Astron 299/L&S 295 Solution Set 1

Given: Sep 7. Due: Wednesday, Sep 14 at the beginning of class

Problem 1 Star Trails

The trick comes with measuring the angles that the stars trace out as they move in the sky (of course it's actually the Earth that moves). The North Star does not appear to move: it is the bright blue-ish star to the left of the Done. The rest of the stars all appear to rotate around that. So we pick a bright star (you might recognize the Big Dipper as some of the stars near the top of the picture) and measure a triangle: the tip is the North Star, and the base is the path made by another star (see Figure 3). The angle that sweeps out tells us how long the exposure was. I printed out a protractor and found an angle of 5°. We know that the stars move around 360° in 24 hrs, or 15°/hr, or 4 min/degree. So 5 degrees is $5 \times 4 = 20$ minutes, which is the answer!

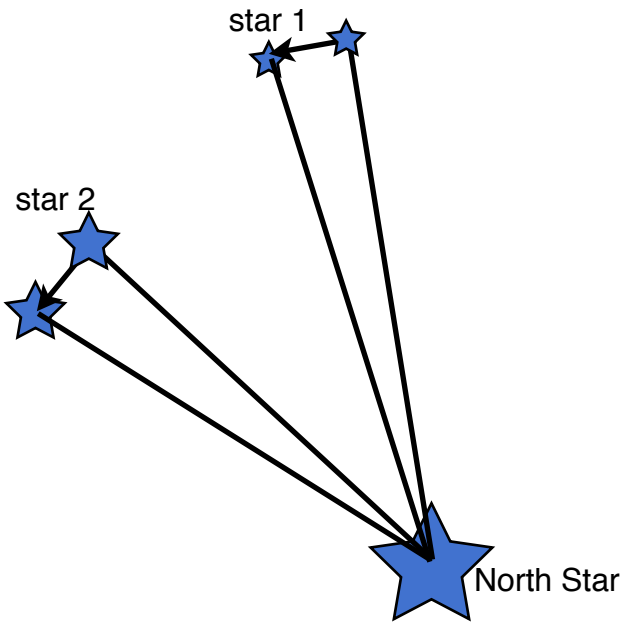

Figure 1: Schematic of star trails, showing two stars appear to rotate around the North Star.