Homework 22

1. A spaceship moves at 0.8c at an angle of 90^o to the line of sight of the observer. If it emits light of wavelength 500nm, what wavelength does the observer measure?
2. Two spaceships move directly toward each other, each at a speed of 0.5c relative to stationary observer. One spaceship emits a signal at a frequency of $5x10^{14}$Hz. What frequency does the other spaceship measure?
3. Estimate Doppler shift of the Md spectral line at 518.362nm of the Sun emission due to the effect of the Earth rotation to the Sun (Sun "wobbling"). Mass of the sun is ~$2x10^{30}$kg, mass of the earth is ~$6x10^{24}$kg, speed of the earth is ~ 30 km/s, the distance from the Earth to the Sun is ~ $1.5x10^{11}$m.