A "right moving" solution to the wave equation is:

$$f_R(z, t) = A \cos(kz - \omega t + \delta)$$

Which of these do you prefer for a "left moving" soln?

A. $f_L(z, t) = A \cos(kz + \omega t + \delta)$
B. $f_L(z, t) = A \cos(kz + \omega t - \delta)$
C. $f_L(z, t) = A \cos(-kz - \omega t + \delta)$
D. $f_L(z, t) = A \cos(-kz - \omega t - \delta)$
E. more than one of these!

(Assume k, ω, δ are positive quantities)

Two different functions $f_1(x, t)$ and $f_2(x, t)$ are solutions of the wave equation.

$$\frac{\partial^2 f}{\partial x^2} = \frac{1}{c^2}\frac{\partial^2 f}{\partial t^2}$$

Is $(Af_1 + Bf_2)$ also a solution of the wave equation?

A. Yes, always

B. No, never

C. Yes, sometimes depending on f_1 and f_2

Two traveling waves 1 and 2 are described by the equations:

$$y_1(x, t) = 2 \sin(2x - t)$$
$$y_2(x, t) = 4 \sin(x - 0.8t)$$

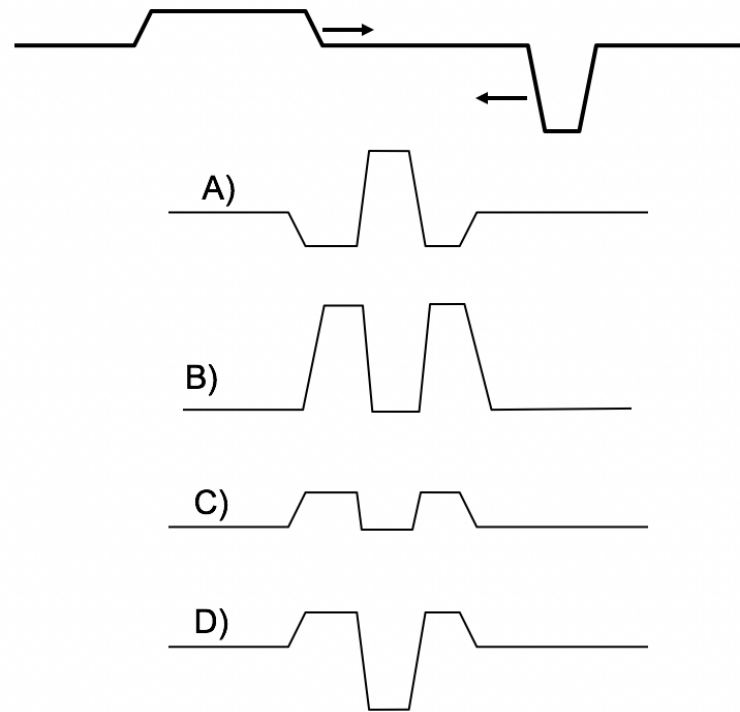All the numbers are in the appropriate SI (mks) units.

Which wave has the higher speed?

A. 1
B. 2
C. Both have the same speed

Two impulse waves are approaching each other, as shown. Which picture correctly shows the total wave when the two waves are passing through each other?

A)

B)

C)

D)

A solution to the wave equation is:

$$f(z, t) = A \cos(kz - \omega t + \delta)$$

- What is the speed of this wave?
- Which way is it moving?
- If δ is small (and >0), is this wave "delayed" or "advanced"?
- What is the frequency?
- The angular frequency?
- The wavelength?
- The wave number?

A solution to the wave equation is:

$$f(z, t) = Re \left[A e^{i(kz - \omega t + \delta)} \right]$$

- What is the speed of this wave?
- Which way is it moving?
- If δ is small (and >0), is this wave "delayed" or "advanced"?
- What is the frequency?
- The angular frequency?
- The wavelength?
- The wave number?

A complex solution to the wave equation in 3D is:

$$\widetilde{f}(\mathbf{r}, t) = \widetilde{A}\, e^{i(\mathbf{k}\cdot\mathbf{r} - \omega t)}$$

- What is the speed of this wave?
- Which way is it moving?
- Why is there no δ?
- What is the frequency?
- The angular frequency?
- The wavelength?
- The wave number?