Physics 126 Discussion #11: Chapter 24.1-24.3

1. A certain star is located $2.93 \times 10^{15}$ miles from the earth. How long ago did the light reaching the earth leave the star?

2. Television transmissions leaving the earth could possibly be received by inhabitants of another planet in a galaxy far far away. Imagine that somewhere there are intelligent creatures watching an episode of *I Love Lucy* which was broadcast in 1952. In 1988 how far in miles is the planet from the earth? Ignore the extra days in leap years.

3. Magnetic resonance imaging, or MRI (see Section 21.7), and positron emission tomography, or PET scanning (see Section 32.6), are two medical diagnostic techniques. Both employ electromagnetic waves. For these waves, find the ratio of the MRI wavelength (frequency $= 6.38 \times 10^{7}$ Hz) to the PET scanning wavelength (frequency $= 1.23 \times 10^{20}$ Hz).