

Activity B

The table below has information on five stars from the solar neighborhood. Complete it by using the Small-Angle Formula $d=1/p$.

Name of the Star	Parallax Angle	Distance from the Sun
Barnard's star	0.00015°	
Sirius		2.5 parsecs
Altair	$0.2''$	
Wolf 359		7.7 l.y.
Ross 128	$0.3''$	

Note: we can use this formula only for very small parallax angles. The parallax angle should be in arcseconds and the distance in parsecs! If otherwise, make the proper conversions.

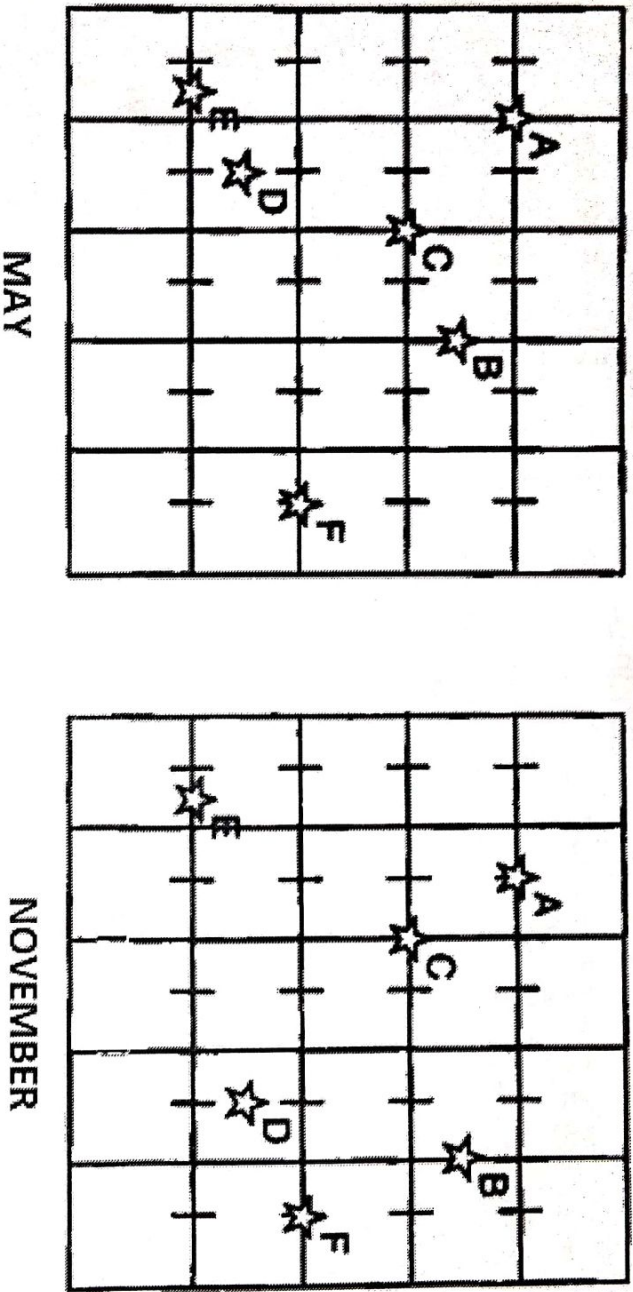
Question:

At your telescope you measure the parallax of the star Regulus to be one-half of the parallax of the star Denebola. What could you tell about their relative distances from us? (Hint: compare Sirius and Altair in the table just above.)

- That Regulus and Denebola are approximately the same distance from Earth.
- That Regulus is about half the distance from us that Denebola is.
- That Regulus is twice the distance from us.
- That Regulus is 8 light years away, and we cannot determine the distance to Denebola.

Activity A

To measure the parallax, photos of a small part of the starry sky are made by a telescope. Below there are drawings made from two photos taken from the same part of the starry sky at 6 months of interval. The whole photographic plate has a dimension of 0.5" (arcseconds).



1. Which stars on the photo are distant 'fixed' stars and which are nearby stars?
2. Which star is the nearest to the Sun? What is its annual parallax? What is its distance to the Sun in parsecs?
3. When star D is at 32.6 l.y. distance from the Sun, what are the distances of the stars A, B and E in l.y.?

Worksheet on Parallax

Questions

1. A typical separation of the eyes is about 6 cm. If an object appears to shift by 10° when you cover one eye and then the other, what is the distance to the object?
2. Between 1830 and 1840 three astronomers, Bessel, Struve and Henderson measured the first annual stellar parallax. A star in **Cygni** appeared to have a parallax of 0.0001° thus enabling a first determination of the distance to a star. Calculate this distance in Astronomical Units (A.U.).
3. The annual parallax of the **Centauri Proxima**, the nearest star to the Sun, is measured to be 0.76 arcseconds ($0.76''$). Calculate its distance from the Sun in Astronomical Units.
Then find the same distance in parsecs by using the Small-Angle Formula $d=1/p$, where d is the distance in parsecs and p is the parallax angle in arcseconds.
4. Would it be more or less accurate to measure the parallax of a star from Neptune? Explain why.