Name: ....

ASTRONOMY 1102 - Section 1
Instructor: Juhan Frank
Fall 1999
Homework # 4 due Mon. Oct. 11
The Sun and its Radiation

1) You may use your calculator, wherever necessary, to do the following problems from the end of chapter 14, on page 486:

Problem 8 (The color of the Sun).

Problem 5 (The lifetime of the Sun: You may use calculators)

2) How much darker is a sunspot than its surroundings? Take the temperatures given on Fig. 14.16 and Stefan-Boltzmann's law Use a calculator to figure out what fraction of the light emitted by every square inch of the photosphere is emitted by a square inch of a sunspot. Use proportions so you don't need to know the value of constant in Stefan-Boltzmann's law.

3) What is the luminous efficiency (fraction converted to luminous energy) of the proton-proton chain? It was shown in class that 600 million tons of $^1H_1$ are fused into 596 million tons of $^4He_2$ every second in the solar core.

4) Consider the sequence of events that would follow if we were to increase slightly the temperature of the solar core. Explain what is meant by the solar thermostat.