Project 1… Estimating Distance to the Moon using Parallax

The most direct way to determine the distance to astronomical objects is to measure their parallax. This is the angle, in degrees, that the object appears to shift in the sky from position A to B as you view it from two different vantage points (1 and 2). The separation between these vantage points, 2R in kilometers, is related to this parallax angle θ by the distance to the object D as the diagram below shows.

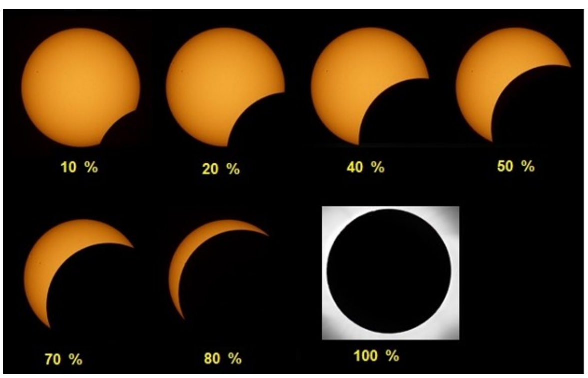
For the total solar eclipse, the diameter of the sun and moon are about 0.5 degrees, so if one observer sees a total eclipse and at the same time a second observer only sees half the sun covered, then the parallax shift of the moon is just half the apparent diameter of the sun or 0.25 degrees. Once you know how far you are from the path of totality in kilometers, you can use the distance and angle to determine the lunar distance.

The observer enters their longitude (west = positive) and latitude on the form to four decimal places. Example: 110° 27′ 15″ west = 110.4542

Enter your longitude in decimal degrees

Enter your latitude in decimal degrees

Distance to path of totality in kilometers



What was the maximum darkening that you saw using the above image guide?

Enter your estimate here (example: enter '50%' as 50)

Parallax angle shift in arcseconds

Your estimate for the distance to the moon in kilometers is

Actual distance is 366,000 kilometers. How did you do?