MEASURiNG TERRiTORiES

Obradoiros de Matemáticas do CPI Domingo Fontán

Proxecto eTwinning Europe is the Way

PHOTO: Sign panel for the Portuguese Way

CALCULATING DISTANCES

DISTANCE BETWEEN THE 3 SCHOOLS... WITH RULER & SCALES

First we have calculated the distances with traditional methods, using a map with scale 1:4 650 000 and a ruler in cm.

Scale is the ratio of proportion between the real dimensions of a territory and those of the drawing that represents it.

In this case it is a “Reduction Scale”, that is, 1 unit of the drawing (for example 1 cm) corresponds to 4 650 000 units in reality (in our example it would be 46,5 km).

RESULTS

Portas - Barletta: 2 090 km

Portas - Beauvais: 1 140 km

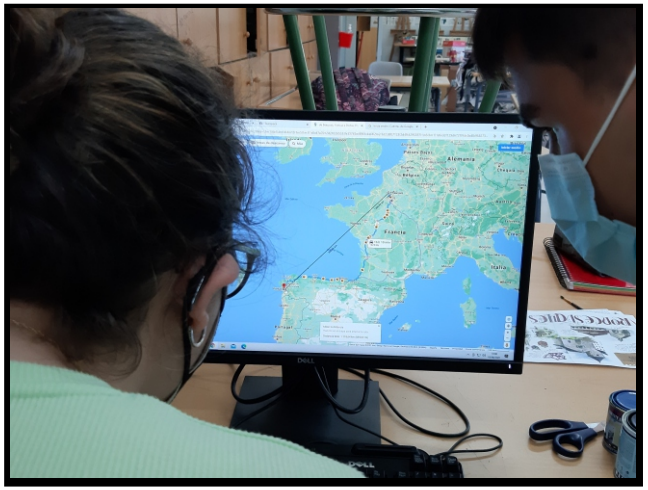
Barletta - Beauvais: 1 480 km

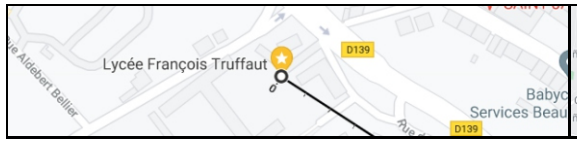
PHOTO: vieira's shell on the ground to mark the Way in Pontevedra

CALCULATING DISTANCES

DISTANCE BETWEEN THE 3 SCHOOLS... WITH GOOGLE MAPS

We used Google Maps tools to calculate the distance between the schools.
Just press the right button of the mouse and mark the two points.
If we compare the results we see that they are similar to those of the previous activity.





RESULTS

Portas - Barletta: 2 058,45 km

Portas - Beauvais: 1 123,68 km

Barletta - Beauvais: 1 424,75 km

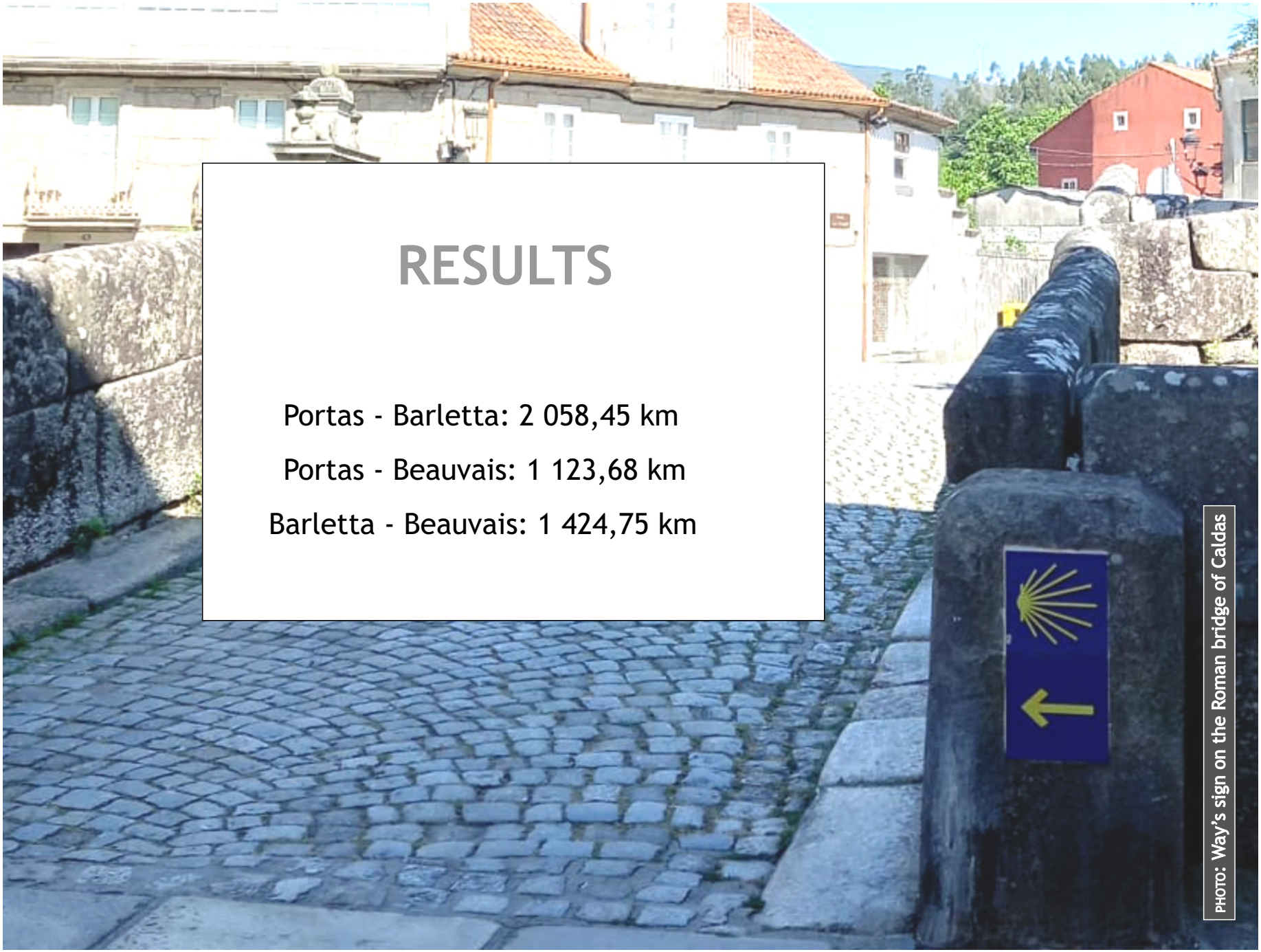
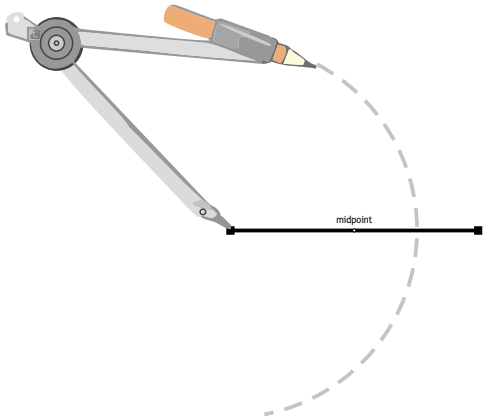


PHOTO: Way's sign on the Roman bridge of Caldas



CALCULATING DISTANCES

PLACE EQUIDISTANT FROM THE TREE SCHOOLS... WITH CIRCUMCENTER

The circumcenter is the center of the circumference circumscribed to a triangle, that is, the circumference that passes through all its vertices.

It is found by drawing the bisectors (the perpendicular lines that pass through the midpoint of each side).

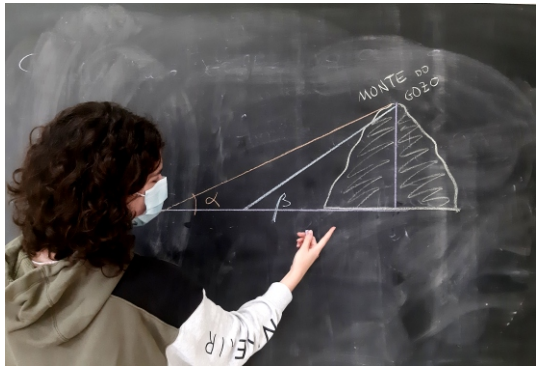
When we find the center of the circumference that passes through our three schools, we find that the point that is equidistant from them is in the Balearic Islands!

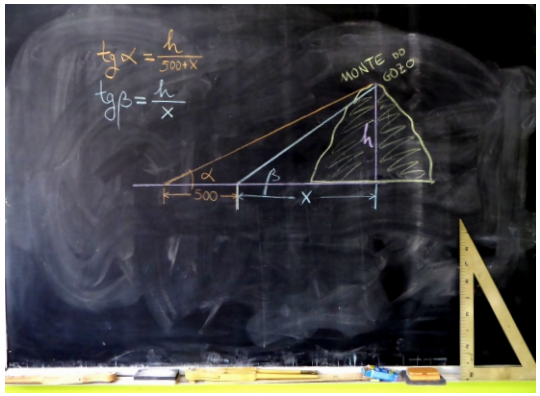
We wouldn't mind taking a trip to check it out ... ;)

PHOTO: sculpture that marks what remains until the final goal of the Way

CALCULATING DISTANCES

HEIGHT OF “MONTE DO GOZO”... WITH TRIGONOMETRY





We have calculated the height of Monte do Gozo (Mount of Joy) with respect to the cathedral (from where the measurements were taken).
The cathedral is approximately 270m above sea level, so we must add 270m to the data we obtain to find the total height of the mountain.

“Monte do Gozo” is the last stage of the French Way and it is a hill located just 5 kms from the final goal.
Here the pilgrims see the city and its cathedral for the first time. It is a moment of great happiness, hence the origin of its name.
We have found the height thanks to Trigonometry, which is the science that studies the relationships between the sides and angles of a triangle.
A theodolite is used to establish the angle of elevation from a specific point (in this case two points separated by 500m in the cathedral square -O Obradoiro-).
The theodolite we have used is borrowed, so we usually replace it at school with an invention with a semicircle of angles and a hanging string! ;)

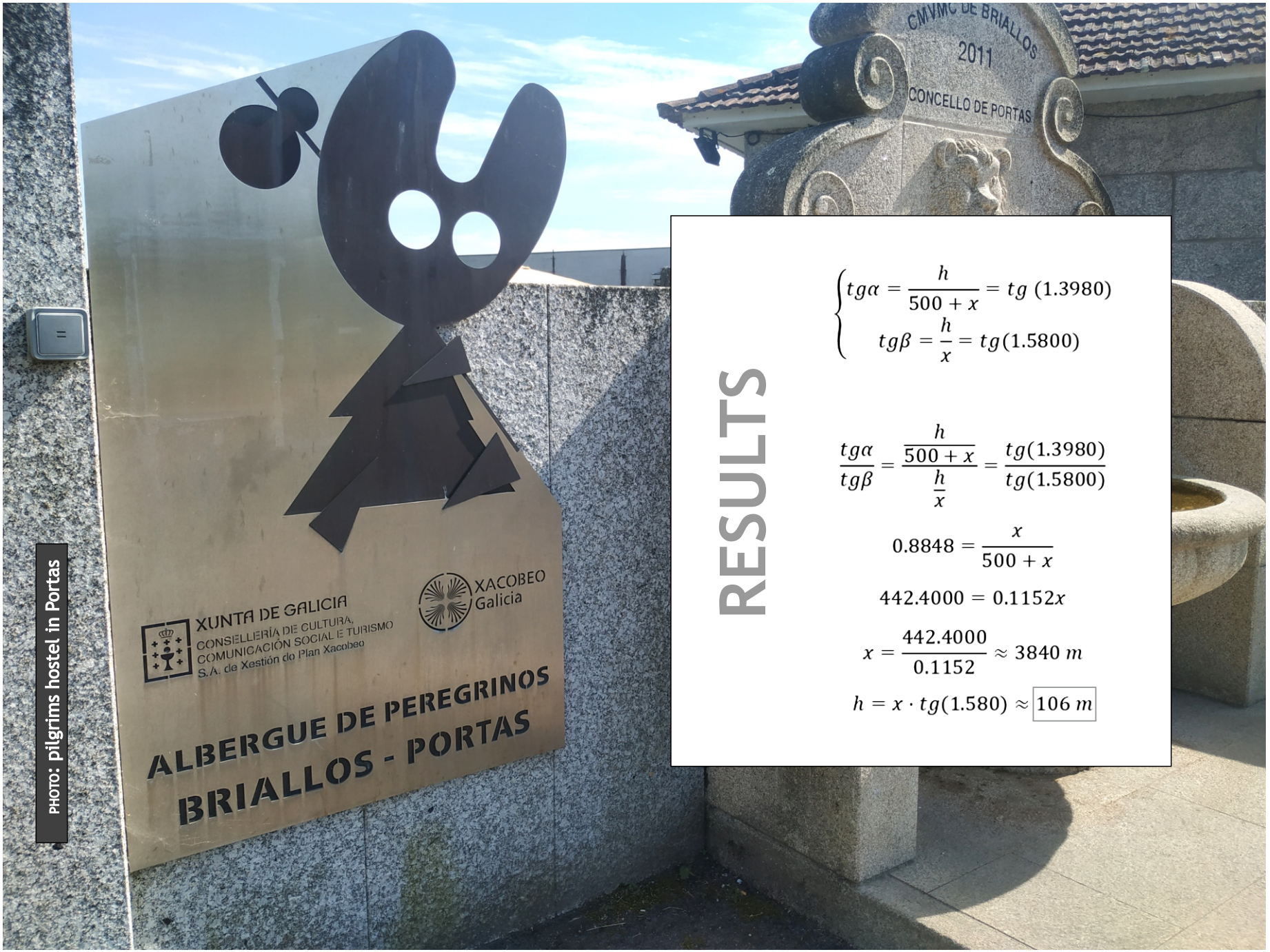


PHOTO: pilgrims hostel in Portas

RESULTS

$$\begin{cases} tg\alpha = \dfrac{h}{500 + x} = tg\ (1.3980) \\ tg\beta = \dfrac{h}{x} = tg(1.5800) \end{cases}$$

$$\frac{tg\alpha}{tg\beta} = \frac{\frac{h}{500 + x}}{\frac{h}{x}} = \frac{tg(1.3980)}{tg(1.5800)}$$

$$0.8848 = \frac{x}{500 + x}$$

$$442.4000 = 0.1152x$$

$$x = \frac{442.4000}{0.1152} \approx 3840\ m$$

$$h = x \cdot tg(1.580) \approx \boxed{106\ m}$$