

UNIVERSITY OF KANSAS
Department of Physics and Astronomy
Astrophysics I (ASTR 691) — Prof. Crossfield — Fall 2026

In-Class Problems 3

You may use your OoMA Sheet, your handwritten notes, and a scientific or graphing calculator – and you may work in a group. As always, be sure to: show your work, circle or highlight your final answer, list units, use the appropriate number of significant figures, and write your name.

1. **Flux From A Nearby Star [10 pts].** Alpha Centauri A is one star in the triple-star Alpha Centauri system ($d=1.3$ parsecs away), and it is a fairly similar star to our Sun (for this problem, assume it is identical to the Sun).
 - (a) Roughly how many times weaker is the stellar flux from this star (F_*) that hits the Earth, relative to the Solar flux from the Sun that reaches the Earth ($F_\odot$)? First give your answer in terms of d and other symbolic values; then also give an actual number. [5 pts]
 - (b) Roughly how many times weaker is the stellar flux density from this star ($F_{\nu,*}$) that hits the Earth, relative to the Solar flux density from the Sun that reaches the Earth ($F_{\nu,\odot}$)? First give your answer in terms of d and other symbolic values; then also give an actual number. [5 pts]
2. **Blackbodies [10 pts].** Roughly sketch the spectra of the following objects, on a graph spanning wavelengths of at least $0.1\text{--}100\ \mu\text{m}$:
 - (a) A large object with $T \approx 6000\ \text{K}$.
 - (b) A small object with $T \approx 6000\ \text{K}$.
 - (c) A large object with $T \approx 300\ \text{K}$.
 - (d) A small object with $T \approx 300\ \text{K}$.
 - (e) A large object with $T \approx 50000\ \text{K}$.