Figure 59. Aristarchus' construction for computing the absolute distances to the moon and sun in terms of the observations made during a lunar eclipse.

0. By similar triangles:
\[
\frac{x}{d} = \frac{x + 20R}{19d} \quad \text{(Why 19d as diameter of sun?)}
\]

1. By algebra (which Aristarchus didn't have):
   \[x = 40L + R \text{ and } d = 20L \neq D = 0.35D\]

2. Since (by Eratosthenes' calculations), \(D = 79,575\) stades,
   \[d = 27,860\] stades

3. Since both moon & sun subtend an angle of 0.5 at earth:
   \[R = \frac{720d}{2\pi} = 3,191,500\] stades
   And \(19R = 60,638,500\) stades
   \[R \approx 40.5d \quad \text{and} \quad 19R \approx 760D\]

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“Aristarchus' Measurements

Modern results

\[R \approx 300 \quad 382R \approx 11,460D\]