

## Student's worksheet

### Experimental procedure

Time of the experiment: 12.20

1. Place the stick in the Sun and make sure it is vertical to the ground.
2. Measure the length of the stick and note down your measurement in the table below.
3. At the time scheduled to conduct the experiment, measure the length of the stick's shadow. Repeat the measurement 5 times and write your values down in the table.
4. Your teacher will provide you the value for length of the third side of the triangle in the picture below. Write the value in your table.
5. Your teacher will also provide you the value for the distance between the two schools. Write the value in your table.

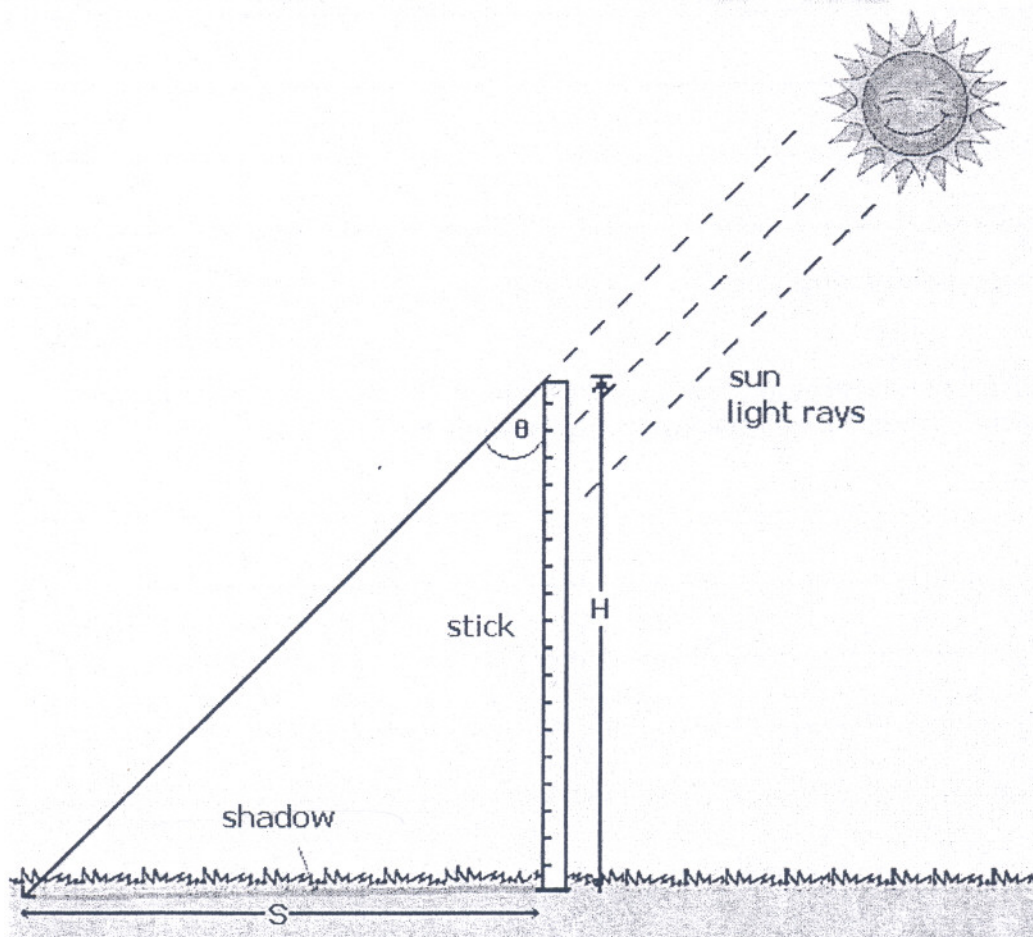


Figure 1

Συνεργαστήκαμε με το Liceul Technologic «Constantin Cantacuzino» Baicoi, Romania, με συντεταγμένες  
γ.πλάτος  $45^{\circ}01'57,72''$  και γ. μήκος  $25^{\circ}51'29,894''$ .  
(Βόρεια) (Ανατολικά)

Table of measurement	
Stick length	
Shadow length (1 <sup>st</sup> measurement)	69 cm
Shadow length (2 <sup>nd</sup> measurement)	78,5 cm
Shadow length (3 <sup>rd</sup> measurement)	74 cm
Shadow length (4 <sup>th</sup> measurement)	68,5 cm
Shadow length (5 <sup>th</sup> measurement)	
Length of triangle's 3 <sup>rd</sup> side	
Distance between schools	1084,383 km

### Exersice

1. Find the mean value for the length of the shadow.

---



---



---



---



---

The mean value for the length of the shadow is: \_\_\_\_\_

2. Divide the length of the stick's length, the length of the stick's shadow and the length of the triangle's 3<sup>rd</sup> side (see table above) with 10.

---



---



---

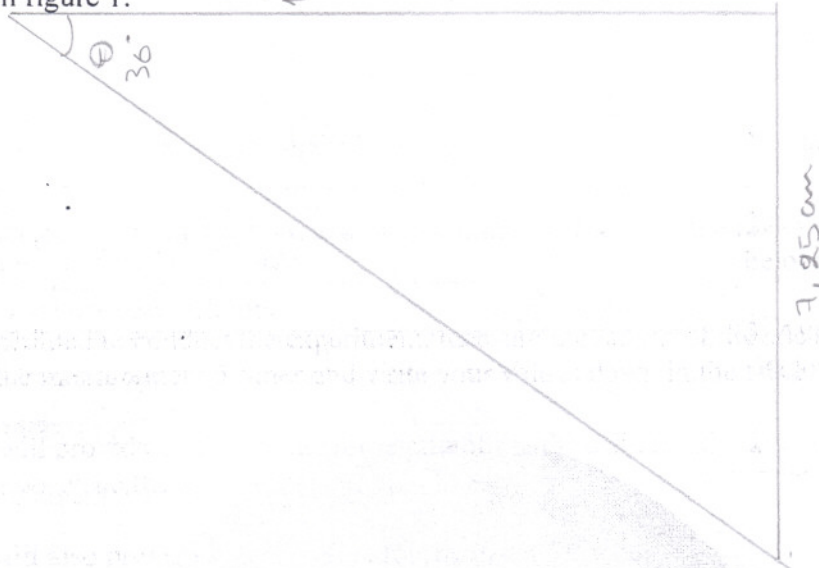


---



---

3. Using the value you calculated at the previous step draw a triangle like the one depicted in figure 1.



4. Using a goniometer measure angle  $\theta$  (see figure 1) in the triangle you drew.

Angle ( $\theta$ ): \_\_\_\_\_

5. Note down the angle measured by your fellow students at the other school.

Angle ( $\varphi$ ): 44,51°

6. Subtract the two angles. The value you'll find corresponds to the angular distance of the two schools.

---



---



---

7. Using proportions calculate the Earth's circumference.

$$\frac{\text{distance between the schools}}{\text{angular distance between the schools}} = \frac{\text{Earth's circumference}}{360^\circ}$$

$$* 44,51^\circ - 36^\circ \Rightarrow 8,51^\circ$$

$$\frac{1084,383}{8,51} = \frac{x}{360} \Rightarrow \frac{1084,383 \cdot 360}{8,51} = x \Rightarrow$$

$$x \Rightarrow 45.872, 841363 \text{ km}$$

$$\frac{2084,383}{\cancel{8,52}} = \frac{x}{360}$$

$$\frac{2084,383 \cdot 360}{8,52} = \cancel{\dots}$$

45,872,842363 km

$$\begin{array}{r} 69 \\ 78 \\ 74 \\ 68 \\ \hline 280 \end{array}$$

~~71,00~~  
~~71,00~~ 72,5  
~~71,00~~

$$\frac{390377,88}{8,52} = x$$

$$45.872,842363 = x$$