Problem 1 - polarization
Consider a wave travelling in the z direction whose electric field is given by
\[ \mathbf{E}(z,t) = 3 \cos(\omega t - \beta z)\mathbf{a}_x + C \cos(\omega t - \beta z + \phi)\mathbf{a}_y. \]
Describe the polarization (e.g. linear, right circular, etc.) and on an xy plot sketch the locus of \(\mathbf{E}(0,t)\) over a cycle for the following cases.

a) \(C = 4 \text{ V/m, } \phi = 0^\circ\)  
b) \(C = 3 \text{ V/m, } \phi = 45^\circ\)

Problem 2 - Arbitrary propagation angle
The direction of \(\mathbf{E}\) and \(\gamma\) of an electromagnetic wave with \(\lambda = 500 \text{ nm}\) are shown below. The wave is traveling through air. The electric field has a magnitude of 30 V/m. What are the \(\mathbf{E}\) and \(\mathbf{H}\) phasors?

[Diagram showing the direction of \(\mathbf{E}\) and \(\gamma\) with an angle of 30°]