em waves

1. What are the (real) electric and magnetic field fields for a monochromatic plane wave whose polarization is parallel to the yz plane, and which is travelling in vacuum in the direction from the origin towards the point (0,-1,2) ? Express your answers for both fields in terms of the amplitude E_o of the electric field oscillations, the frequency ω, and the speed of light c. Use cartesian co-ordinates and basis vectors.

2. A plane electromagnetic wave traveling in a vacuum is given by

$$\vec{E} = \hat{y} E_o e^{i(kz - \omega t)}$$

where E_o is real. A circular loop of radius a, N turns, and resistance R is located with its center at the origin so that a diameter lies along the z-axis and the plane of the loop makes an angle θ with the y axis. Find the emf induced in the loop as a function of time. Assume that $a << \lambda$. (Why?).