Before recitation you may want to refer to [https://en.wikipedia.org/wiki/Plane_wave](https://en.wikipedia.org/wiki/Plane_wave)

Light, radiant heat (infrared radiation), X rays, and radio waves are all examples of traveling electromagnetic waves. Electromagnetic waves comprise combinations of electric and magnetic fields that are mutually compatible in the sense that the changes in one generate the other. The simplest form of a traveling electromagnetic wave is a plane wave. For a wave traveling in the $x$ direction whose electric field is in the $y$ direction, the electric and magnetic fields are given by

$$
\vec{E} = E_0 \sin(kx - \omega t) \hat{y} \\
\vec{B} = B_0 \sin(kx - \omega t) \hat{k}
$$

This wave is linearly polarized in the $y$ direction.

1. For a given wave, what are the physical variables to which the wave responds?

2. Which of the parameters determine the characteristics of the wave?

3. What is the wavelength $\lambda$ of this wave? Show your work or explain in words.

4. What is the period $T$ of this wave? Show your work or explain in words.

5. What is the velocity $v$ of this wave? Show your work or explain in words.

6. What is the mathematical expression for the electric field at the point $(x = 0, y = 0, z)$ at time $t$?