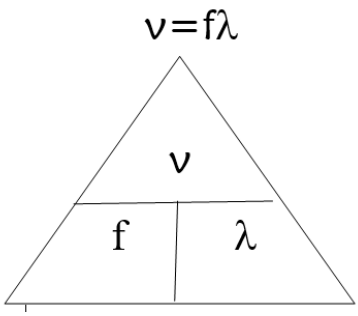
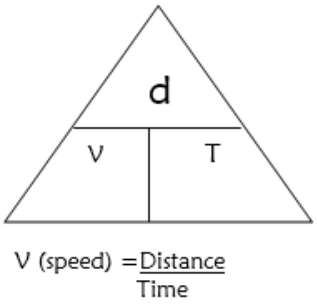
PHYSICS: WAVE CALCULATIONS



$$T = \frac{1}{f} \qquad f = \frac{1}{T}$$



Review

A 'snapshot in time' of a wave is shown below. Which one of the diagrams below represents a wave with twice the wavelength and twice the amplitude?

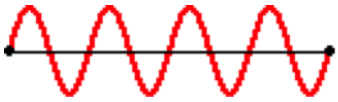


Diagram A

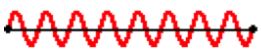


Diagram B

Diagram C

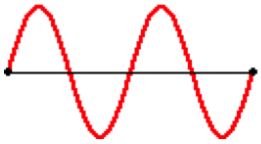
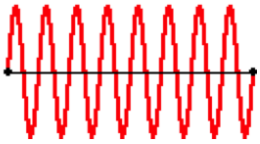


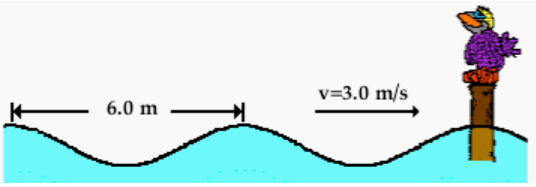
Diagram D



Frequency & Period

1. A pendulum takes 0.5 second to complete one cycle. What is the pendulum's period and frequency?

2. The water waves below are traveling with a speed of 3.0 m/s and splashing periodically against the Wilbert's perch. Each adjacent crest is 6.0 meters apart and splashes Wilbert's feet upon reaching his perch. How much time passes between each successive drenching?



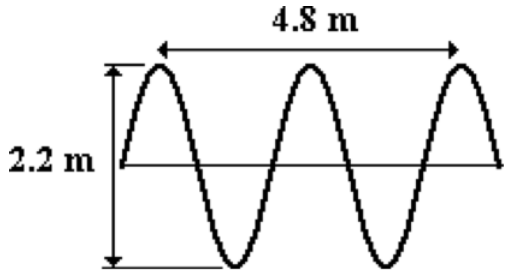
Wavelength

3. A wave has a speed of 50 m/sec and a frequency of 10 Hz. Calculate its wavelength.

Speed

4. Mac and Tosh are resting on top of the water near the end of the pool when Mac creates a surface wave. The wave travels the length of the pool and back in 25 seconds. The pool is 25 meters long. Determine the speed of the wave.

A wave with a frequency of 4.5 Hz is created in an elastic rope. The diagram below represents a *snapshot* of the wave at a given instant of time.



5. Determine the speed of the wave (in meters/second).

Distance

6. A fisherman uses a sonic ranger to determine the depth of a lake. The sound waves travel at 1210 m/s through the water and require 0.020 seconds to travel to the lake's bottom and back to the boat. How deep is the lake?

All Together

Two boats - Boat A and Boat B - are anchored a distance of 24 meters apart. The incoming water waves force the boats to oscillate up and down, making one complete cycle every 10 seconds. When Boat A is at its peak, Boat B is at its low point and there is a crest in between the two boats. The vertical distance between Boat A and Boat B at their extreme is 8 meters.

7. Fill In the data. The wavelength is ___ m, the period is ___ s, the frequency is ___ Hz, and the amplitude is ___ m.

Two boats - Boat A and Boat B - are anchored a distance of 24 meters apart. The incoming water waves force the boats to oscillate up and down, making one complete cycle every 20 seconds. When Boat A is at its peak, Boat B is at its low point. There are never any wave crests between the two boats. The vertical distance between Boat A and Boat B at their extreme is 10 meters.

8. Fill in the data. The wavelength is ___ m, the period is ___ s, the frequency is ___ Hz, and the amplitude is ___ m.
