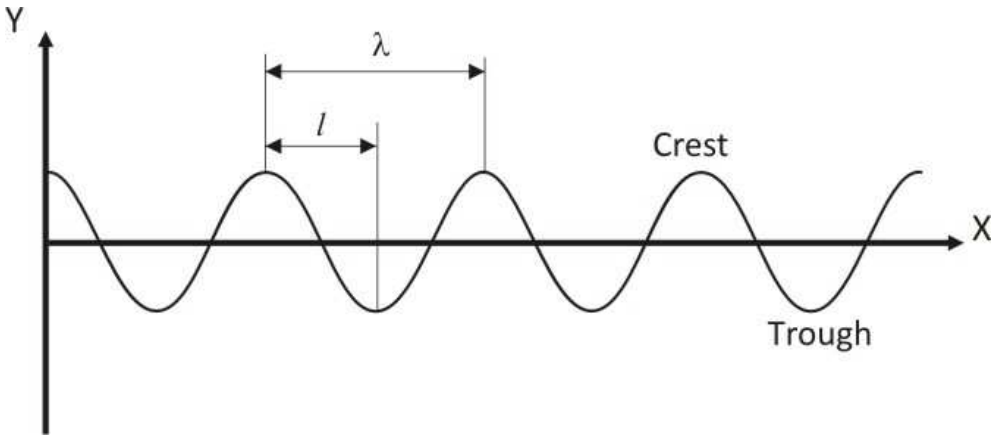
Pepe and Alfredo are resting on an offshore raft after a swim. They estimate that 3.0 m separates a trough and an adjacent crest of surface waves on the lake. They count 16 crests that pass by the raft in 22.0 s. Calculate how fast the waves are moving.

Solution.

$$l = 3m, N = 16, t = 22.0s;$$

$$\upsilon - ?$$



$\lambda = 2l$, because l separates a trough and an adjacent crest and λ separates two adjacent crests.

The time period of the waves is:

$$T = \frac{t}{N}.$$

The speed of the waves is:

$$\upsilon = \frac{\lambda}{T};$$

$$\upsilon = \frac{2lN}{t}.$$

$$\upsilon = \frac{2 \cdot 3m \cdot 16}{22.0s} = 4.36\frac{m}{s}.$$

Answer: The speed of the waves is $\upsilon = 4.36\frac{m}{s}$.