sound wave moving at 331 m/s is 0.75 m. What is the frequency of this wave?

16) **Graded.** The wavelength of a sound wave moving at 330 m/s is 35 cm. What is the period of this wave?

Selected Answers

1) Draw a diagram of a transverse wave and label the following parts:

direction of the disturbance	a crest	a trough	a wavelength (λ)
direction of the wave movement	the rest position	the amplitude	



- 5) The frequency of a wave is 95 Hz. The wavelength is 14 m. What is the velocity of the wave?

$$v = f \times \lambda$$

$$v = 95 \text{ Hz} \times 14 \text{ m}$$

$$v = 1330 \frac{\text{m}}{\text{s}}$$

- 6) The period of a wave is 0.0039 s, and the wavelength is 82 mm. What is the velocity of the wave?

$$\text{frequency} = \frac{1}{\text{period}}$$

$$f = \frac{1}{0.0039 \text{ s}} = 256.41 \text{ Hz}$$

$$\lambda = 82 \text{ mm} = 0.082 \text{ m (convert from mm to m first!)}$$

$$v = f \times \lambda = 256.51 \text{ Hz} \times 0.082 \text{ m}$$

$$v = 21.026 \frac{\text{m}}{\text{s}}$$

- 7) An ocean wave passes a buoy at a rate of 16 crests every 10 seconds. The distance between wave crests is 7 m. How fast is the wave moving?

Here, the frequency is the number of crests per second, or:

$$f = 16 \text{ crests} \div 10 \text{ seconds} = 1.6 \text{ Hz}$$

$$\lambda = 7 \text{ m}$$

$$v = f \times \lambda = 1.6 \text{ Hz} \times 7 \text{ m}$$

$$v = 11.2 \text{ m/s}$$

- 9) A sound wave has frequency of 445 Hz and travels through air at 331 m/s. What is the wavelength?

$$\lambda = v \div f$$

$$\lambda = \frac{331 \frac{\text{m}}{\text{s}}}{445 \text{ Hz}}$$

$$\lambda = 0.74 \text{ m}$$

- 0 A sound wave has a velocity of 1450 m/s through water. If the frequency of the wave is 265 Hz, what is the wavelength?

$$v = 1450 \frac{\text{m}}{\text{s}}$$

$$f = 265 \text{ Hz}$$

$$\lambda = v \div f = 1450 \frac{\text{m}}{\text{s}} \div 265 \text{ Hz}$$

$$\lambda = 5.47 \text{ m}$$

- 11) A sound wave has a velocity of 1.531 km/s through sea water. The period of the wave is 0.0087 seconds. What is the wavelength of the wave?

$$v = 1.531 \frac{km}{s} = 1531 \frac{m}{s} \text{ (convert km to m)}$$

$$f = \frac{1}{\text{period}} = \frac{1}{0.0087 s} = 114.94 \text{ Hz}$$

$$\lambda = v \div f = 1531 \frac{m}{s} \div 114.94 \text{ Hz}$$

$$\lambda = 13.32 \text{ m}$$

- 13) The wavelength of a wave is 14 m. The velocity of the wave is $950 \frac{m}{s}$. What is the frequency of the wave?

$$\lambda = 14 \text{ m}$$

$$v = 950 \frac{m}{s}$$

$$f = v \div \lambda = 950 \frac{m}{s} \div 14 \text{ m}$$

$$f = 67.86 \text{ Hz}$$

- 14) The distance between troughs in a wave is 11.5 cm. The wave is moving at $5.5 \frac{km}{s}$. What is the period of the wave?

$$\lambda = 11.5 \text{ cm} = 0.115 \text{ m (convert!)}$$

$$v = 5.5 \frac{km}{s} = 5500 \frac{m}{s} \text{ (convert!)}$$

$$f = v \div \lambda = 5500 \frac{m}{s} \div 0.115 \text{ m}$$

$$f = 47826 \text{ Hz}$$

$$\text{period} = \frac{1}{\text{frequency}}$$

$$\text{period} = 0.000021 \text{ s}$$