**A quick exercise in visualizing electromagnetic waves**

An electromagnetic **PLANE** wave is described by

,

and has a wavelength of meters. All points in this problem are in meters.

1. Draw a sketch of the wave on the axes below, at time .

*y*

*x*

3

6

9

12

*z*

2. At , find both and at the points , , and . (Your answers are vectors, and should include both **magnitude** and **direction**.)

3. At , find both and at the points , , and . (Remember, it’s a plane wave….)

4. Find the period and frequency of the wave. (Numerical answers, please.)

5. At nsec, find at and at the points , ,, , and .