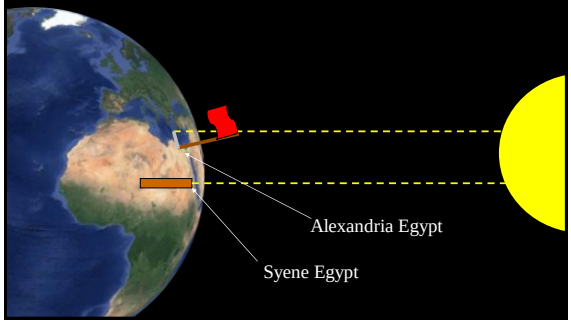
Eratosthenes

Measuring the circumference of the Earth around the year 200 B.C.E.

…and Today

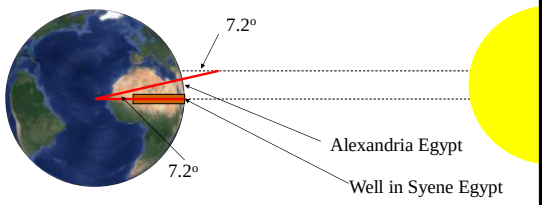
Eratosthenes Measurements



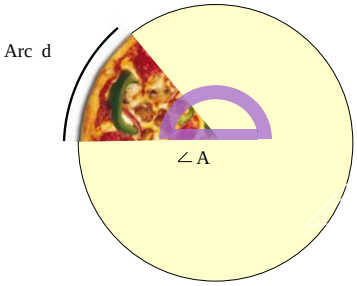
Eratosthenes Knew…

- GEOMETRY
- The Earth is Round
- The Sun's rays are parallel
- Once a year at noon, on June 21 the Sun shown to the bottom of a deep well in Syene, Egypt -- there were no shadows
- There were shadows in Alexandria at that time
- The distance between Syene and Alexandria was ~5000 stadia (925 km)

Eratosthenes Measurements

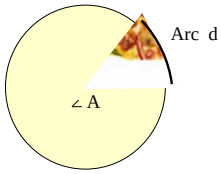


Eratosthenes Pizza



Eratosthenes Pizza

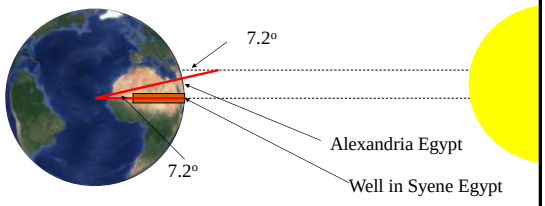
$$\frac{A}{360^\circ} = \frac{d}{C}$$



- The ratio of angle A (the slice) to 360° (the whole pizza) is the same as the ratio of length d to the circumference of the whole pizza crust

Eratosthenes Measurements

$$\frac{7.2^\circ}{360^\circ} = \frac{\text{distance from Syene to Alexandria}}{\text{Circumference of Earth}}$$

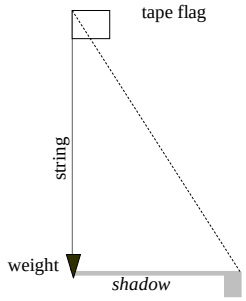


Eratosthenes Calculations

- Eratosthenes calculated the polar circumference of the earth at 250,000 stadia (46,250 km)
- Remember this was 2,200 years ago…

2200 years later…

- Place tape and weight on string
- Measure length of string
  tip of weight to the top of flag.
- At solar noon on equinox, measure the length of shadow.



- Construct 1/10 scale triangle using measurements.
- Measure the Sun angle
- Find distance to Equator
- Calculate circumference of Earth