Homework #4

1) On a clear (cloudless) night the air temperature is often lower near the ground than it is higher up. This is called a *temperature inversion.* Draw a sketch and (using rays) explain why it is that on such nights you can usually hear sounds from far away. Note also that the earth tends to absorb sound.

2) The range of the human voice ranges from about 65 Hz (a low "C") to about 1046 Hz (a high "C"). What wavelengths do these frequencies correspond to (in meters)?

3) What makes ultrasound and infrasound any different from ordinary sound?

4) Under what conditions does a shock wave occur?

5) What is Huygens's principle and what does it help us understand?

6) If an observer is moving toward a source of sound, or if a source is moving toward an observer, the observed pitch increases. Does the wavelength change in either of these situations? Explain.

7) Does the Doppler effect depend on how far away a source and receiver are from each other? Explain.