Lab Preparation - Distances to the Stars

Before the first lab session:

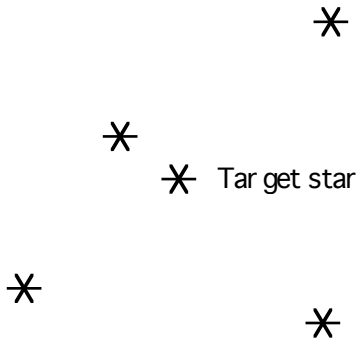
Read entirely the lab manual <u>The Distances to the Stars</u>.

Answer the following questions to check your understanding of the basic ideas.

1) Consider Figure 1 in the lab manual. This figure shows the Earth, Sun, and stars as seen from a distance far from Earth. Below is a picture of the *same* target star as seen from Earth — that is, a picture of the sky toward the target star.

a) Draw on this picture the path which you expect the target star to follow in the sky as a result of the Earth's motion. That is, sketch the parallax motion of the target star.

b) Explain why you have drawn the path as you have.



2) Consider the motion of the star shown in Figure 3 in the lab manual.

a) What is the star's parallax angle?

b) What is the distance to the star in Astronomical Units?

c) What is the distance to the star in parsecs?

3) Please go to http://www.cfa.harvard.edu/~wbrown/Files/NewScientist.mp3 to hear a podcast about the discovery of "hypervelocity stars" by Dr. Warren Brown.

(a) What is the current idea about the origin such fast-moving stars in the Milky Way?

(b) One of the stars Dr. Brown studied has a proper motion of 0.0105 arcsec/yr and is located at a distance of 15 000 pc from us. What is the transverse velocity of this star?