

## Answer on Question #41759, Physics, Acoustics

A sound pulse (like a loud clap) is directed toward the wall of a tall building that is 680 m from the source of the sound. The reflected wave is detected 4.0 seconds after the pulse is produced.

- A) how long does it take the pulse to reach the building?
- B) what is the speed of the sound pulse?

### Solution:

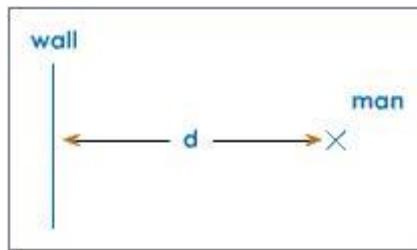
Given:

$$d = 680 \text{ m},$$

$$T = 4 \text{ s},$$

$$t = ?,$$

$$v = ?$$



- A) how long does it take the pulse to reach the building?

If it takes 4 seconds for the echo to be detected it must have taken 4 seconds for the sound to travel to the object and back.

Thus,

$$t = \frac{T}{2} = 2 \text{ s}$$

- B) what is the speed of the sound pulse?

Distance travelled by sound is

$$D = 2d = 2 \cdot 680 = 1360 \text{ m}$$

$$\text{Velocity of sound} = \frac{\text{distance travelled}}{\text{time taken}}$$

$$v = \frac{2d}{T} = \frac{1360}{4} = 340 \text{ m/s}$$

**Answer.** A)  $t = 2 \text{ s}$ , B)  $v = 340 \text{ m/s}$ .