

Oscillations and Waves

1. A sound wave travels through air with a speed of 340 m/s.
 - a. If the wavelength is 0.5 m, what is its wavenumber.
 - b. Using the relationship $\omega = \kappa v$, calculate the angular frequency
 - c. What is the frequency of the wave?

2. Given the equation of a wave

$$x = 2400 e^{i(1.14 \times 10^7 z - 1.8 \times 10^{15} t + 0.8)}$$

- a. What is the wavelength?
 - b. What is the frequency?
 - c. What is the speed of the wave?
 - d. What is x when $z = 6 \times 10^{-5}$ and $t = 9 \times 10^{-14}$ s?
 - e. Find at least two times when $x = 1750$ at the point $z = 52.5$ nm.
3. Given three oscillators
 - a. $x_1 = 5 e^{i(200t)}$
 - b. $x_2 = 8 e^{i(200t+0.25)}$
 - c. $x_3 = 4 e^{i(200t+0.6)}$

Find the amplitude and phase angle of the sum of these oscillators.