1. Do Lyons Problem 1.4.
2. Do Lyons Problem 1.5.
3. Do Lyons Problem 1.6.
4. Do Lyons Problem 1.7.
5. Do Lyons Problem 1.8.
6. Do Lyons Problem 1.9.
7. You measure the flux of a source to 1%. What is the error in the brightness of the source in magnitudes? What is the error in magnitudes corresponding to a 10% error in the measurement of the flux?
8. In the case of trigonometric parallaxes, how does the error in the derived distance of a star, $\delta_D$, depend on the error in the derived parallax, $\delta_p$?
9. In the case of photometric parallaxes (an important and widely used technique whereby the distance of an object is derived by measuring its apparent magnitude and assuming its absolute magnitude), show that the error in the derived distance, $D$, of a star depends on the error in the measured apparent magnitude, $\delta_m$, as $\delta_D = 0.46D\delta_m$.
10. You observe a star with a parallax 0.010 ± 0.002 arcseconds. That star is also observed to have an apparent magnitude of 15.00 ± 0.05.
   (a) What is the distance modulus and absolute magnitude of that star?
   (b) What is the error in the absolute magnitude of the star?
11. All other things equal and assuming only Poissonian noise, how much more flux do I need to collect from a source in order to increase the $S/N$ of my detection by a factor of 3?