

Math 1613 - Trigonometry

Written Assignment 8 - Due 2017.07.28

Directions: Please answer the following question in complete sentences. Be sure to label all geometric objects in any illustrations (if any). I will accept an answer in a scanned image format, as a pdf, or as a picture taken and sent from your awesome smart phone.

Question: The space velocity \vec{v} of a star relative to the sun can be expressed as the resultant vector of two perpendicular vectors – the radial velocity \vec{v}_r , and the tangential velocity \vec{v}_t , where $\vec{v} = \vec{v}_r + \vec{v}_t$. If a star is located near the sun and its space velocity is large, then its motion across the sky will also be large. Barnard's Star is a relatively close star with a distance of 35 trillion miles from the sun. It moves across the sky through an angle of $10.34''$ per year, which is the largest motion of any known star. Its radial velocity is $\vec{v}_r = 67$ miles per second toward the sun.

- (a) Approximate the tangential velocity \vec{v}_t of Barnard's Star. (*Hint*: Use the arc length formula $s = r\theta$).
- (b) Compute the magnitude of \vec{v} .

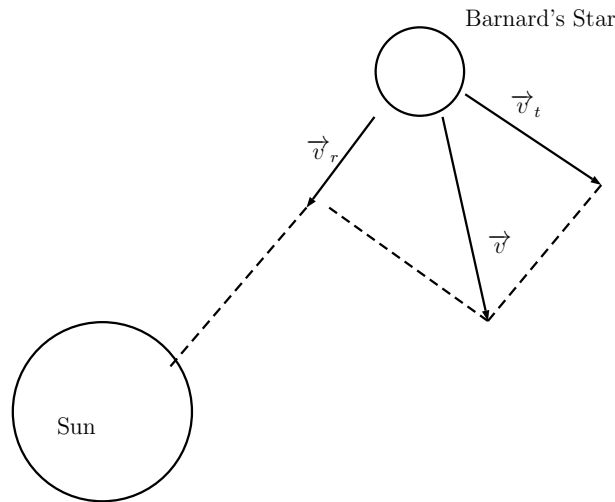


FIGURE 1. Awesome pic of the scenario for this week's problem.