Task #1

Infrared waves have wavelengths between $7.8 \times 10^{-7}\,\text{m}$ and $1.0 \times 10^{-3}\,\text{m}$. What is the range of its frequencies?

speed of light: $3.0 \times 10^{8}\,\text{m/s}$	speed of sound in air: $340\,\text{m/s}$

Task #2

A clarinet plays an "A", which has a frequency of 440 Hz.

(a) Find the wavelength of the sound in air.

(b) Under water, the wavelength of this frequency is 3.37 meters. What is the speed of sound under water?

speed of light: $3.0 \times 10^{8}\,\text{m/s}$	speed of sound in air: $340\,\text{m/s}$

Task #3

A certain galaxy glows with a frequency of $4.991 \times 10^{14}\,\text{Hz}$ (orange). When you observe the galaxy from a telescope, the color of light you see has a frequency of $4.989 \times 10^{14}\,\text{Hz}$ (slightly redder).

(a) Assume the earth is approximately stationary. Is the galaxy moving toward the earth or away from the earth?

(b) How fast is the galaxy moving?

speed of light: $3.0 \times 10^{8}\,\text{m/s}$	speed of sound in air: $340\,\text{m/s}$