1. For the following wave expressions, indicate if the wave is standing or traveling. If the wave is traveling, find the direction of propagation and the velocity.

a) \( \sin(377t + 0.05x) \) \( \text{Traveling in} \ -x \), \( \nu = \frac{\omega}{\beta} = 7.540 \text{ m/s} \)

b) \( \cos(10^5t - 2 \times 10^{-4}x) \) \( \text{Traveling in} \ +x \), \( \nu = \frac{\omega}{\beta} = 5 \times 10^5 \text{ m/s} \)

c) \( \cos(120t) \sin(55x) \) \( \text{Standing} \)

2. Find the phasor representation of the following expressions

a) \( v(t) = 5 \cos \left( \omega t - \frac{\pi}{4} \right) \) \( \vec{V} = 5 e^{\frac{-j3\pi}{4}} \)

b) \( v(t) = 120 \sin \left( \omega t + \frac{\pi}{4} \right) \) \( \vec{V} = 120 e^{\frac{-j3\pi}{4}} \)

c) \( v(t) = 3 \sin \left( \omega t + \frac{2\pi}{3} \right) + 2 \cos \left( \omega t - \frac{\pi}{6} \right) \) \( \vec{V} = 4.35 e^{\frac{-j19.5\pi}{4}} \)

3. Find the time domain expression for the following phasors.

a) \( \vec{V} = 6 + j4V \) \( 7.2 e^{j33.7^\circ} \Rightarrow v(t) = 7.2 \cos(\omega t + 33.7^\circ) \)

b) \( \vec{V} = 2 e^{\frac{j3\pi}{4}V} \) \( v(t) = \text{Re} \left[ 2 e^{j3\pi/4} e^{j\omega t} \right] = 2 \cos(\omega t + 3\pi/4) \)

4. A wave is described by \( v(t, z) = 3e^{-\alpha z} \sin(2\pi \times 10^9 t - 2\pi z) \). Find the frequency, wavelength and velocity. At \( z = 2 \text{m} \) the magnitude is measured as 1V. Find the attenuation constant.

5. In class we showed that any function, \( f(x - ct) \) is a solution of the wave equation. By the same process, show that \( f(x + ct) \) is also a solution.