1. **Cepheids in M31**
   (a) Suppose you found a classical Cepheid with a period of 30 days in M31, and you measure its average V magnitude to be 18.6. Calculate its absolute magnitude and estimate the distance to M31.
   (b) W Virginis stars (Population II Cepheids) are a factor of four less luminous than classical Cepheids for the same pulsation periods. By what factor would a derived distance to M31 be in error if M31 Cepheids of one type were mistakenly identified as the other? (This mistake was unwittingly made by Hubble before a distinction between the two types was discovered.)

2. Suppose that a quasar is as bright as a solar-type star (they share similar *apparent* magnitudes) but the quasar is a factor of a million further away than the star. What is the quasar's luminosity?