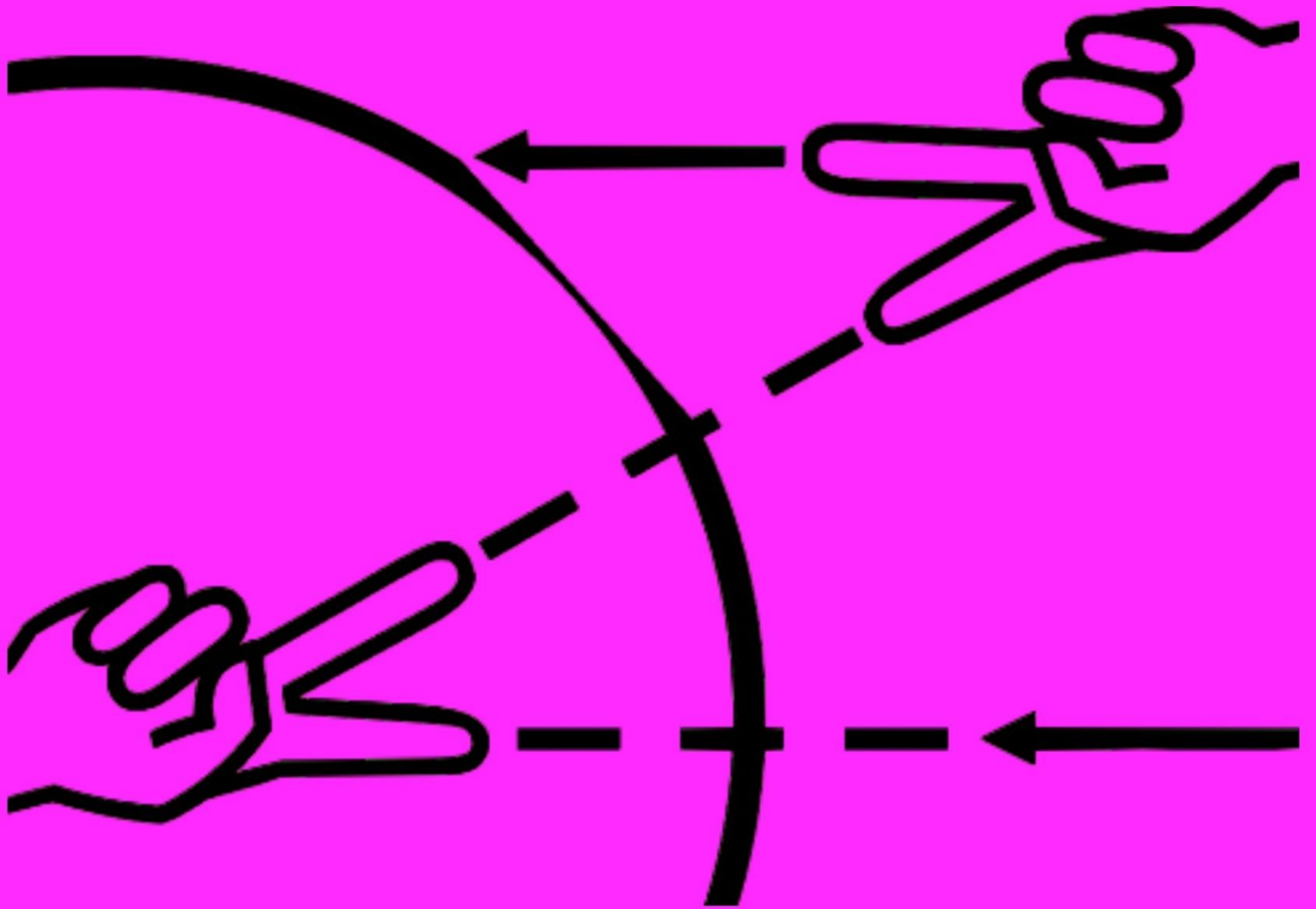


# Eratosthenes



december 2017

**4** Continents

**11** Countries

**24** Schools

**75** Measures

ARGENTINA (4)

Alta Gracia, Chivilcoy, Pergamino, Rio Cuarto

BRAZIL (2)

Piranguinho, Rio de Janeiro

COLOMBIA (1)

Guarne

CROATIA (2)

Brštanovo, Donji Muć

FRANCE (1)

Lafrançaise

GREECE (6)

Aigio, Athens, Ilion, Ioannina, Petroupoli, Piraeus

INDIA (2)

Yamunanagar (2)

ITALY (2)

Bologna, Merlara

ROMANIA (2)

Busteni, Râmnicu Vâlcea

SPAIN (1)

Úbeda

TUNISIA (1)


Mohammedia

Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Aigio	Greece	1st High School of Aigio	38.252	22.079
	Alta Gracia	Argentina	Fundación Caminos de Anisacate	-31.659	-64.417
	Athens	Greece	Experimental College Agion Anargyron	38.027	23.726
	Bologna	Italy	IC9 "il Guercino"	44.468	11.384
	Brštanovo	Croatia	Osnovna škola kneza Branimira	43.658	16.415
	Busteni	Romania	Colegiul Ion Kalinderu	45.416	25.535
	Chivilcoy	Argentina	Parque Cielos del Sur	-34.911	-60.014
	Donji Muć	Croatia	oš kneza Branimira	43.694	16.462
	Guarne	Colombia	Grupo Astrofanáticos	6.274	-75.449
	Ilion	Greece	11th JuniorHigh School of Ilion	38.033	23.697
	Ioannina	Greece	Experimental College	39.666	20.845
	Lafrançaise	France	Collège Antonin Perbosc	44.127	1.237
	Merlara	Italy	Lower Secondary School "Dante Alighieri"	45.166	11.433
	Mohammedia	Tunisia	Lycée M'hamdia	36.678	10.152
	Pergamino	Argentina	Plaza 9 de Julio	-33.895	-60.566
	Petroupoli	Greece	4o Junior High School	38.036	23.674
	Piraeus	Greece	2nd Junior High School of Korydallos	37.977	23.655
	Piranguinho	Brazil	Universidade Federal de Itajubá	-22.411	-45.535
	Râmnicu Vâlcea	Romania	S.G. Nr4 Gradinita Dumbrava Minuata	45.093	24.358
	Rio de Janeiro	Brazil	Centro Educacional Nosso Mundo	-22.890	-43.317
	Rio Cuarto	Argentina	Colegio Concordia	-33.149	-64.351
	Úbeda	Spain	Colegio Salesiano Santo Domingo Savio	38.017	-3.367
	Yamunanagar Damla	India	GSSS Damla	30.087	77.240
	Yamunanagar	India	DIE&T Tejli	30.134	77.310

# Aigio, Greece

December 2017

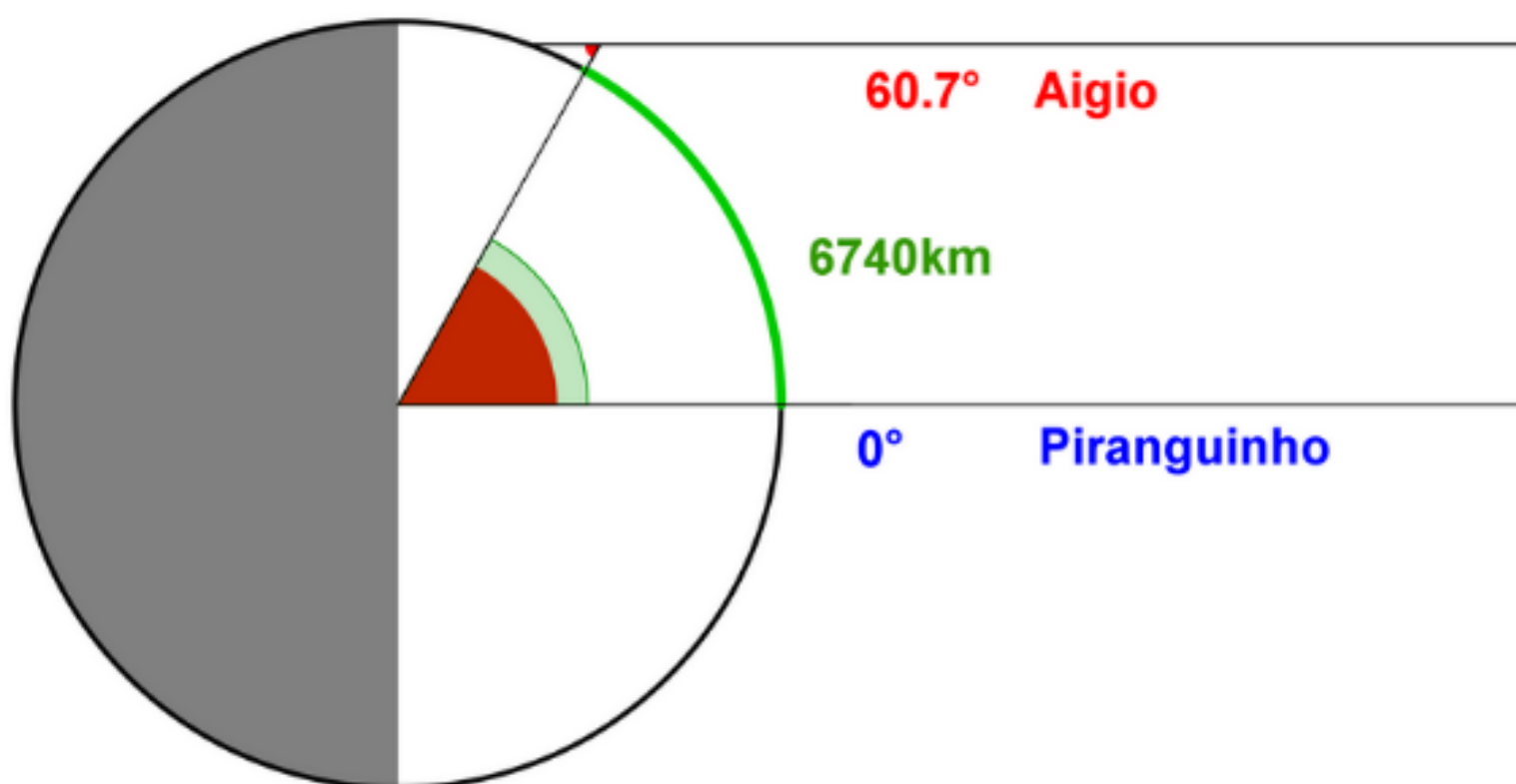


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Aigio	Greece	1st High School of Aigio	38.252	22.079

Date	Gnomon	Shadow	Angle
05 December	50 cm	89 cm	60.7 °
06 December	50 cm	90 cm	60.9 °

**05/12/2017 (Aigio-Greece) Latitude: 38.252°**

**05/12/2017 (Piranguinho-Brasil) Latitude: -22.411°**



$$\text{circumference} = \frac{360^\circ \times 6740\text{km}}{60.7^\circ + 0^\circ} = 39974 \text{ km}$$





# Alta Gracia, Argentina

December 2017

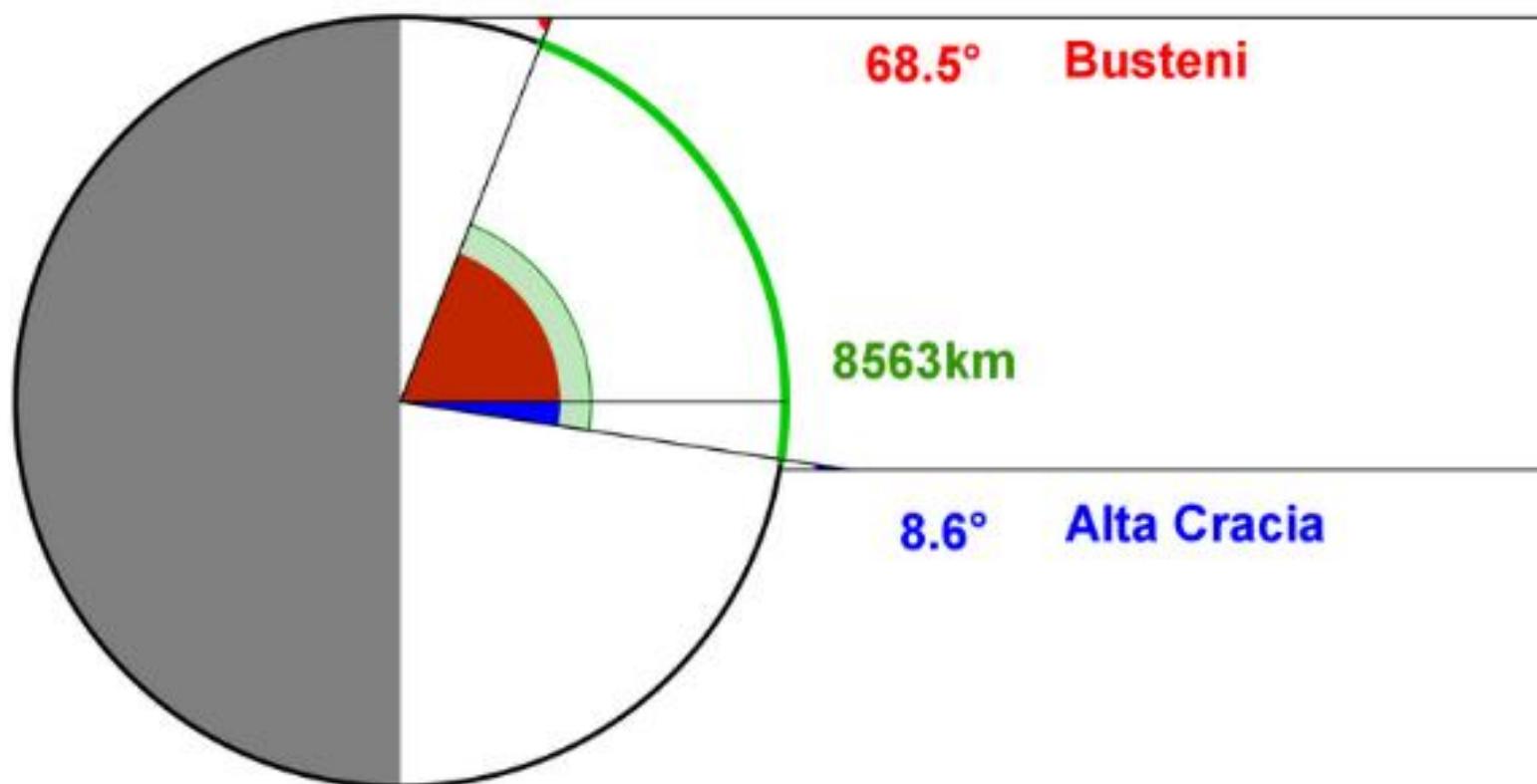


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Alta Gracia	Argentina	Fundación Caminos de Anisacate	-31.659	-64.417

Date	Gnomon	Shadow	Angle
07 December	39 cm	-5.9 cm	-8.6 °
08 December	39 cm	-5.7 cm	-8.3 °
10 December	75 cm	-11.3 cm	-8.6 °
11 December	75 cm	-11.3 cm	-8.6 °
13 December	75 cm	-11 cm	-8.3 °
14 December	75 cm	-10.5 cm	-8 °
15 December	75 cm	-10.5 cm	-8 °
18 December	75 cm	-10.5 cm	-8 °
20 December	75 cm	-10.4 cm	-7.9 °

**11/12/2017 (Busteni-Romania) Latitude: 45.416°**

**11/12/2017 (Alta Gracia-Argentina) Latitude: -31.659°**



$$\text{circumference} = \frac{360^\circ \times 8563\text{km}}{68.5^\circ + 8.6^\circ} = 39983 \text{ km}$$







# Athens, Greece

December 2017

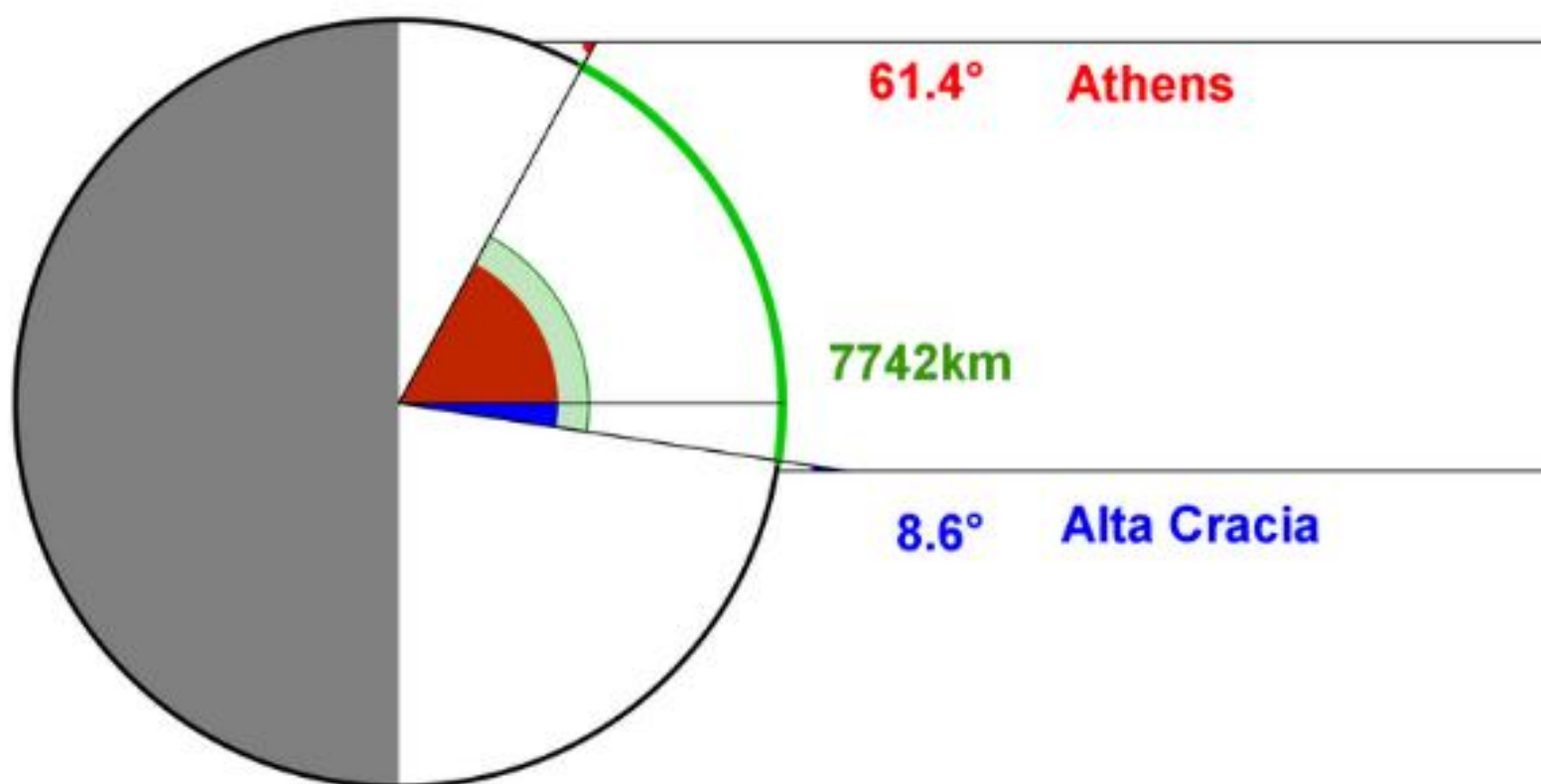


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Athens	Greece	Experimental College Agion Anargyron	38.027	23.726

Date	Gnomon	Shadow	Angle
01 December	22 cm	37 cm	66.1 °
11 December	49 cm	90 cm	62.9 °

11/12/2017 (Athens-Greece) Latitude: 38.027°

11/12/2017 (Alta Cracia-Argentina) Latitude: -31.659°



$$\text{circumference} = \frac{360^\circ \times 7742\text{km}}{61.4^\circ + 8.6^\circ} = 39816 \text{ km}$$





# Bologna, Italy

December 2017

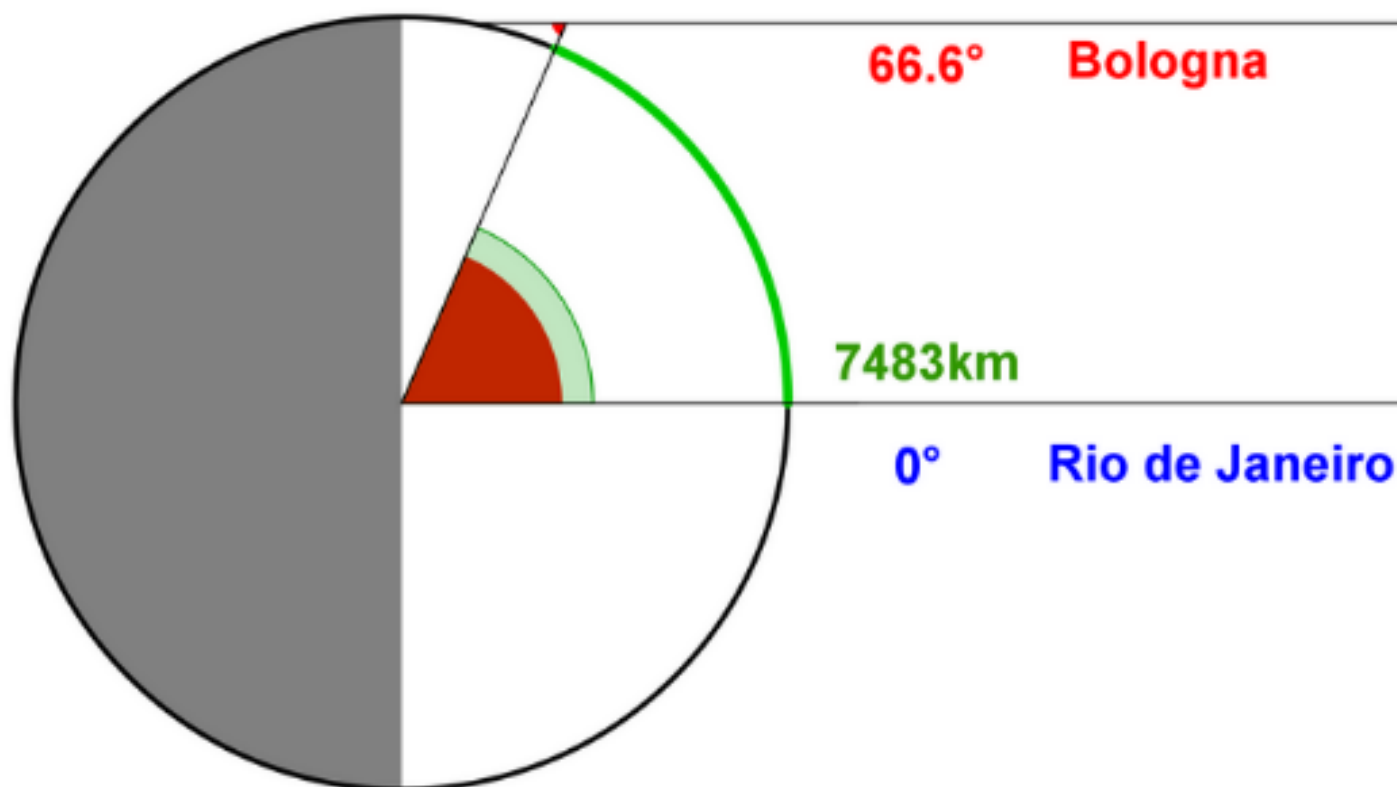


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Bologna	Italy	IC9 "il Guercino"	44.468	11.384

Date	Gnomon	Shadow	Angle
21 December	100 cm	231 cm	66.6 °

**21/12/2017 (Bologna-Italy) Latitude: 44.468°**

**21/12/2017 (Rio de Janeiro-Brazil) Latitude: -22.89°**



$$\text{circumference} = \frac{360^\circ \times 7483\text{km}}{66.6^\circ + 0^\circ} = 40449 \text{ km}$$







# Brštanovo, Croatia

December 2017

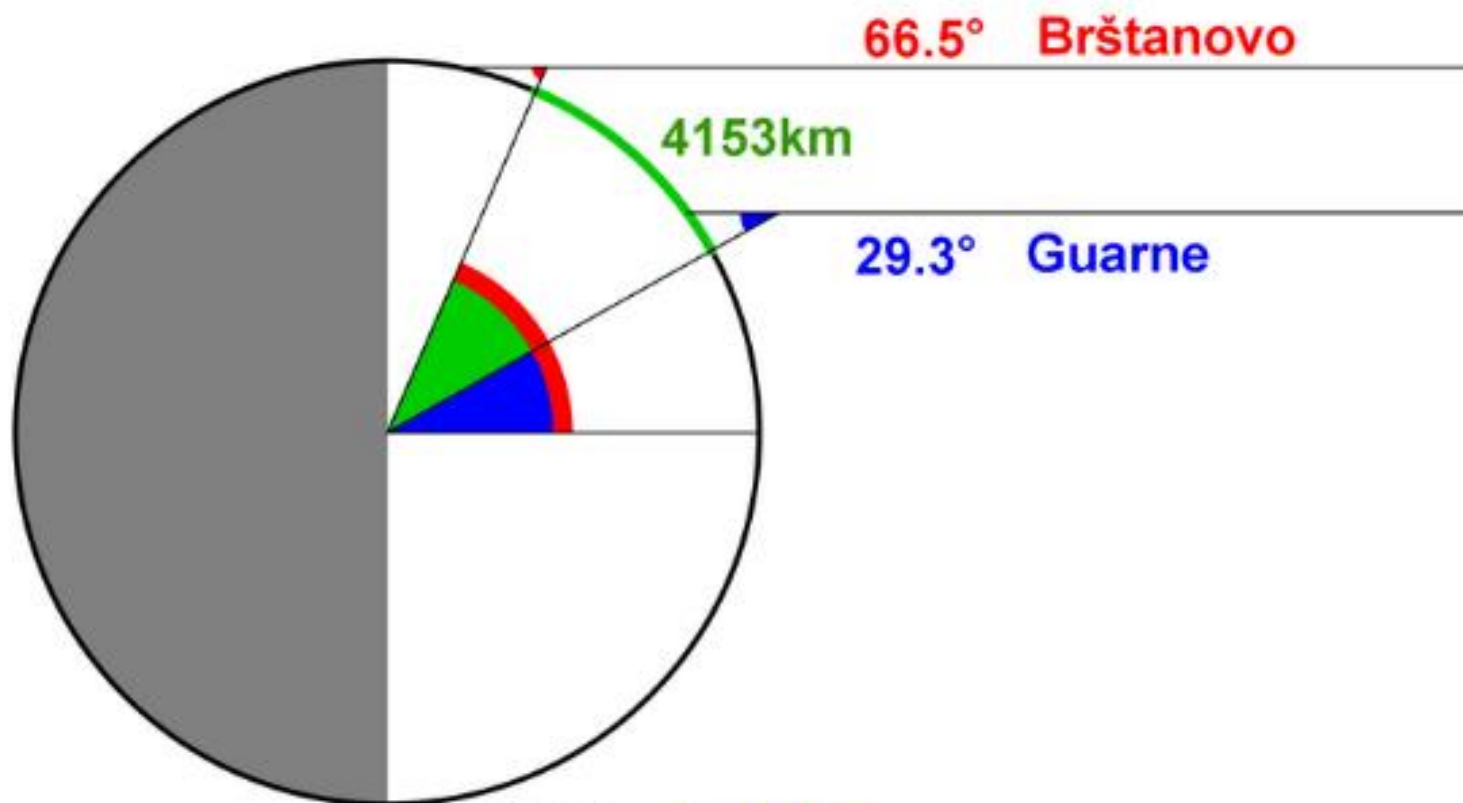


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Brštanovo	Croatia	Osnovna škola kneza Branimira	43.658	16.415

Date	Gnomon	Shadow	Angle
04 December	100 cm	229 cm	66.4 °
05 December	100 cm	229.5 cm	66.5 °
06 December	100 cm	233.5 cm	66.8 °

05/12/2017 (Brštanovo-Croatia) Latitude: 43.658°

05/12/2017 (Guarne-Colombia) Latitude: 6.274°



$$\text{circumference} = \frac{360^\circ \times 4153\text{km}}{66.5^\circ - 29.3^\circ} = 40190 \text{ km}$$








# Busteni, Romania

December 2017

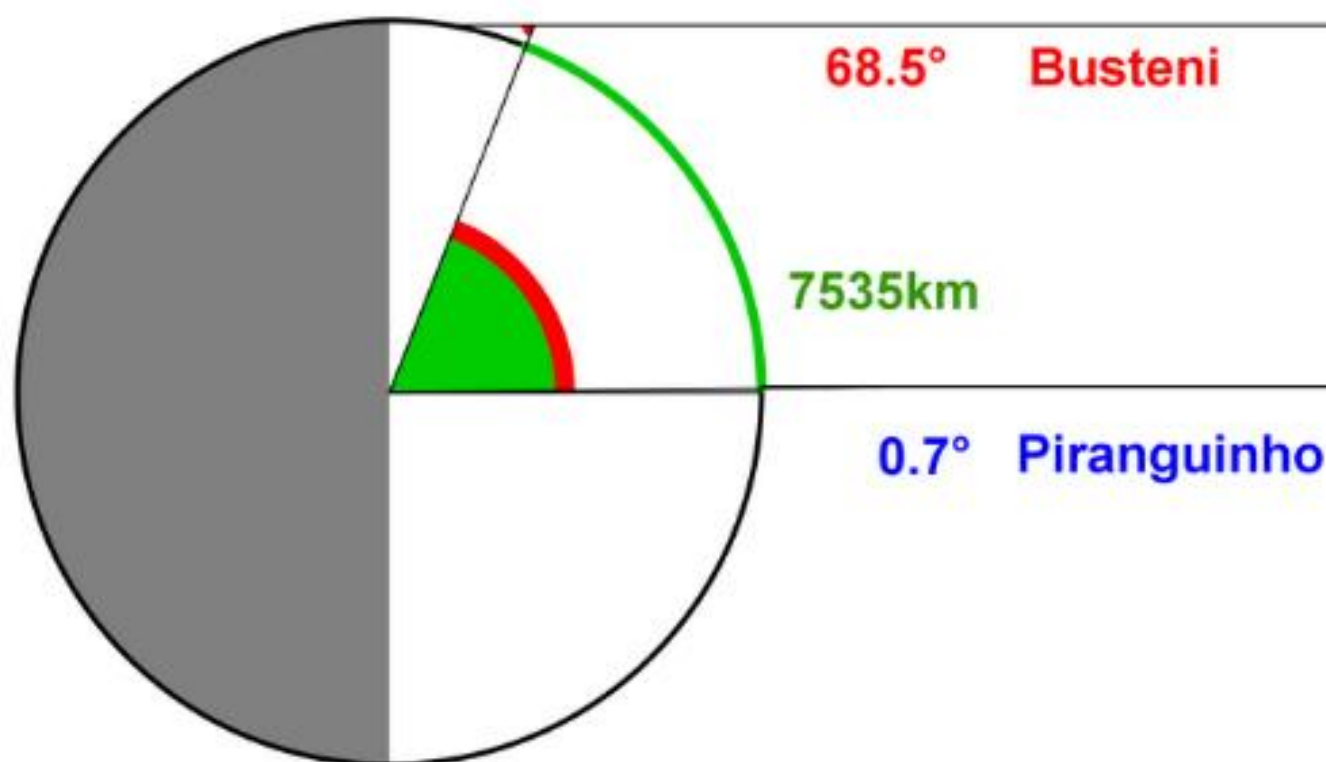


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Busteni	Romania	Colegiul Ion Kalinderu	45.416	25.535

Date	Gnomon	Shadow	Angle
07 December	68 cm	170 cm	68.1 °
08 December	62.2 cm	155 cm	68.1 °
11 December	15 cm	38 cm	68.5 °
12 December	11 cm	27.9 cm	68.5 °
14 December	23.5 cm	60 cm	68.6 °
21 December	19.3 cm	50 cm	68.9 °

**12/12/2017 (Busteni-Romania) Latitude: 45.414°**

**12/12/2017 (Piranguinho-Brazil) Latitude: -22.411°**



$$\text{circumference} = \frac{360^\circ \times 7535\text{km}}{68.5^\circ - 0.7^\circ} = 40009 \text{ km}$$








# Chivilcoy, Argentina

December 2017

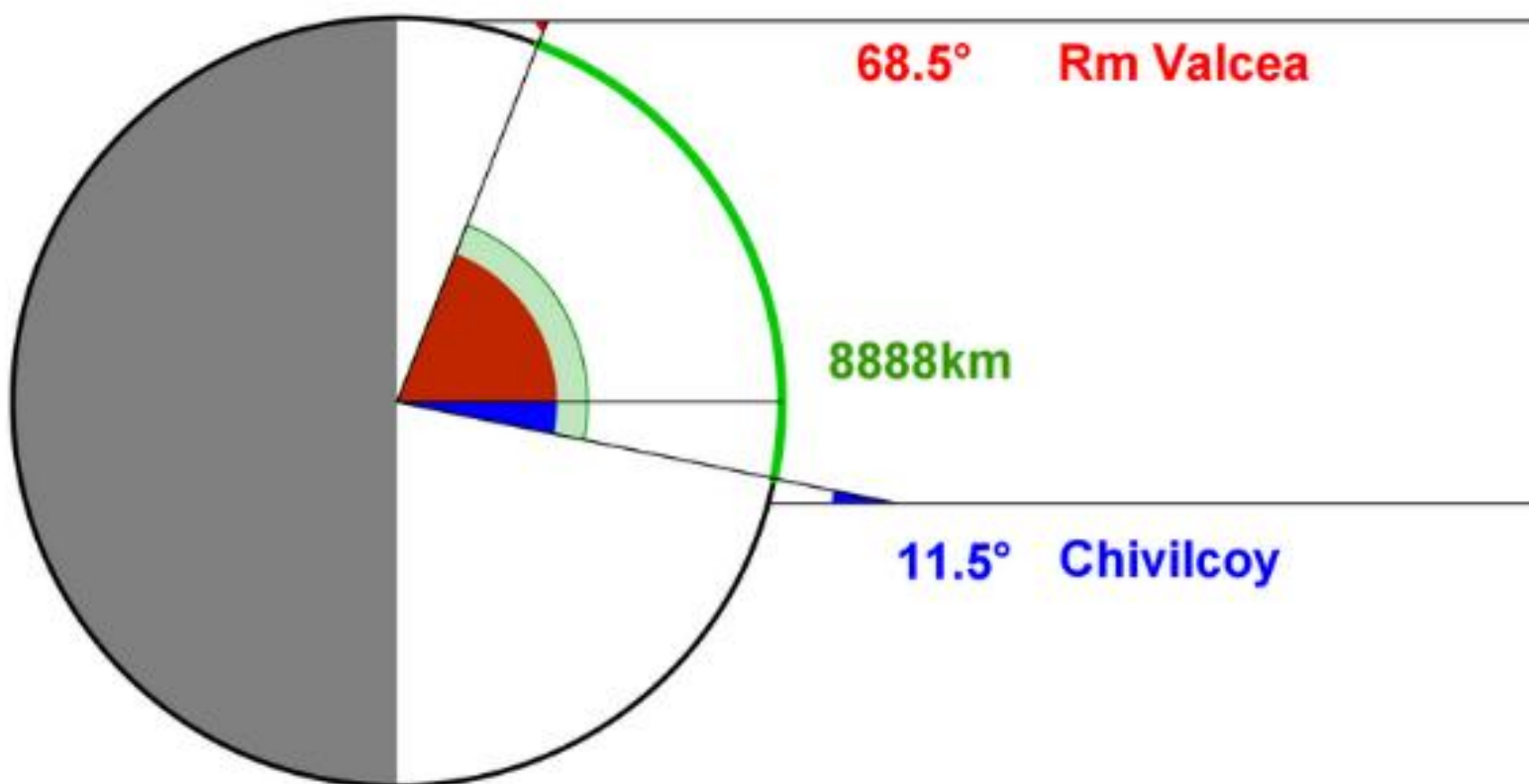


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Chivilcoy	Argentina	Parque Cielos del Sur	-34.911	-60.014

Date	Gnomon	Shadow	Angle
21 December	100 cm	-20.3 cm	-11.5 °

**21/12/2017 (Rm Valcea-Romania) Latitude: 45.093°**

**21/12/2017 (Chivilcoy-Argentina) Latitude: -34.911°**




$$\text{circumference} = \frac{360^\circ \times 8888\text{km}}{68.5^\circ + 11.5^\circ} = 39996 \text{ km}$$



# Donji Muc, Croatia

December 2017

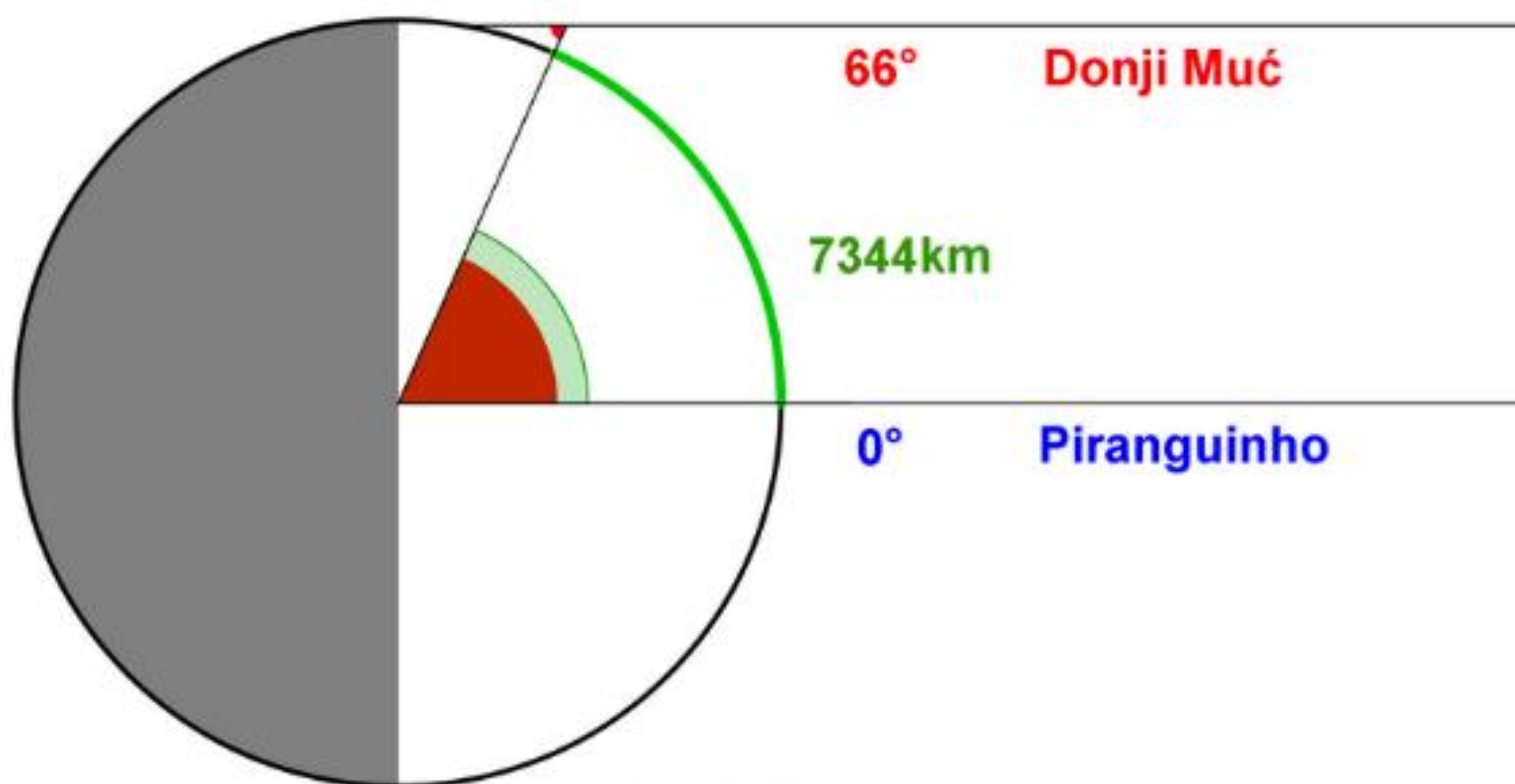


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Donji Muć	Croatia	oš kneza Branimira	43.694	16.462

Date	Gnomon	Shadow	Angle
05 December	100 cm	225 cm	66.0 °

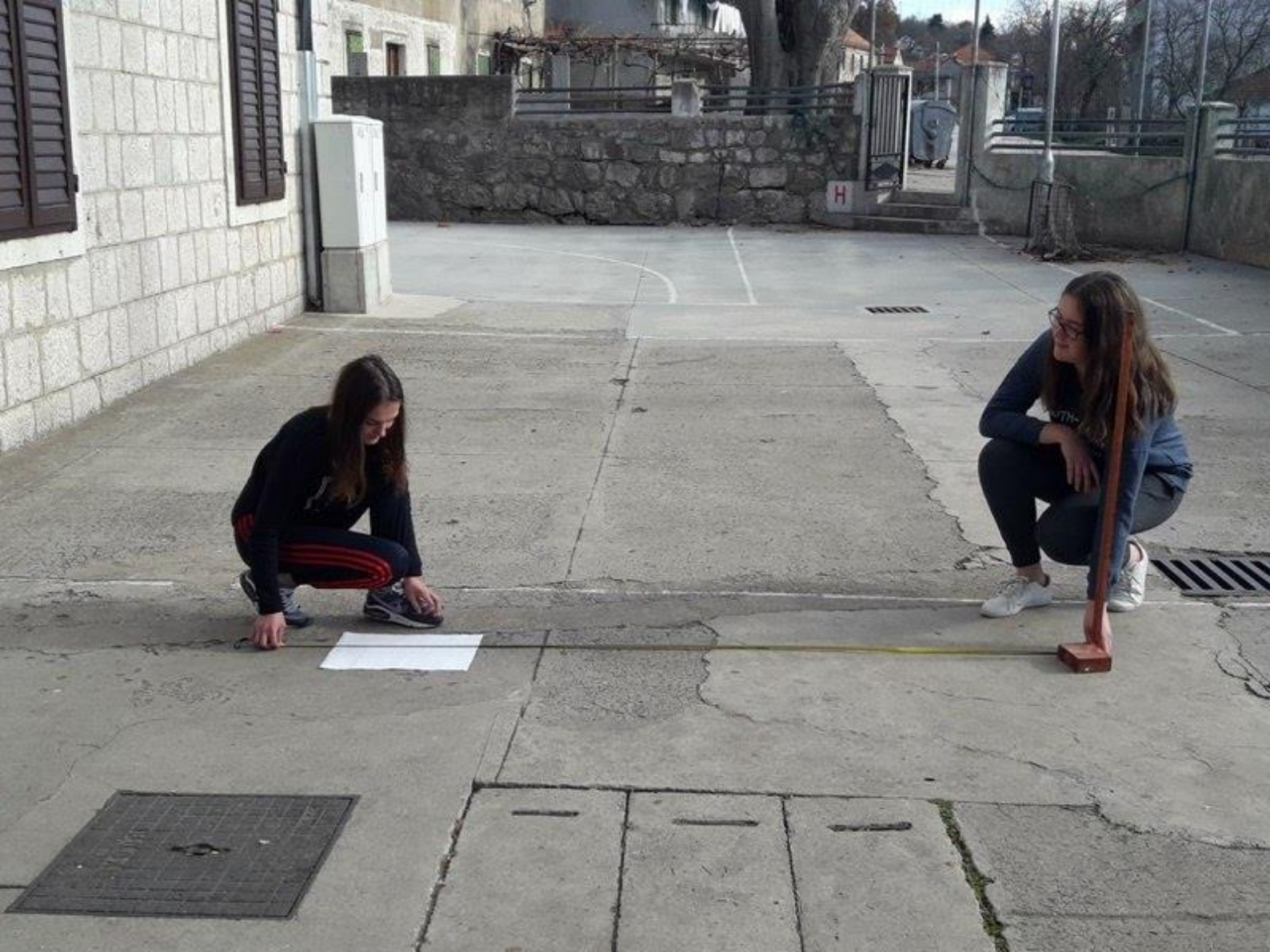
05/12/2017 (Donji Muć-Croatia) Latitude: 43.694°

05/12/2017 (Piranguinho-Brasil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 7344\text{km}}{66^\circ + 0^\circ} = 40058 \text{ km}$$







# Guarne, Colombia

December 2017

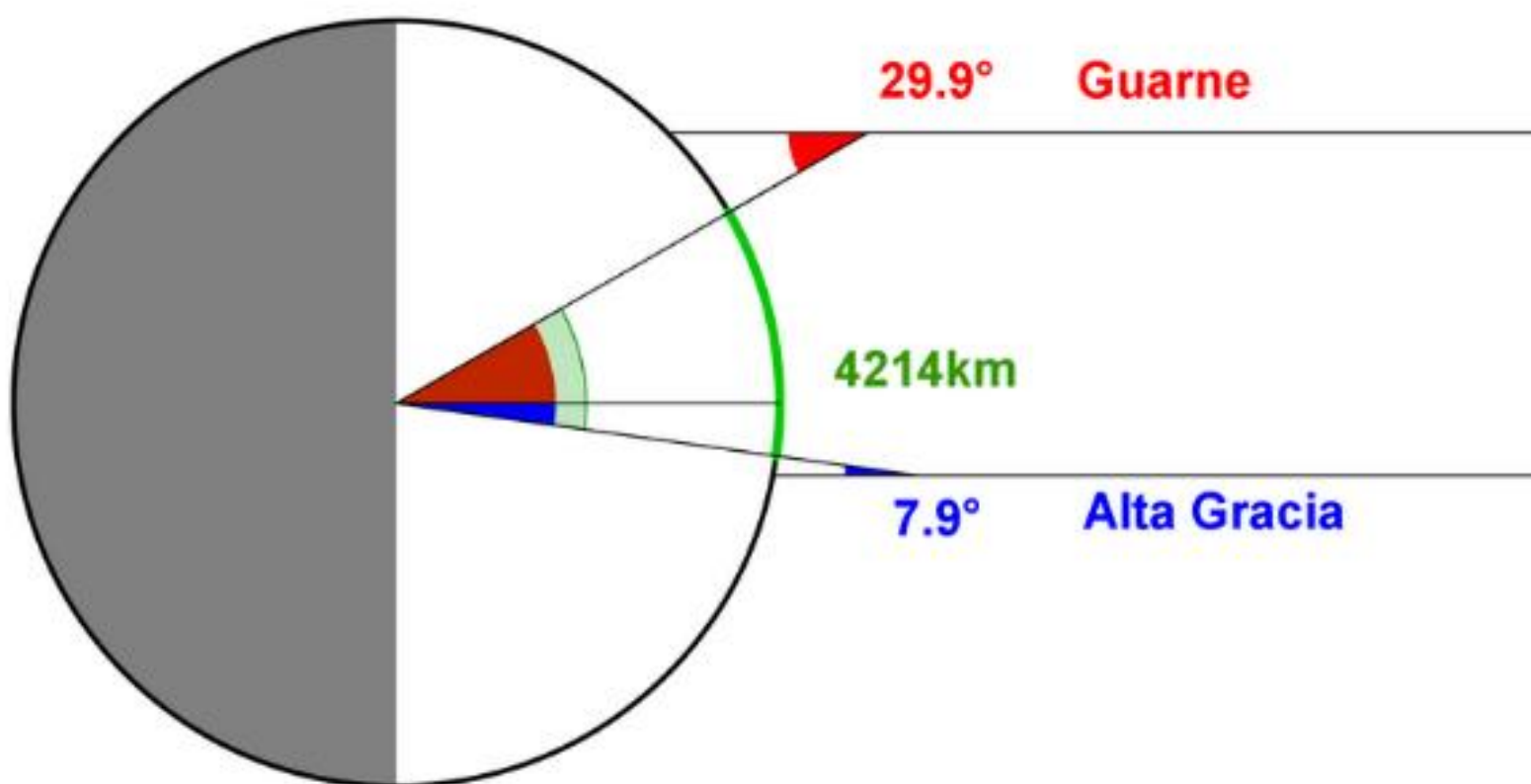


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Guarne	Colombia	Grupo Astrofanáticos	6.274	-75.449

Date	Gnomon	Shadow	Angle
05 December	65.3 cm	36.6 cm	29.3 °
14 December	65.3 cm	37.8 cm	30.1 °
20 December	65.3 cm	37.5 cm	29.9 °
22 December	65.3 cm	38.3 cm	30.4 °

**20/12/2017 (Guarne-Colombia) Latitude: 6.274°**

**20/12/2017 (Alta Gracia-Argentina) Latitude: -31.659°**



$$\text{circumference} = \frac{360^\circ \times 4214\text{km}}{29.9^\circ + 7.9^\circ} = 40133 \text{ km}$$







# Ilion, Greece

December 2017

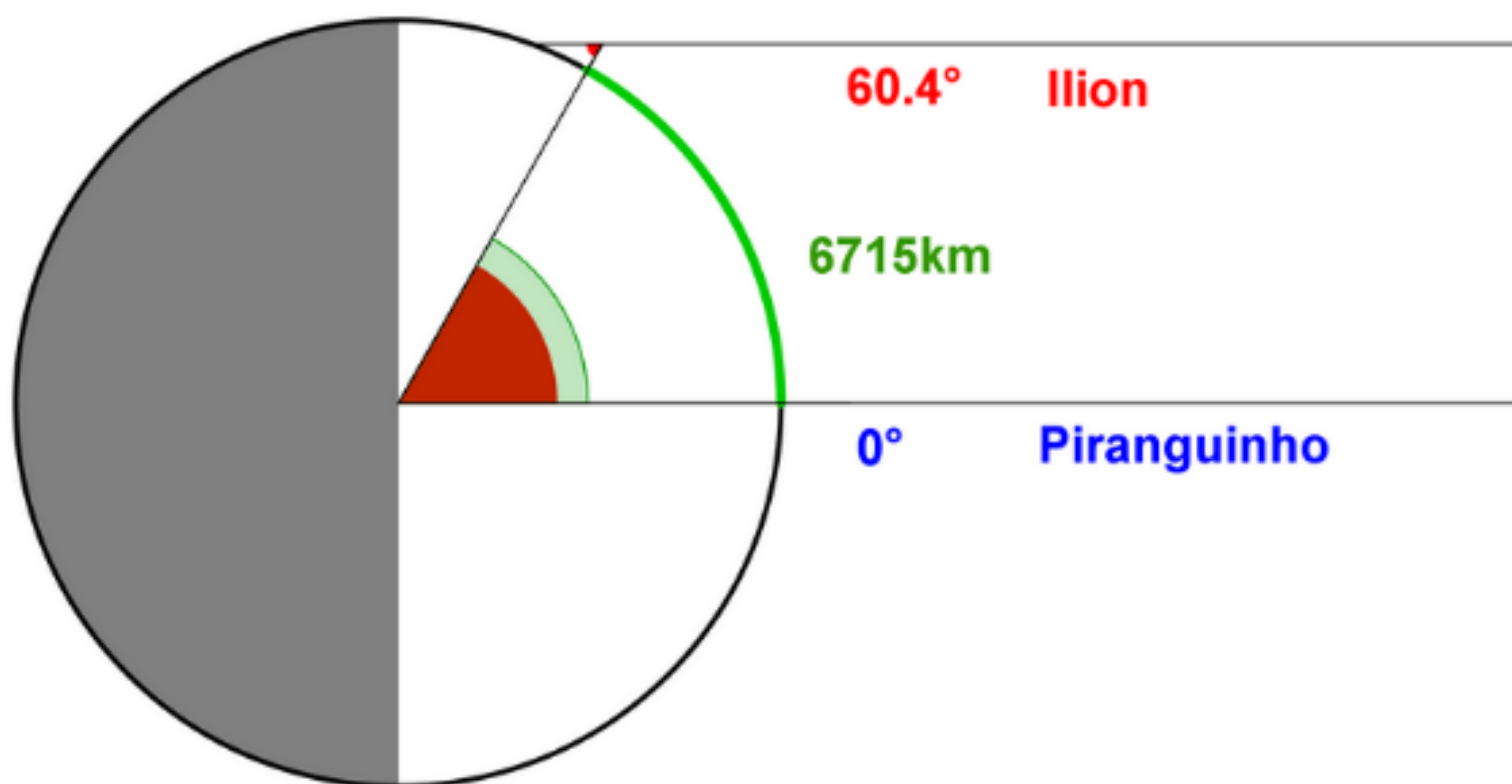


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Ilion	Greece	11th JuniorHigh School of Ilion	38.033	23.697

Date	Gnomon	Shadow	Angle
05 December	30.4 cm	53.5 cm	60.4 °
06 December	30.4 cm	54,5 cm	60.8 °
07 December	30.4 cm	55.8 cm	61.4 °
12 December	30.4 cm	55 cm	61,1 °
14 December	30.4 cm	55.2 cm	61.2 °
19 December	30.4 cm	55.8 cm	61.4 °

**05/12/2017 (Ilion-Greece) Latitude: 38.033°**

**05/12/2017 (Piranguinho-Brasil) Latitude: -22.411°**



$$\text{circumference} = \frac{360^\circ \times 6715\text{km}}{60.4^\circ + 0^\circ} = 40023 \text{ km}$$







# Ioannina, Greece

December 2017



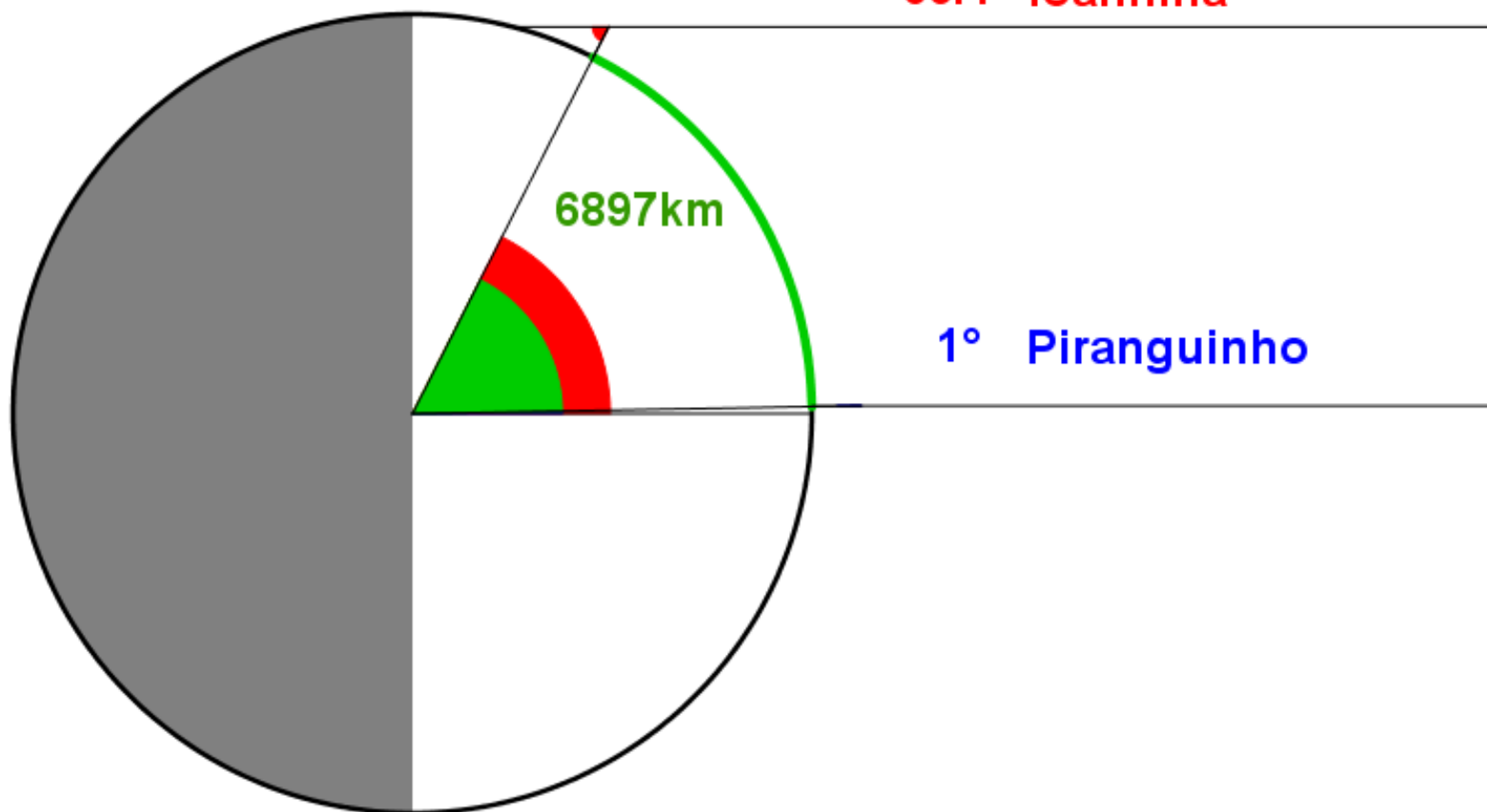
Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Ioannina	Greece	Experimental College	39.666	20.845

Date	Gnomon	Shadow	Angle
19 December	100 cm	197.3 cm	63.1 °
20 December	100 cm	197.3 cm	63.1 °

20/12/2017 (Ioannina-Greece) Latitude: 39.667°

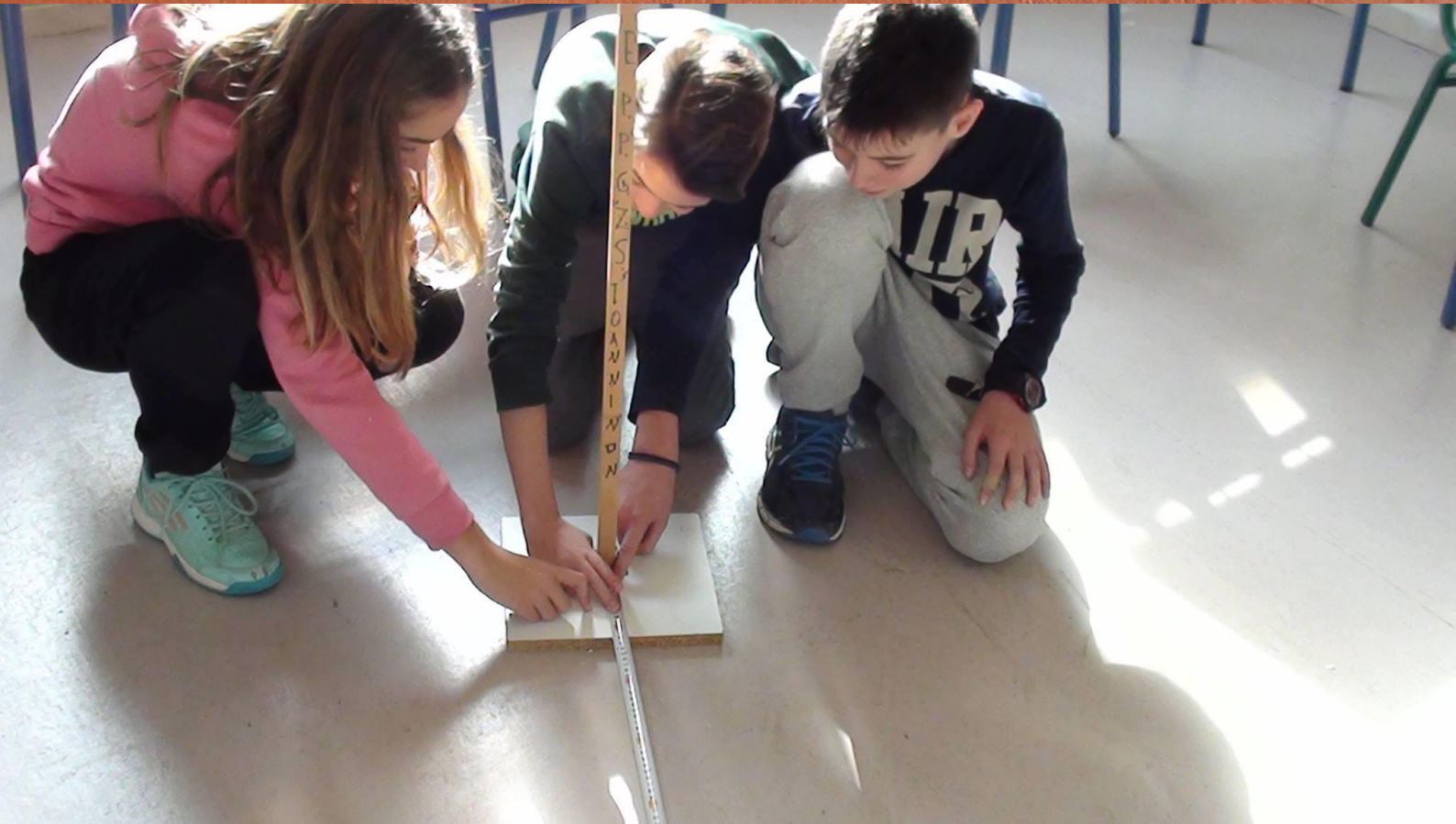
20/12/2017 (Piranguinho-Brazil) Latitude: -22.411°

63.1° Ioannina



$$\text{circumference} = \frac{360^\circ \times 6897\text{km}}{63.1^\circ - 1^\circ} = 39983 \text{ km}$$







# Lafrançaise, France

December 2017

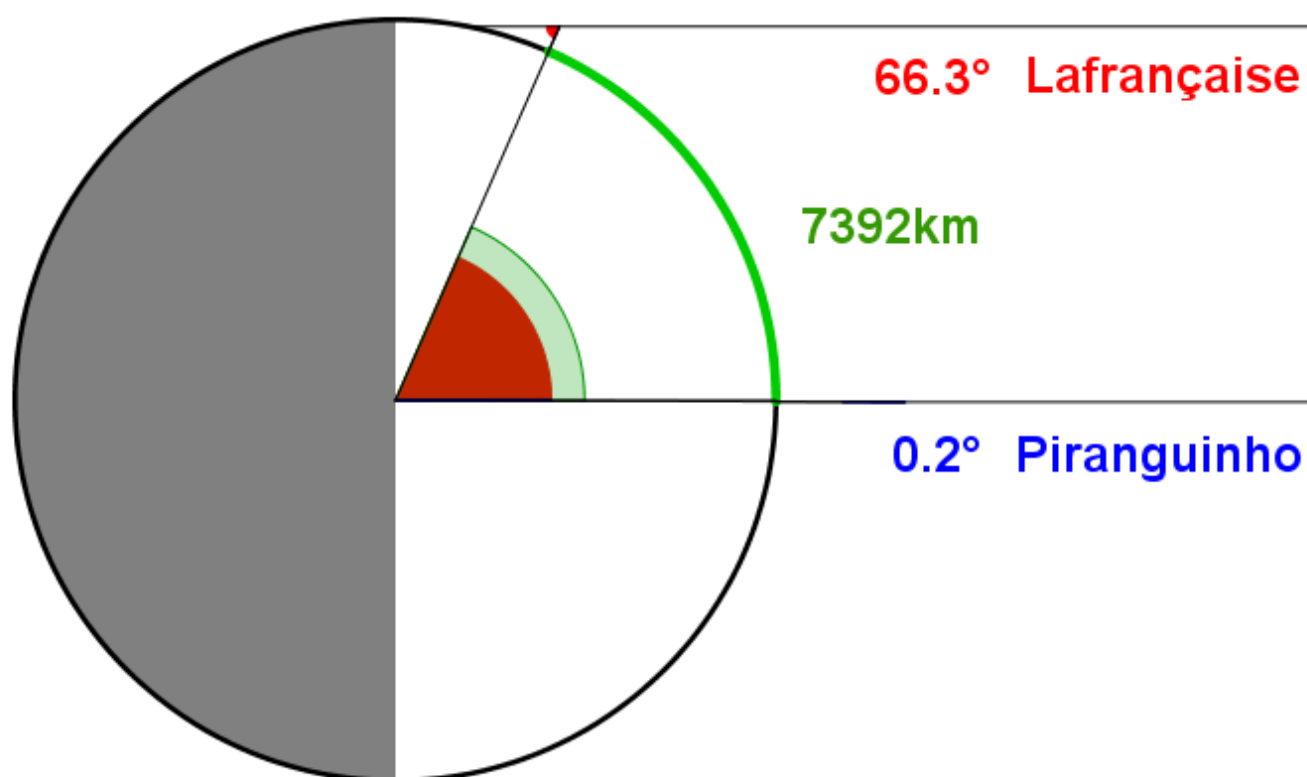


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Lafrançaise	France	Collège Antonin Perbosc	44.127	1.237

Date	Gnomon	Shadow	Angle
01 December	100 cm	222.5 cm	65.8 °
04 December	100 cm	227.5 cm	66.3 °
07 December	100 cm	230 cm	66.5 °
08 December	100 cm	233 cm	66.8 °
15 December	100 cm	240 cm	67.4 °

04/12/2017 (Lafrançaise-France) Latitude: 44.127°

04/12/2017 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 7392\text{km}}{66.3^\circ + 0.2^\circ} = 40017 \text{ km}$$





# Merlara, Italy

December 2017

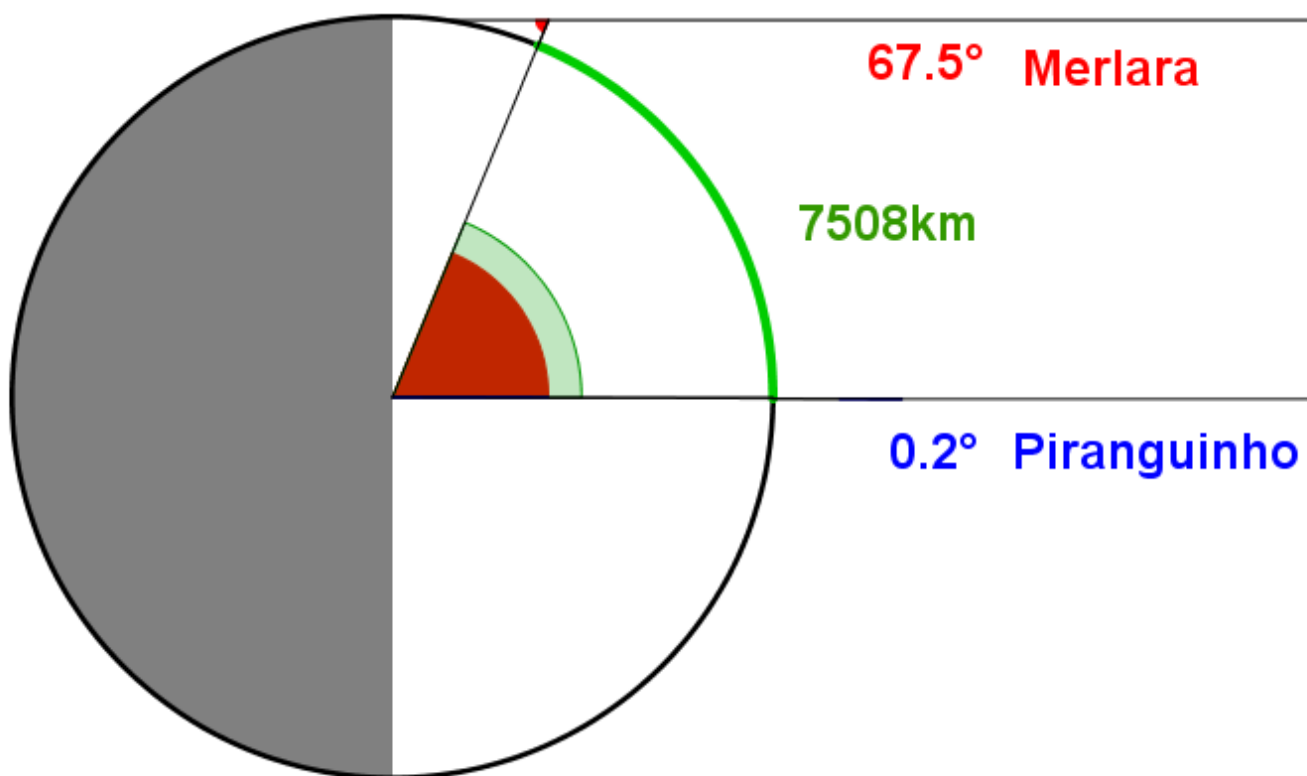


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Merlara	Italy	Lower Secondary School "Dante Alighieri"	45.166	11.433

Date	Gnomon	Shadow	Angle
01 December	100 cm	226 cm	66.1 °
04 December	100 cm	241 cm	67.5 °
21 December	100 cm	241 cm	67.5 °

04/12/2017 (Merlara-Italy) Latitude: 45.166°

04/12/2017 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 7508\text{km}}{67.5^\circ + 0.2^\circ} = 39924 \text{ km}$$





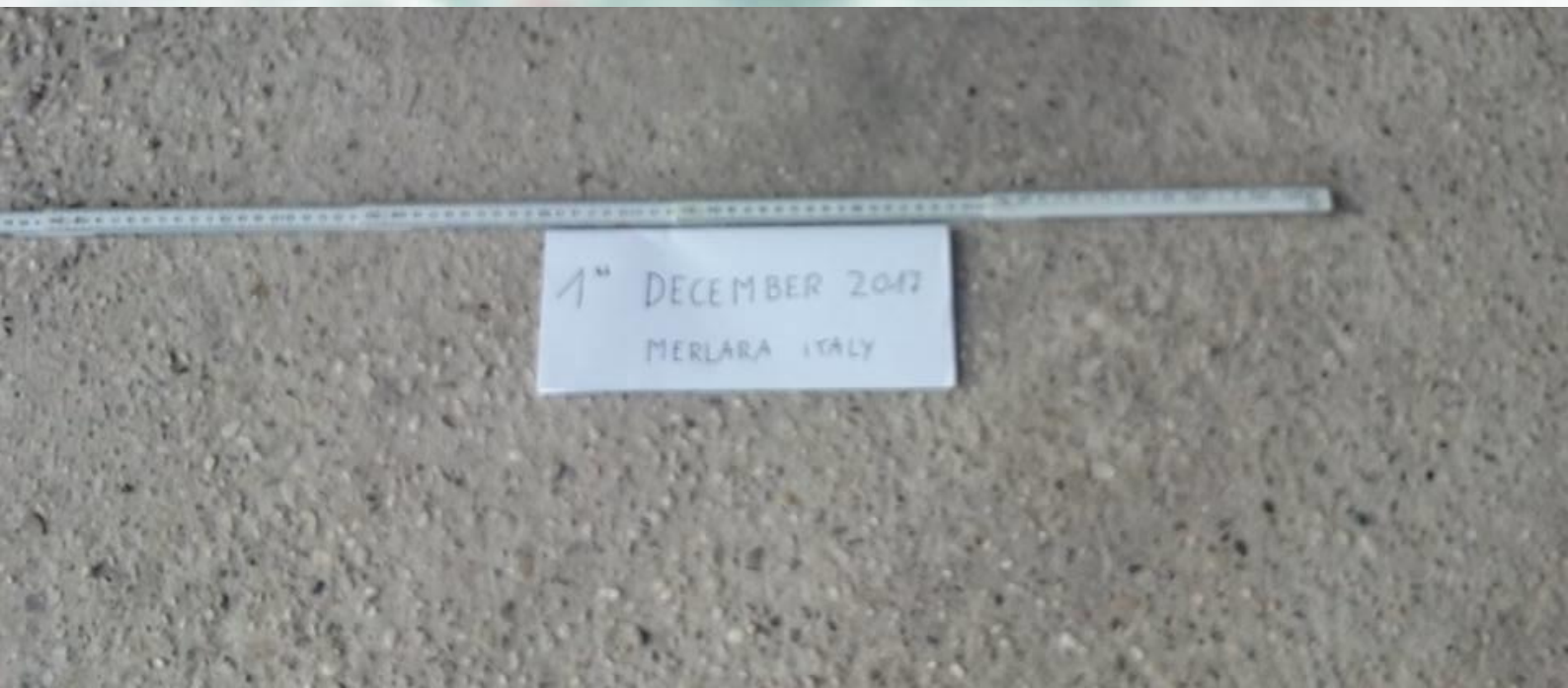
# Buon primo giorno



Merlara, Italy  
21th December 2017  
WINTER SOLSTICE

45,166N 11,433E  
Gnomon 100cm  
shadow 241cm  
angle 67,5

# d'inverno!



1<sup>st</sup> DECEMBER 2017  
MERLARA ITALY

# Mohammedia, Tunisia

December 2017



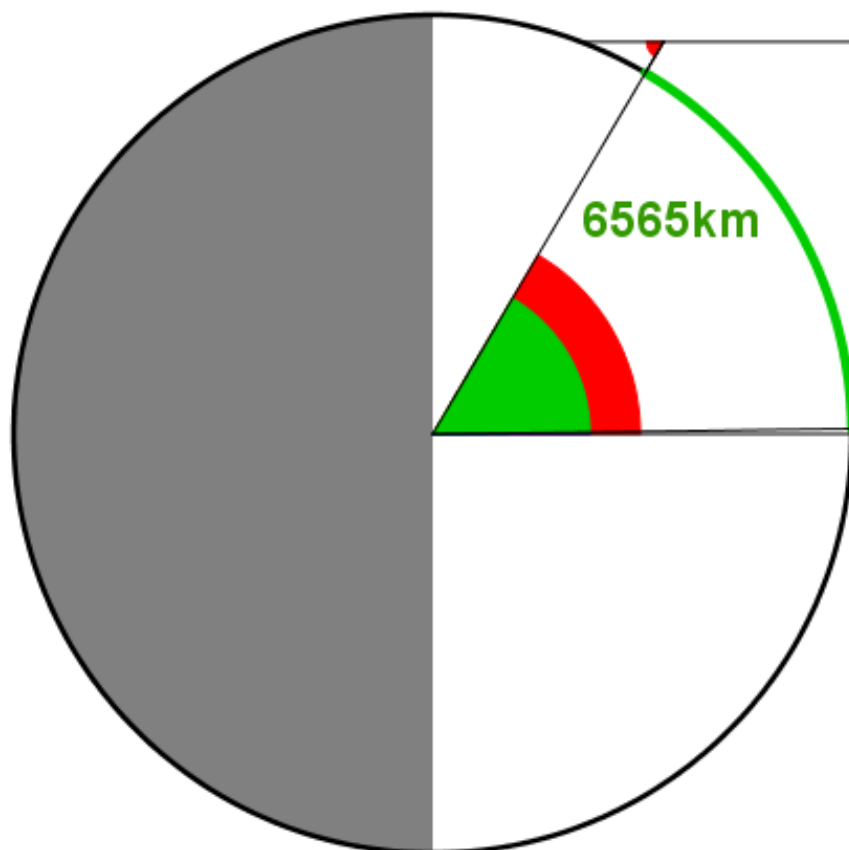
Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Mohammedia	Tunisia	Lycée M'hamdia	36.678	10.152

Date	Gnomon	Shadow	Angle
08 December	83 cm	141 cm	59.5 °

08/12/2017 (Mohammedia-Tunisia) Latitude: 36.678°

08/12/2017 (Piranguinho-Brazil) Latitude: -22.411°

**59.5° Mohammedia**



**0.7° Piranguinho**

$$\text{circumference} = \frac{360^\circ \times 6565\text{km}}{59.5^\circ - 0.7^\circ} = 40194 \text{ km}$$






# Pergamino, Argentina

December 2017

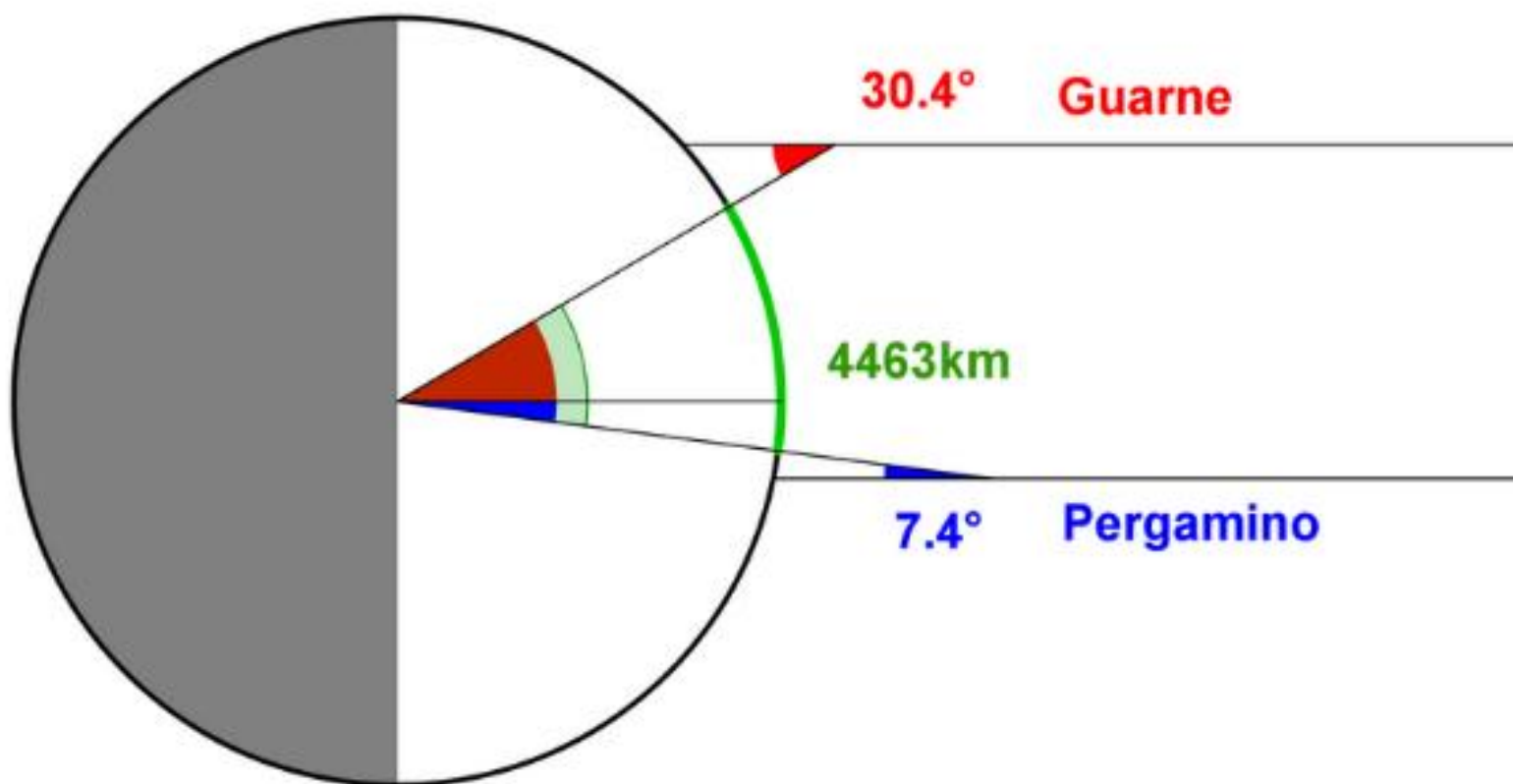


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Pergamino	Argentina	Plaza 9 de Julio	-33.895	-60.566

Date	Gnomon	Shadow	Angle
22 December	10 cm	-1.3 cm	-7.4 °

**22/12/2017 (Guarne-Colombia) Latitude: 6.274°**

**22/12/2017 (Pergamino-Argentina) Latitude: -33.895°**



$$\text{circumference} = \frac{360^\circ \times 4463\text{km}}{30.4^\circ + 7.4^\circ} = 42505 \text{ km}$$





# Petroupoli, Greece

December 2017

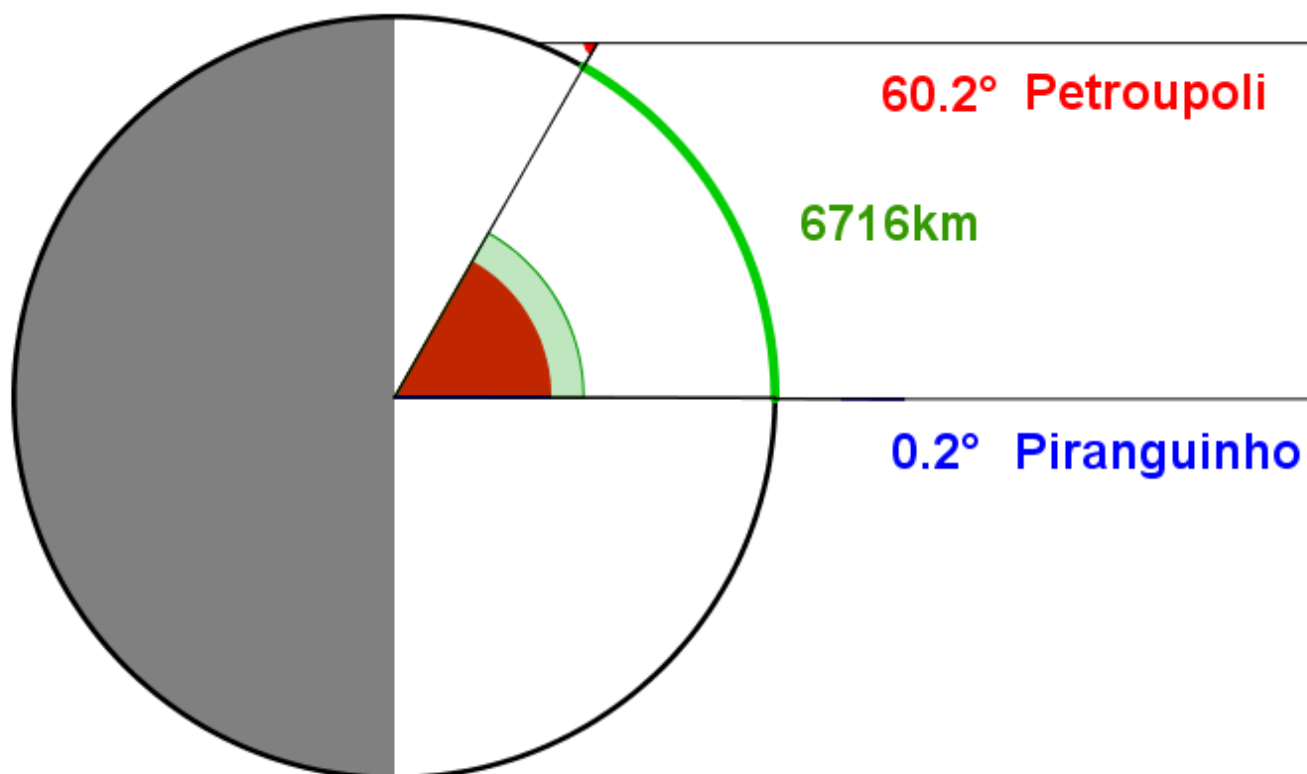


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Petroupoli	Greece	4o Junior High School	38.036	23.674

Date	Gnomon	Shadow	Angle
01 December	52.3 cm	91 cm	60.1 °
04 December	52.3 cm	91.3 cm	60.2 °
08 December	52.3 cm	93.5 cm	60.8 °
15 December	52.3 cm	95.5 cm	61.3 °
18 December	52.3 cm	96 cm	61.4 °

04/12/2017 (Petroupoli-Greece) Latitude: 38.036°

04/12/2017 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 6716\text{km}}{60.2^\circ + 0.2^\circ} = 40029 \text{ km}$$







# Piraeus, Greece

December 2017

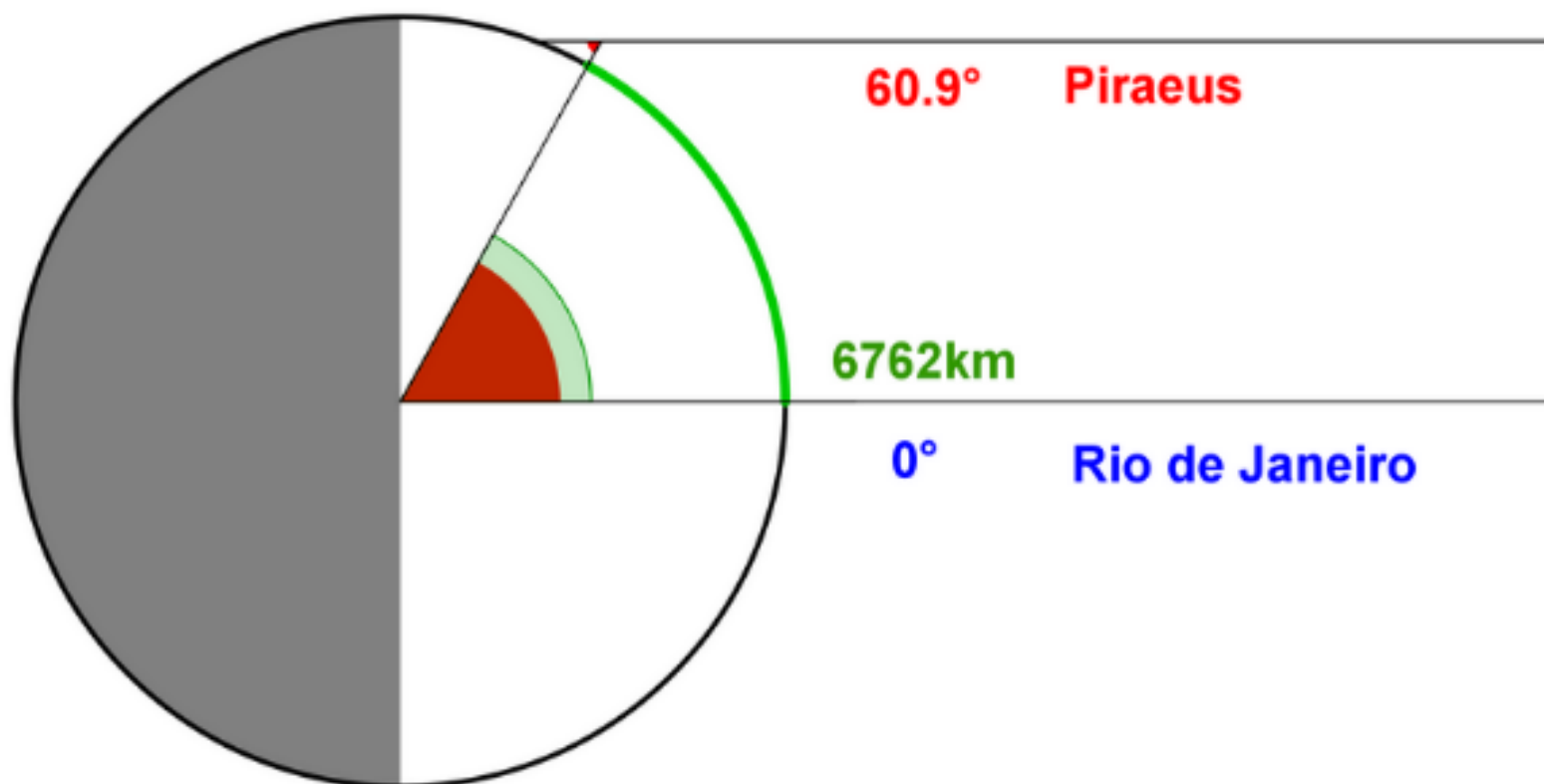


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Piraeus	Greece	2nd Junior High School of Korydallos	37.977	23.655

Date	Gnomon	Shadow	Angle
06 December	100 cm	171 cm	59.7 °
12 December	100 cm	178 cm	60.7 °
18 December	100 cm	180 cm	60.9 °

**18/12/2017 (Piraeus-Greece) Latitude: 37.977°**

**18/12/2017 (Rio de Janeiro-Brazil) Latitude: -22.89°**



$$\text{circumference} = \frac{360^\circ \times 6762\text{km}}{60.9^\circ + 0^\circ} = 39972 \text{ km}$$







# Piranguinho, Brazil

December 2017

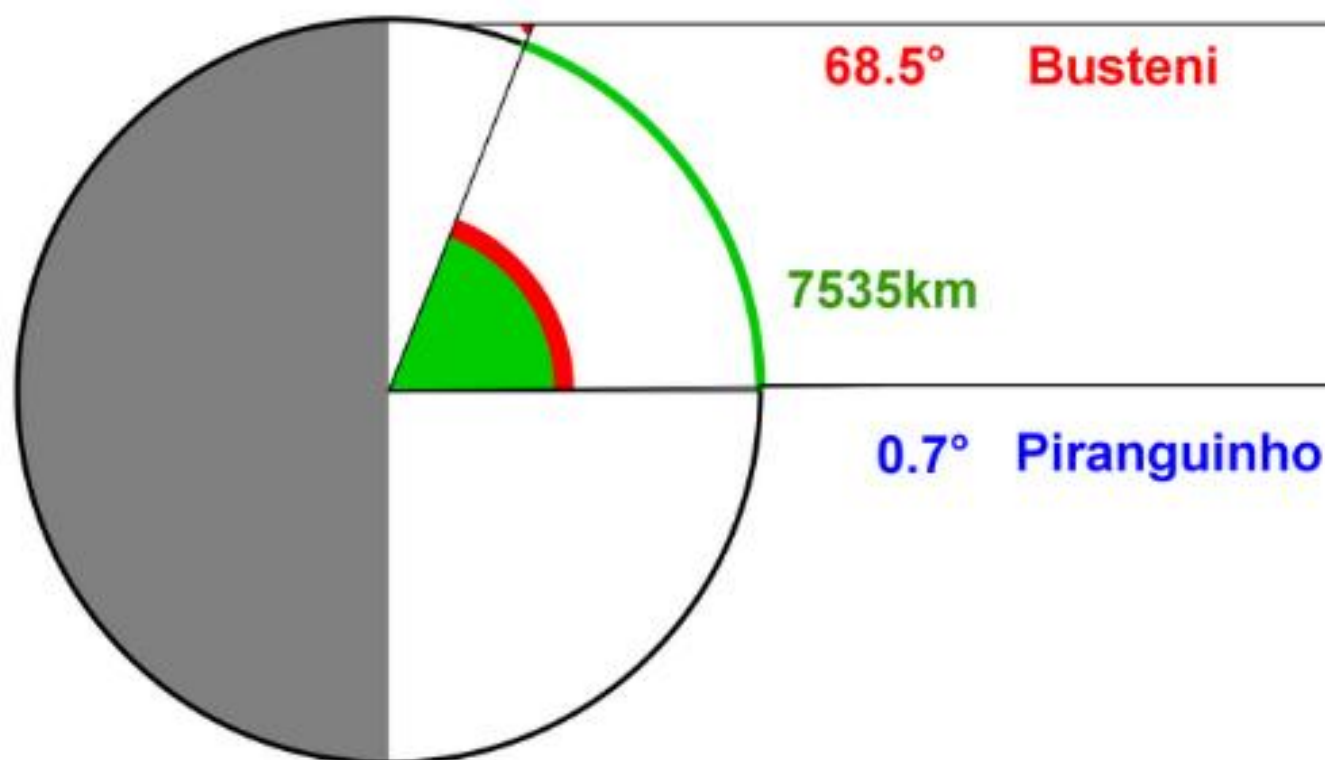


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Piranguinho	Brazil	Universidade Federal de Itajubá	-22.411	-45.535

Date	Gnomon	Shadow	Angle
04 December	70 cm	-0.2 cm	-0.2 °
05 December	70 cm	0 cm	0 °
08 December	70 cm	0.9 cm	0.7 °
09 December	70 cm	1 cm	0.8 °
12 December	70 cm	0.9 cm	0.7 °
14 December	70 cm	1.2 cm	1 °
19 December	70 cm	1.1 cm	0.9 °
20 December	70 cm	1.2 cm	0.8 °
26 December	70 cm	1.3 cm	1.1 °
27 December	70 cm	1.1 cm	0.9 °

**12/12/2017 (Busteni-Romania) Latitude: 45.414°**

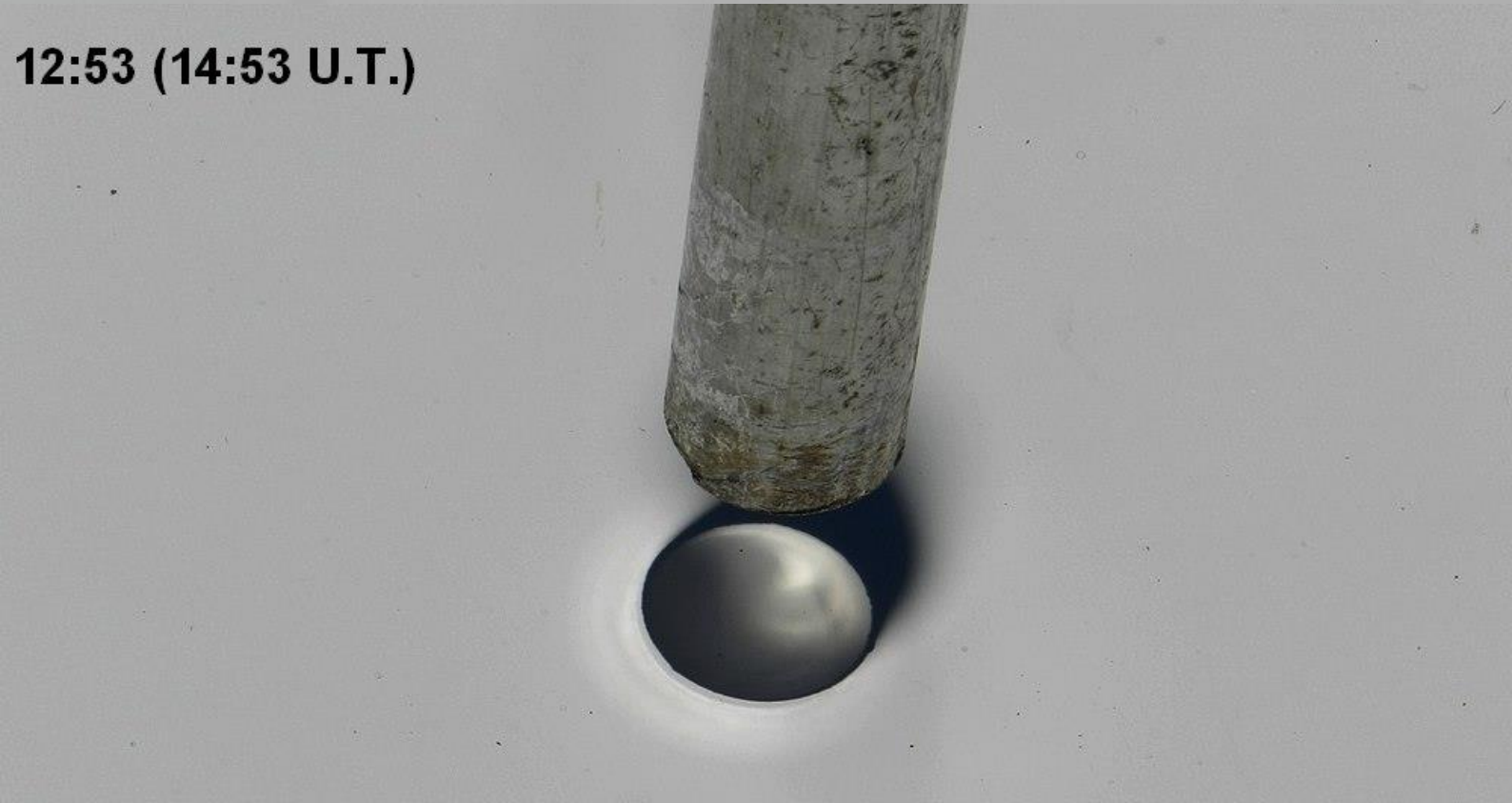
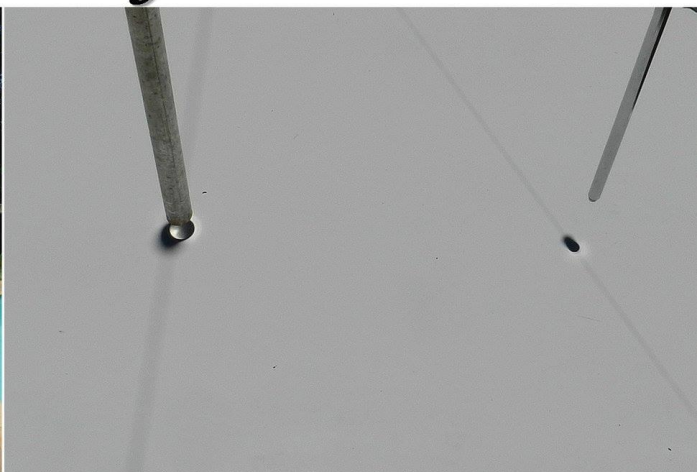
**12/12/2017 (Piranguinho-Brazil) Latitude: -22.411°**



$$\text{circumference} = \frac{360^\circ \times 7535\text{km}}{68.5^\circ - 0.7^\circ} = 40009 \text{ km}$$



***Dia sem Sombra e com Sol à pino em Piranguinho!!!  
"No Shadow" day in Piranguinho!!!***



# Râmnicu Vâlcea, Romania

December 2017

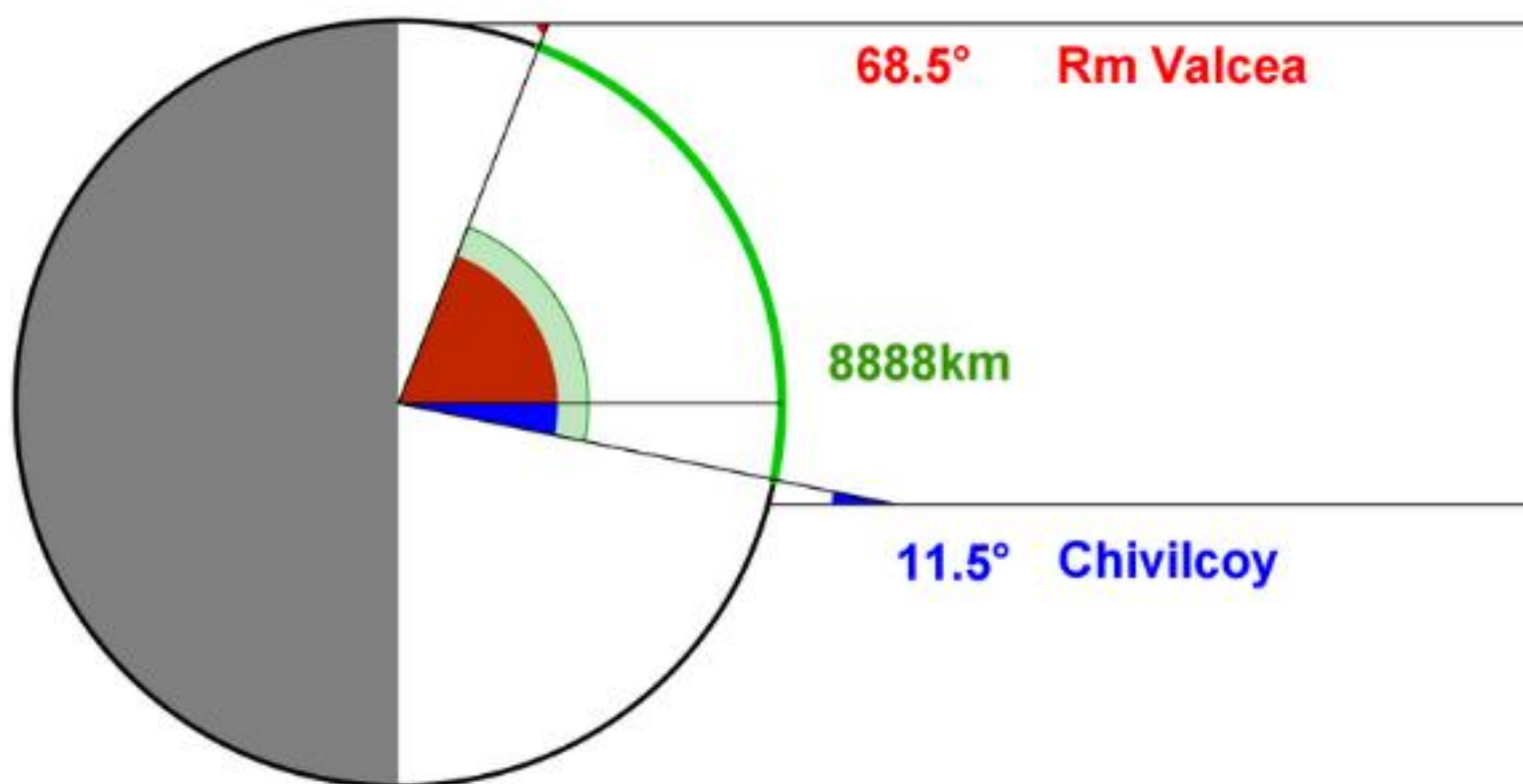


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Râmnicu Vâlcea	Romania	S.G. Nr4 Gradinita Dumbrava Minuata	45.093	24.358

Date	Gnomon	Shadow	Angle
21 December	30 cm	76.2 cm	68.5 °

21/12/2017 (Rm Valcea-Romania) Latitude: 45.093°

21/12/2017 (Chivilcoy-Argentina) Latitude: -34.911°



$$\text{circumference} = \frac{360^\circ \times 8888\text{km}}{68.5^\circ + 11.5^\circ} = 39996 \text{ km}$$





# Rio Cuarto Concordia, Argentina

December 2017

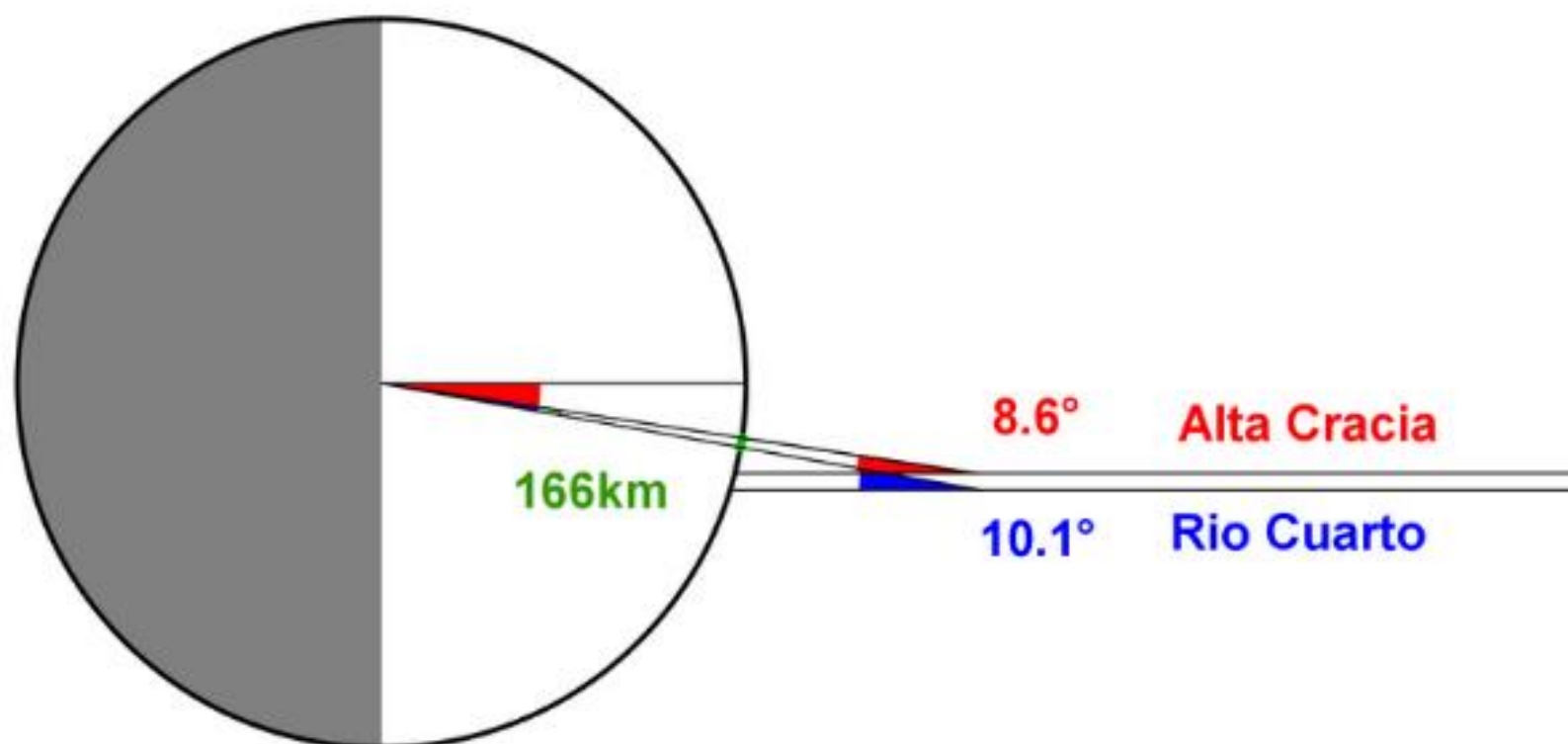


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Rio Cuarto	Argentina	Colegio Concordia	-33.149	-64.351

Date	Gnomon	Shadow	Angle
07 December	53.5 cm	-9.5 cm	-10.1 °
14 December	53.5 cm	-8.5 cm	-9 °

07/12/2017 (Alta Cracia-Argentina) Latitude: -31.659°

07/12/2017 (Rio Cuarto-Argentina) Latitude: -33.149°



$$\text{circumference} = \frac{360^\circ \times 166\text{km}}{10.1^\circ - 8.6^\circ} = 39840 \text{ km}$$








# Rio de Janeiro CENOM, Brazil

December 2017

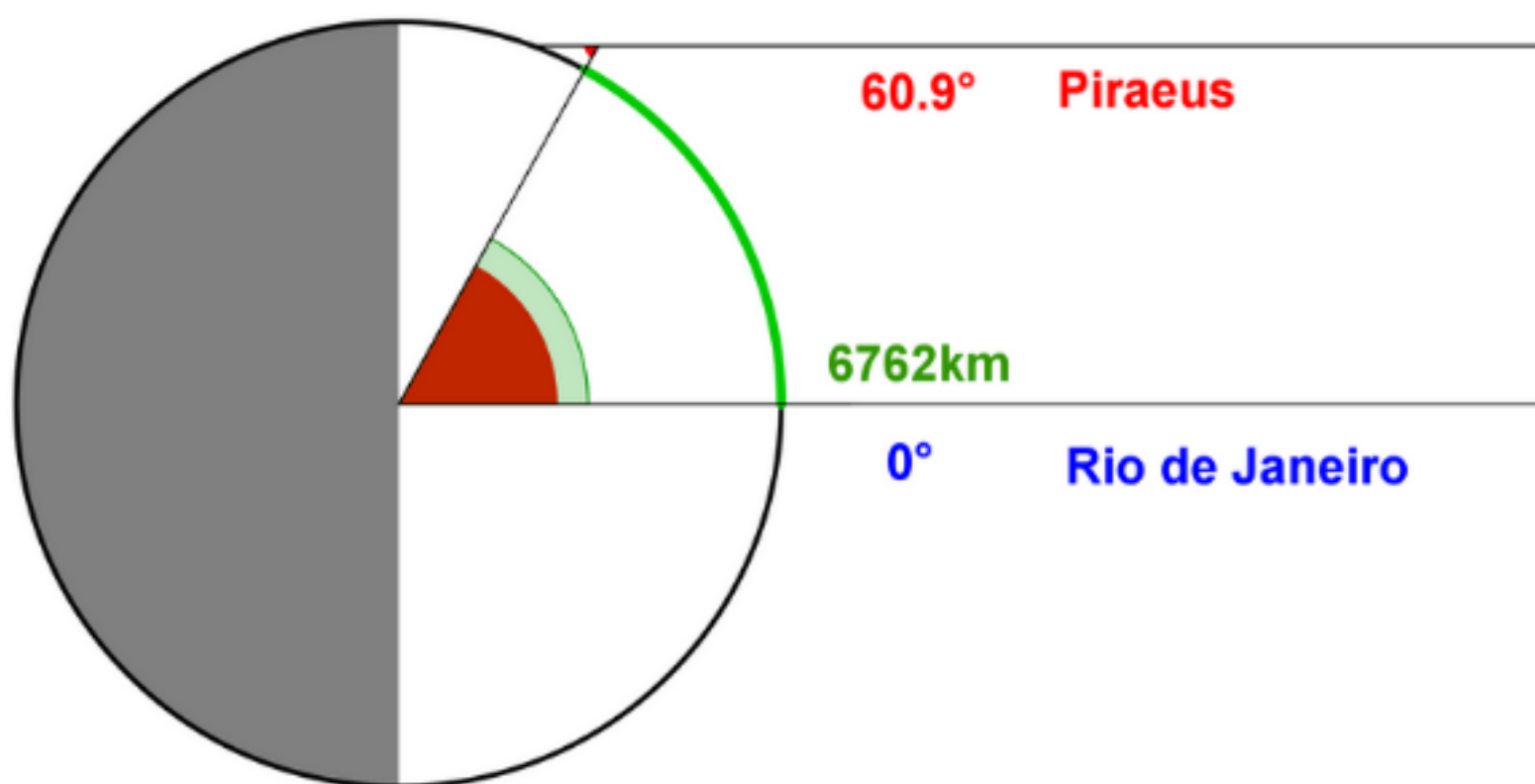


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Rio de Janeiro	Brazil	Centro Educacional Nosso Mundo	-22.890	-43.317

Date	Gnomon	Shadow	Angle
06 December	100 cm	-8 cm	-4.6 °
18 December	100 cm	0 cm	0 °
20 December	100 cm	0 cm	0 °
21 December	100 cm	0 cm	0 °

**18/12/2017 (Piraeus-Greece) Latitude: 37.977°**

**18/12/2017 (Rio de Janeiro-Brazil) Latitude: -22.89°**



$$\text{circumference} = \frac{360^\circ \times 6762\text{km}}{60.9^\circ + 0^\circ} = 39972 \text{ km}$$








# Úbeda, Spain

December 2017

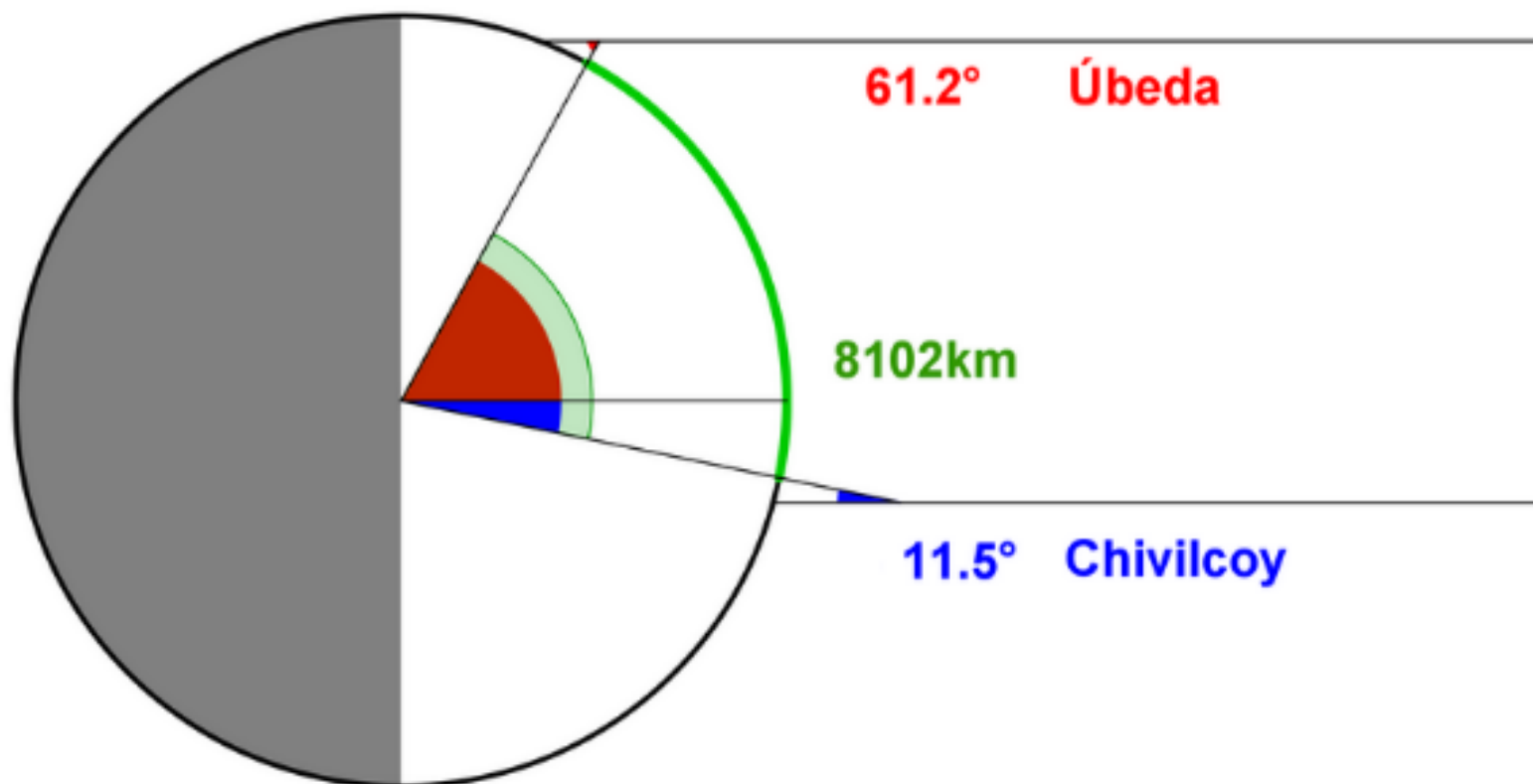


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Úbeda	Spain	Colegio Salesiano Santo Domingo Savio	38.017	-3.367

Date	Gnomon	Shadow	Angle
21 December	121 cm	220 cm	61.2 °

**21/12/2017 (Úbeda-Spain) Latitude: 38.017°**

**21/12/2017 (Chivilcoy-Argentina) Latitude: -34.911°**



$$\text{circumference} = \frac{360^\circ \times 8102\text{km}}{61.2^\circ + 11.5^\circ} = 40120 \text{ km}$$






# Yamunanagar Damla, India

December 2017

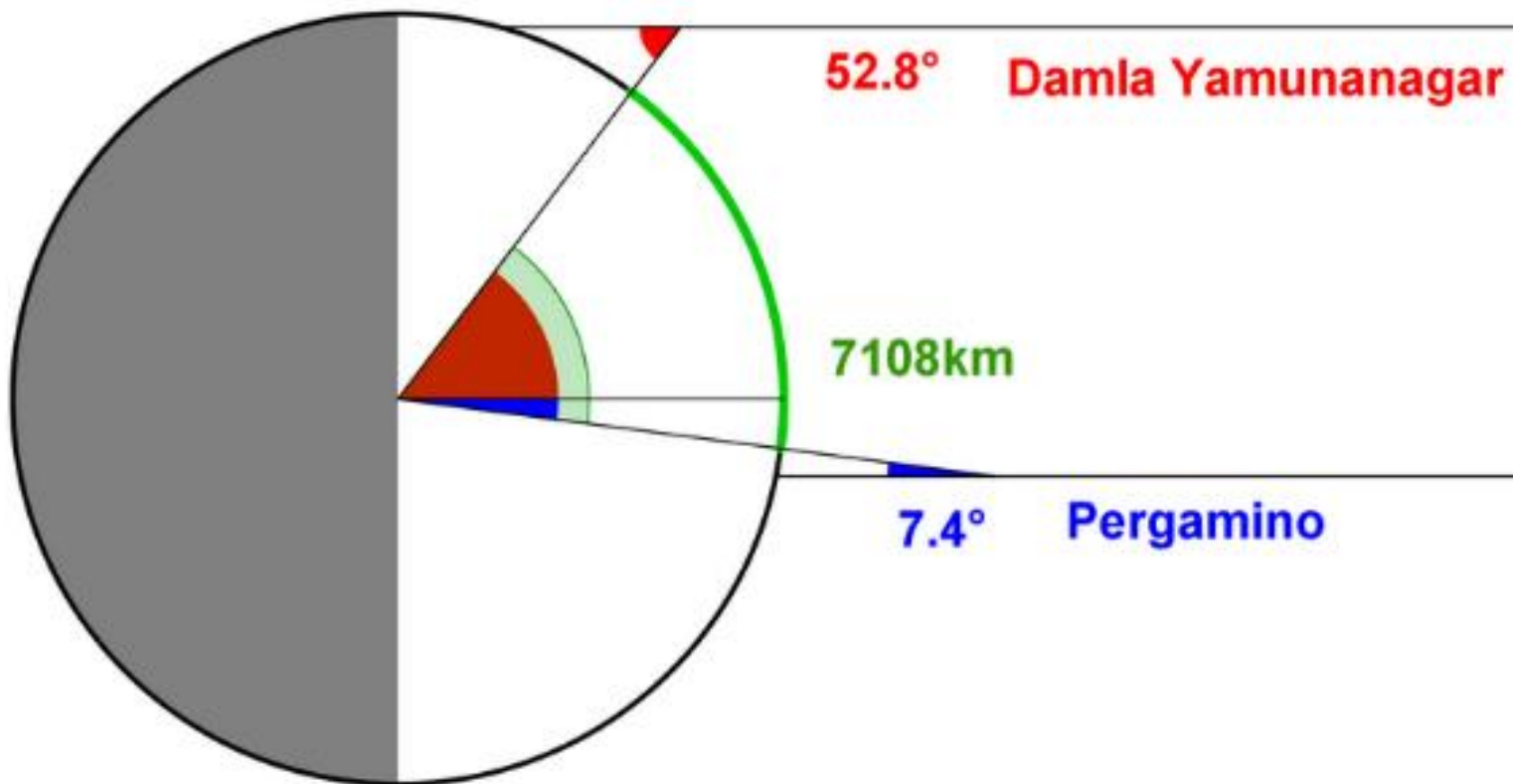


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Yamunanagar Damla	India	GSSS Damla	30.087	77.240

Date	Gnomon	Shadow	Angle
22 December	17.6 cm	23.2 cm	52.8 °

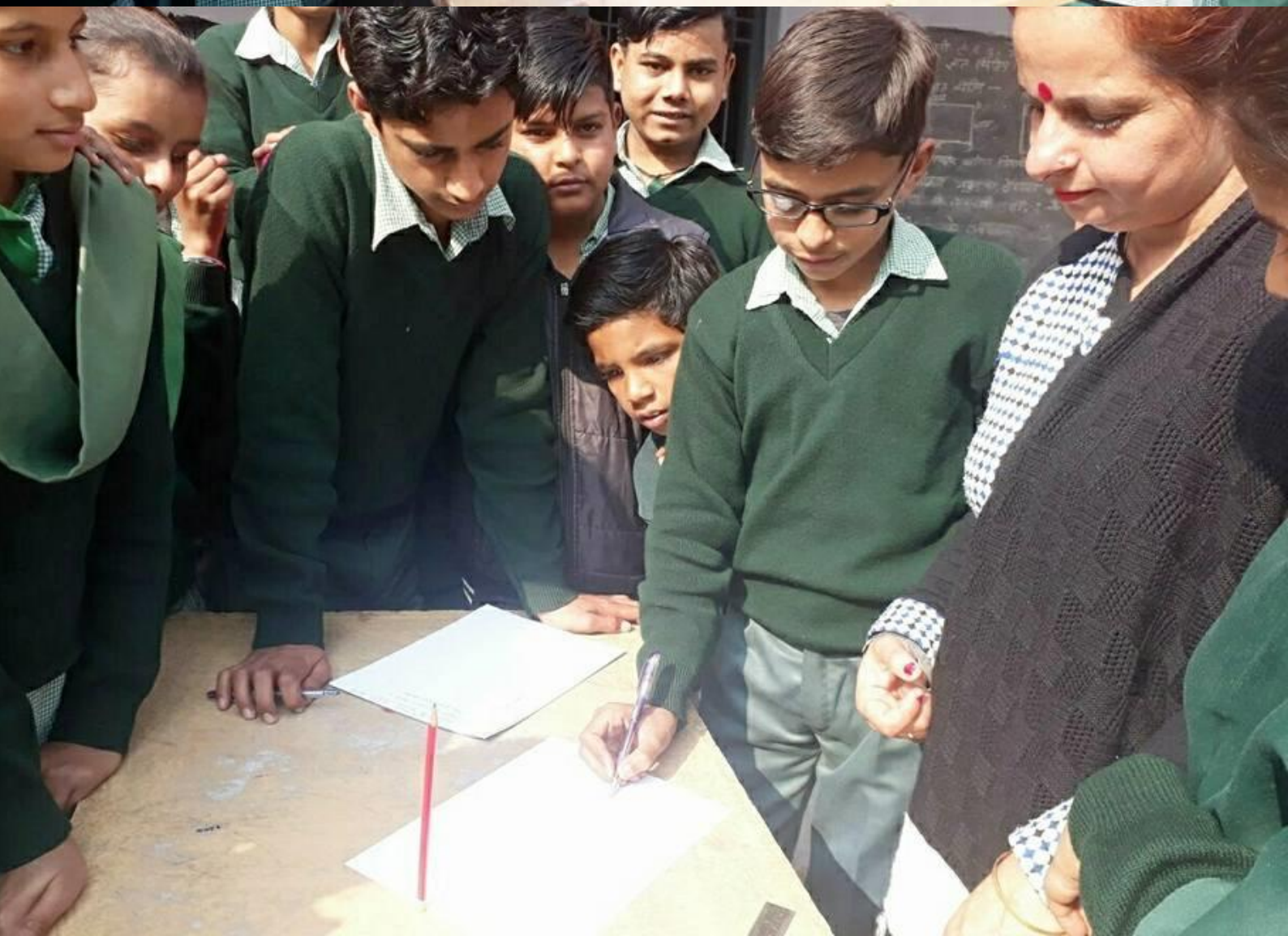
**22/12/2017 (Damla Yamunanagar-India) Latitude: 30.087°**

**22/12/2017 (Pergamino-Argentina ) Latitude: -33.895°**



$$\text{circumference} = \frac{360^\circ \times 7108\text{km}}{52.8^\circ + 7.4^\circ} = 42506 \text{ km}$$






# Yamunanagar Tejli, India

December 2017

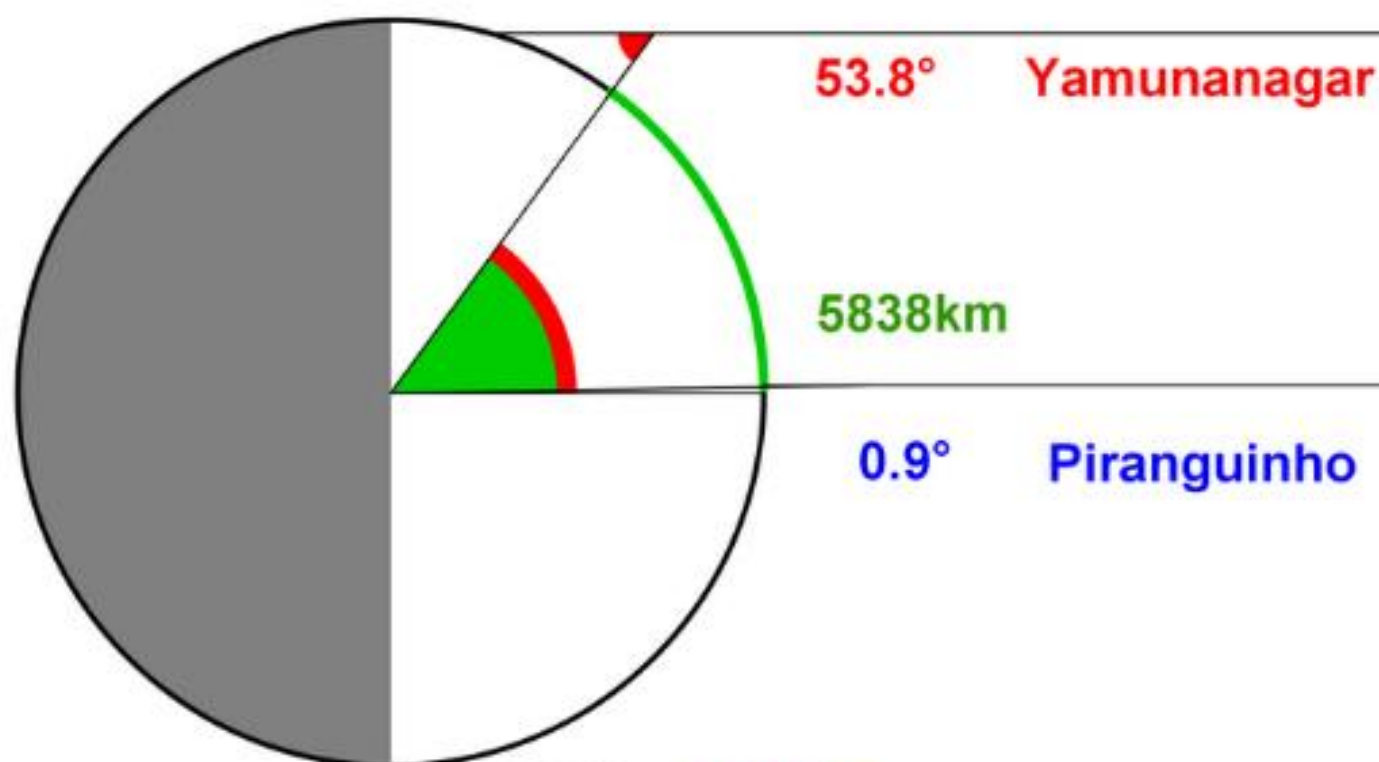


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Yamunanagar	India	DIE&T Tejli	30.134	77.310

Date	Gnomon	Shadow	Angle
19 December	59 cm	80.5 cm	53.8 °

19/12/2017 (Yamunanagar-India) Latitude: 30.134°

19/12/2017 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 5838\text{km}}{53.8^\circ - 0.9^\circ} = 39729 \text{ km}$$







