Introduction to Astronomy

HW100303

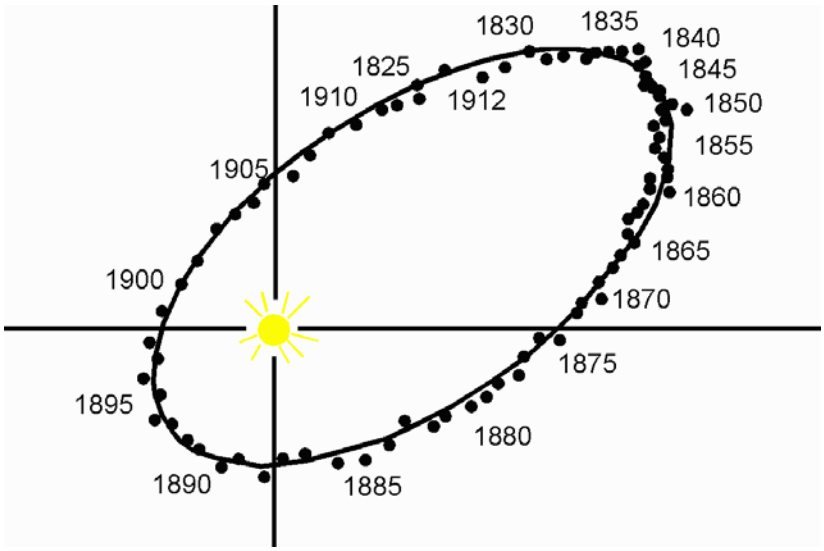
due in one week

1. Which gives a more accurate measure of a star's surface temperature, its color ratios or its spectral lines? Explain your reasoning.

2. Give 2 reasons why a visual binary star is unlikely to also be a spectroscopic binary star.

3. How far away is a star that has a proper motion of 0.08 arcseconds per year and a tangential velocity (proper motion) of 40 km/s? For a star at this distance, what would its tangential velocity have to be in order for it to exhibit the same proper motion as Barnard's star?

4. The visual binary 70 Ophiuchi has a period of 87.7 years. The parallax of 70 Ophiuchi is 0.2 arcseconds, and the apparent length of the semimajor axis as seen through a telescope is 4.5 arcsec. (a) What is the distance to 70 Ophiuchi in parsecs? (b) What is the actual length of the semimajor axis in AU? (c) What is the sum of the masses of the two stars in solar masses? Also see figure in p. 467 of your textbook.



5. Search the World Wide Web for information about *Gaia*, a European Space Agency (ESA) spacecraft planned to extend the work carried out by *Hipparcos*. When is *Gaia* planned to be launched? How does it compare to *Hipparcos* in terms of performance? For how many more years will it be able to measure parallaxes? What other types of research will it carry out?

6. The spectral classes of stars have become O, B, A, F, G, K, M, L, T to include cool celestial objects. Can you come up with a mnemonic expression for the classification sequence?