Measuring the Earth
A joint exercise of the University of Houston and the University of Kansas

Eratosthenes’ Observation

- Eratosthenes calculated the circumference of the Earth at 24,421 miles in ~ 200 B.C.
- In Alexandria, he noted the sun angle the same day there was no shadow in a deep well in Syene.
- He calculated that the distance between the two locations was 1/50th of Earth’s circumference.

Requirements of the method

1) Stations should be directly N-S of each other.
2) Measurements should be made at local noon.
3) Need to know the distance between stations.

Geography

Assume parallel rays from the Sun

Measure the angles at the two locations

Potential sources of error:
1) Length of shadow
2) Height of stick
3) Stick not vertical
4) Distance between locations

Calculate the circumference

\[
\frac{\alpha_L - \alpha_H}{360} = \frac{1024}{\text{circumference}}
\]