Practice Problems Related to Plasma Processes

1. As we did in a previous practice problem, assume that the space and time variation of quantities is $\sin(\mathbf{k} \cdot \mathbf{r} - \omega t)$ (or the consine equivalent). Demonstrate that the time-averaged $\mathbf{j} \cdot \mathbf{E} = 0$.

2. For a frequency ω that is greater than ω_p but close to ω_p, what are the phase and group velocities of the wave?