

Eratosthenes' Experiment The Circumference of the Earth

Name _____ P- _____

Read page 4, the Earth Beat in your textbook. Refer to the diagrams below for the simple geometry of the Earth's circumference to the angle of the sun. Calculate the size of the Earth by using our measurements of the sun's angle in comparison to other schools in the world.

Example:

City	Distance	Sun's angle
A	3335 km	0°
B		30°

$30/360 = 1/12$ of a full circle so:

$12 \times 3335 \text{ km} = 40,020 \text{ km}$ (close to 40,000 km actual circum.)

Now we will make our own observations:

<u>Ring Stand Rod, cm</u>	<u>Shadow, cm</u>	<u>Angle</u>
_____	_____	_____

$$\tan^{-1} (\text{ring stand height} / \text{shadow length}) = \text{angle}$$

Time of day _____

Day of the year _____

Latitude in Aviano = $46^\circ 2'N$

Longitude in Aviano = $12^\circ 36'E$

On Vernal Equinox - the sun's rays strike the equator at 90° , causing no shadow so we will measure on Sept. 21/22.

1 meter = 1/10,000,000 of the distance between the north pole and the equator so:

$$10,000 \text{ km} = 90^\circ$$

$$1^\circ = 111.11 \text{ km}$$

To find the distance Aviano is from the equator:

$$46^\circ 2' = 46 \frac{2}{60}^\circ = 46.03^\circ (111.11 \text{ km}) = \underline{\hspace{2cm}} \text{ km}$$

To find the circumference of the Earth:

$$\frac{\text{shadow angle (} \underline{\hspace{2cm}} \text{)}}{360^\circ} = \frac{\text{Aviano/Equator distance (} \underline{\hspace{2cm}} \text{)}}{\text{Circumference of the Earth!!!!!!}}$$