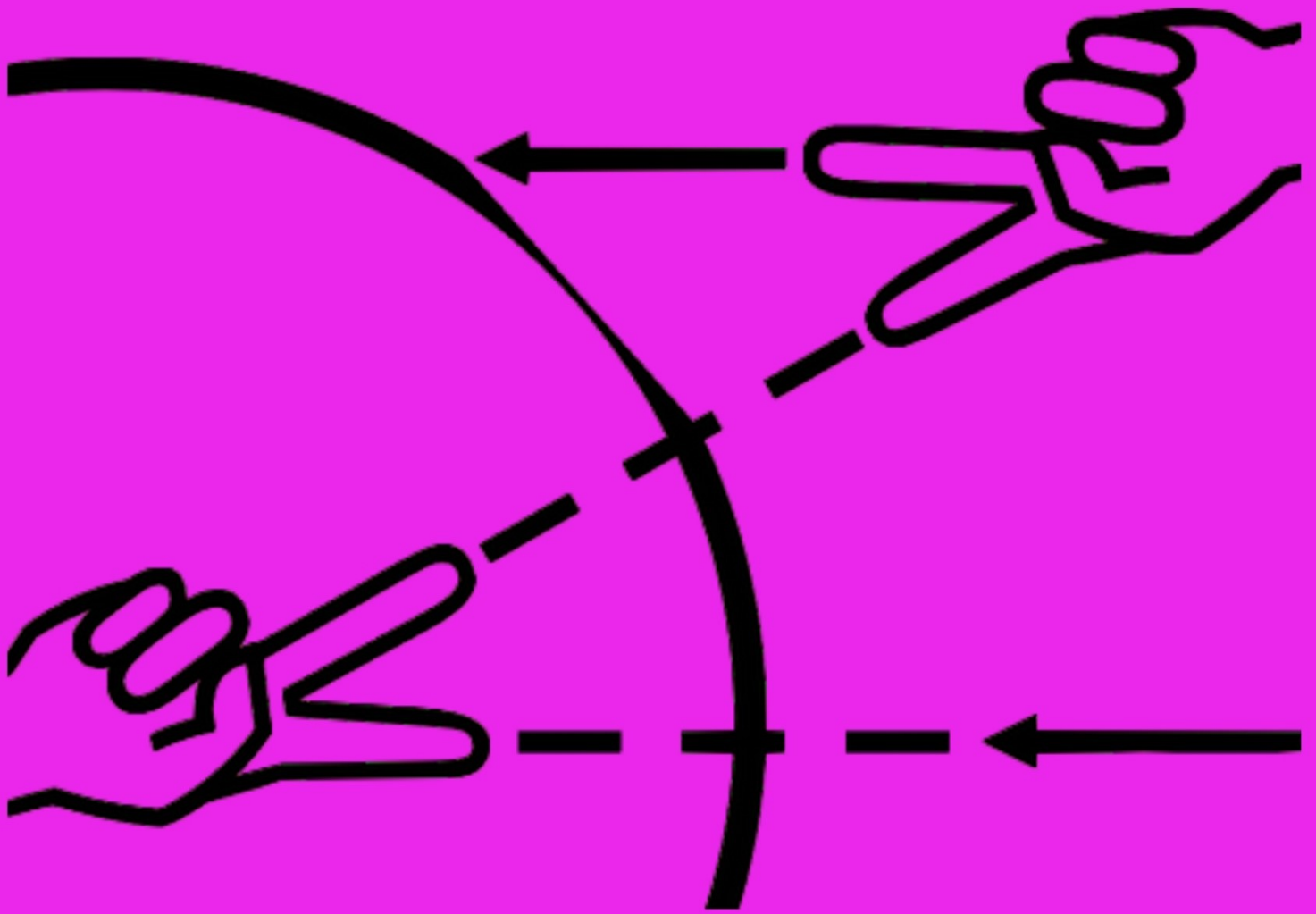


Eratosthenes



3 Continents

9 Countries

16 Schools

57 Measures

3 Continents

9 Countries

16 Schools

57 Measures

ARGENTINA (1)
Chivilcoy

BRAZIL (3)
Maricá, Piranguinho, Rio de Janeiro

COLOMBIA (1)
Guarne

FRANCE (1)
Lafrançaise
















GREECE (3)
Aigio, Athens, Petropouli

INDIA (3)
Tandi Nani, Yamunanagar (2)

PAKISTAN (1)
Jajjah Abbasian


ROMANIA (2)
Busteni, Mărgineni

SPAIN (1)
Úbeda

Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Aigio	Greece	1st High School of Aigio	38.252	22.079
	Athens	Greece	Experimental College Agion Anargyron	38.027	23.726
	Busteni	Romania	Colegiul Ion Kalinderu	45.416	25.535
	Chivilcoy	Argentina	Parque Cielos del Sur	-34.911	-60.014
	Guarne	Colombia	Grupo Astrofanáticos	6.274	-75.449
	Jajjah Abbasian	Pakistan	Government Boys Secondary School	28.754	70.569
	Lafrançaise	France	Collège Antonin Perbosc	44.127	1.237
	Mărgineni	Romania	Gh. Popescu School	44.533	24.554
	Maricá	Brazil	Grupo 84 Cidade de Maricá	-22.919	-42.817
	Petroupoli	Greece	4o Junior High School	38.036	23.674
	Piranguinho	Brazil	Universidade Federal de Itajubá	-22.411	-45.535
	Rio de Janeiro	Brazil	Centro Educacional Nosso Mundo	-22.890	-43.317
	Tandi Nani	India	Govt senior secondary school Tandil Nani	23.346	92.483
	Úbeda	Spain	Colegio Salesiano Santo Domingo Savio	38.017	-3.367
	Yamunanagar CVRSC	India	C V Raman Science Club	30.140	77.274
	Yamunanagar SD	India	Spring Dales Public School	30.133	77.250

Aigio, Greece



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

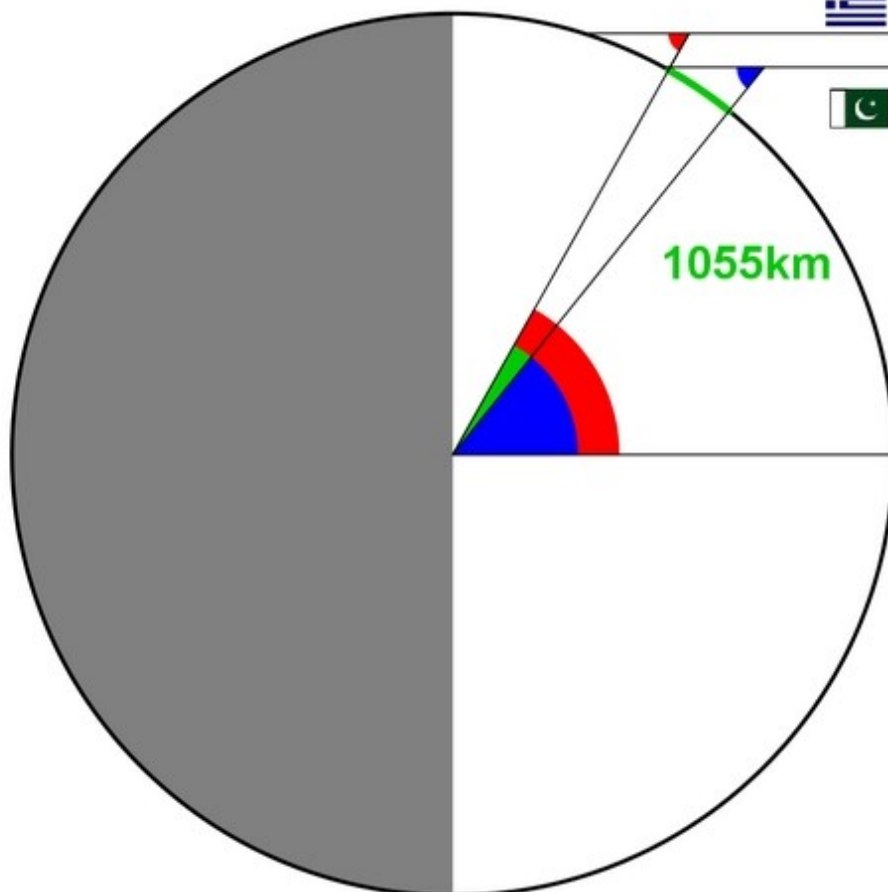
Date	Gnomon	Shadow	Angle
06 December 2019	30.0cm	53.5cm	60.7°
11 December 2019	30.0cm	54.6cm	61.2°

06/12/2019 (Aigio-Greece) Latitude: 38.252°

06/12/2019 (Jajjah Abbasian-Pakistan) Latitude: 28.754°

 **60.7° Aigio**

 **51.2° Jajjah Abbasian**



$$\text{circumference} = \frac{360^\circ \times 1055\text{km}}{60.7^\circ - 51.2^\circ} = 39979 \text{ km}$$

Distance	Angle
circumference	360°
1055km	60.7° - 51.2°



Athens, Greece



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

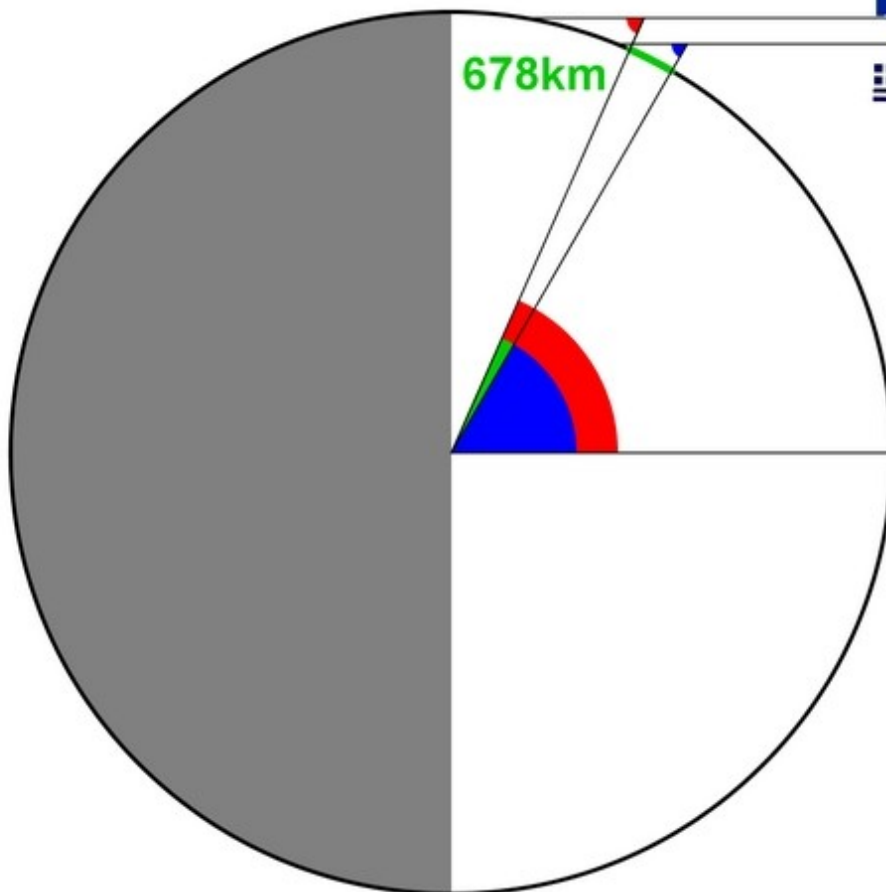
Date	Gnomon	Shadow	Angle
02 December 2019	49.0cm	85.0cm	60.0°
18 December 2019	49.0cm	90.0cm	61.4°

02/12/2019 (Lafrançaise-France) Latitude: 44.127°

02/12/2019 (Athens-Greece) Latitude: 38.027°

 66.1° Lafrançaise

 60° Athens



$$\text{circumference} = \frac{360^\circ \times 678\text{km}}{66.1^\circ - 60^\circ} = 40013 \text{ km}$$

Distance	Angle
circumference	360°
678km	66.1° - 60°



Busteni, Romania

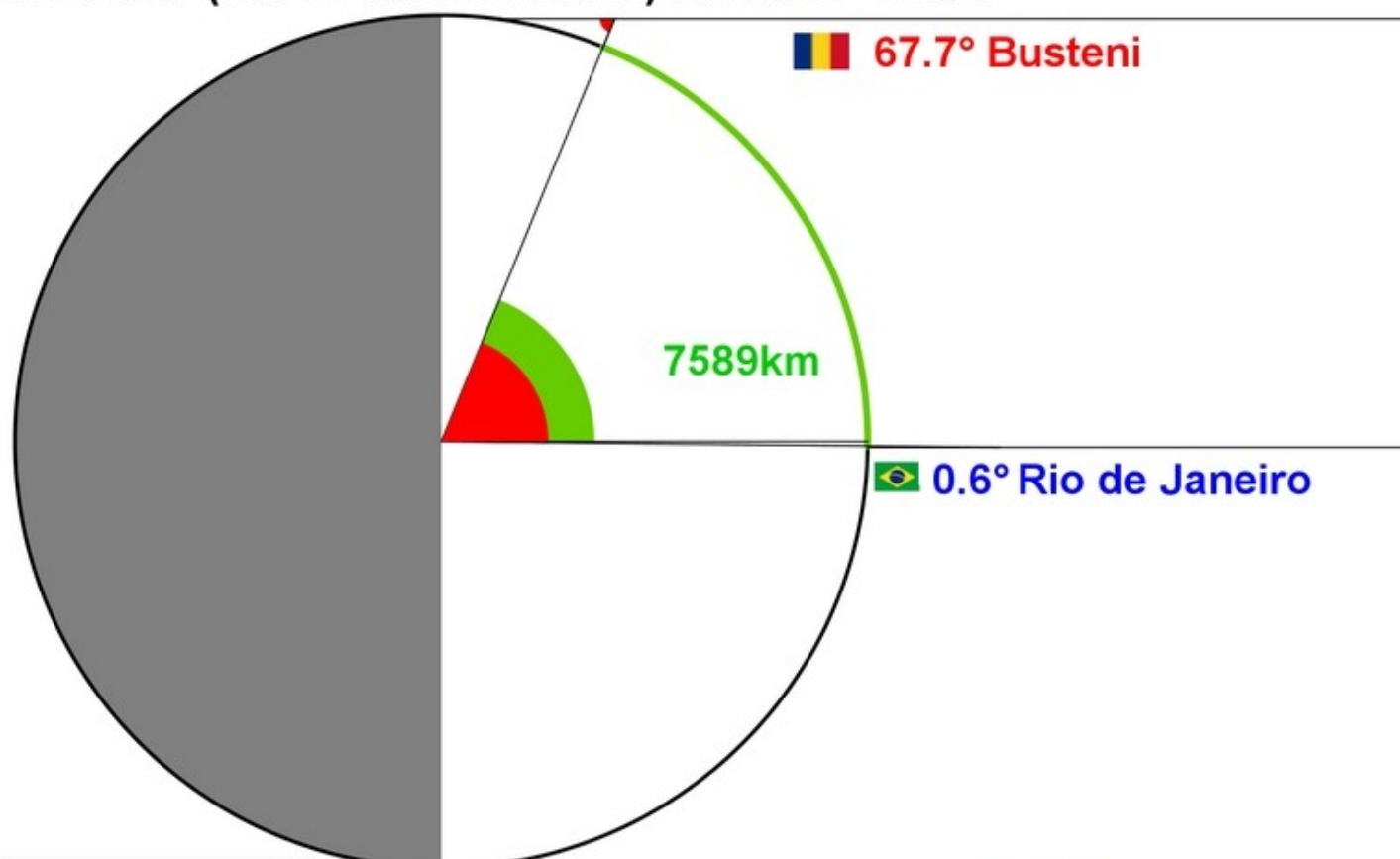


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Busteni	Romania	Colegiul Ion Kalinderu	45.416	25.535

Date	Gnomon	Shadow	Angle
02 December 2019	100.0cm	239.4cm	67.3°
03 December 2019	50.0cm	120.5cm	67.5°
04 December 2019	17.0cm	41.2cm	67.6°
05 December 2019	50.0cm	122.0cm	67.7°
06 December 2019	50.0cm	122.8cm	67.8°
09 December 2019	50cm	124.8cm	68.2°
10 December 2019	50.0cm	125.4cm	68.3°
11 December 2019	50.0cm	125.9cm	68.3°
16 December 2019	50cm	128.1cm	68.7°
17 December 2019	50cm	128.4cm	68.7°
18 December 2019	50.0cm	128.6cm	68.8°
19 December 2019	7.7cm	20.0cm	68.9°
20 December 2019	8.5cm	22.0cm	68.9°
21 December 2019	100.0cm	258.3cm	68.8°
22 December 2019	100.0cm	258.5cm	68.9°

05/12/2019 (Busteni-Romania) Latitude: 45.416°

05/12/2019 (Rio de Janeiro-Brazil) Latitude: -22.89°




Distance	Angle
circumference	360°
7589km	67.7° + 0.6°

$$\text{circumference} = \frac{360^\circ \times 7589\text{km}}{67.7^\circ + 0.6^\circ} = 40001 \text{ km}$$



Chivilcoy, Argentina

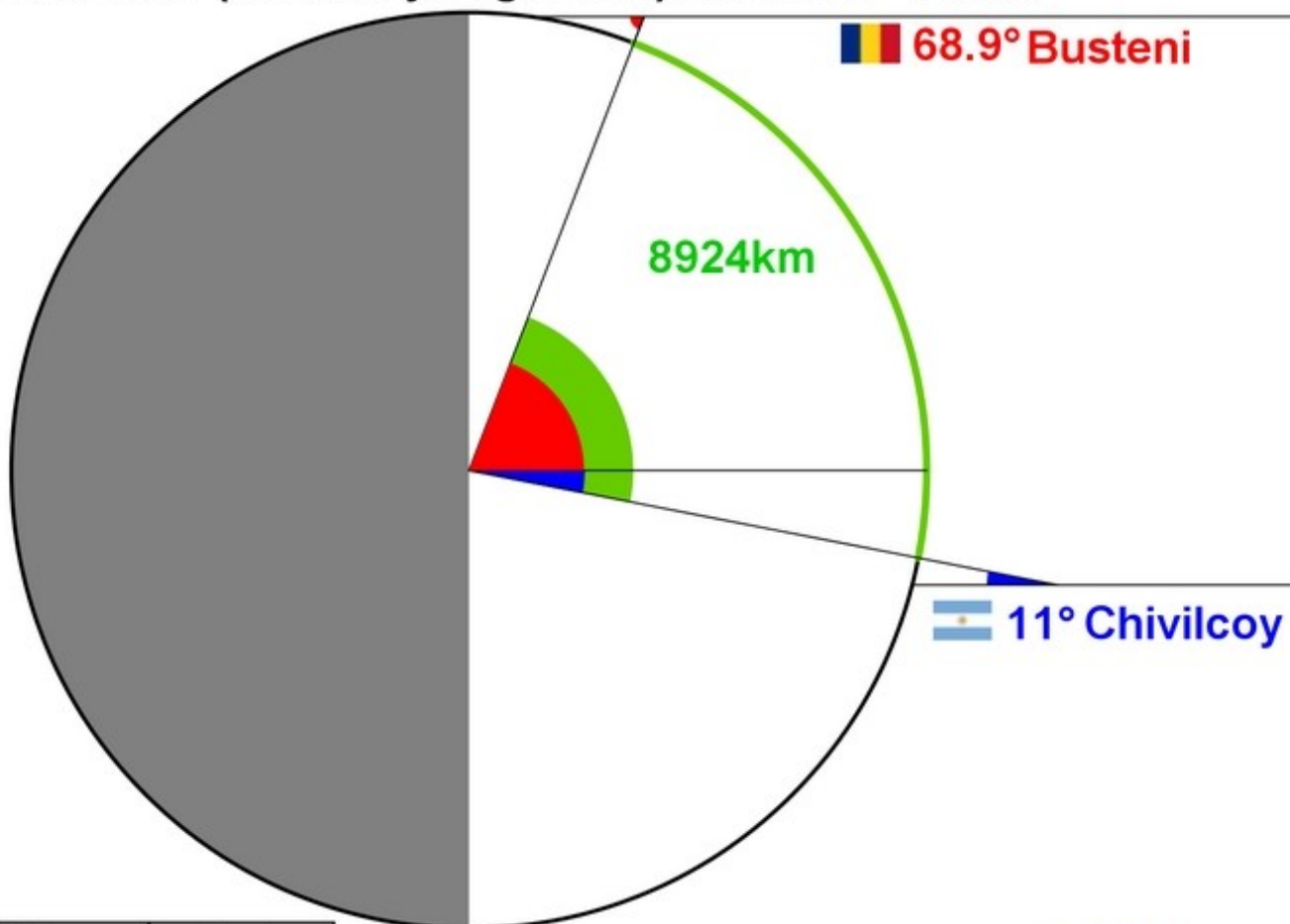


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Chivilcoy	Argentina	Parque Cielos del Sur	-34.911	-60.014

Date	Gnomon	Shadow	Angle
22 December 2019	100.0cm	-19.5cm	-11.0°

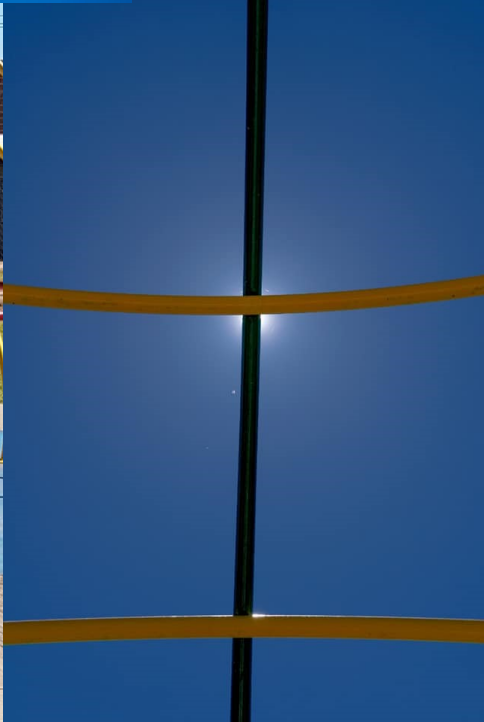
22/12/2019 (Busteni-Romania) Latitude: 45.416°

22/12/2019 (Chivilcoy-Argentina) Latitude: -34.911°



Distance	Angle
circumference	360°
8924km	68.9° + 11°

$$\text{circumference} = \frac{360^\circ \times 8924\text{km}}{68.9^\circ + 11^\circ} = 40208 \text{ km}$$



Guarne, Colombia

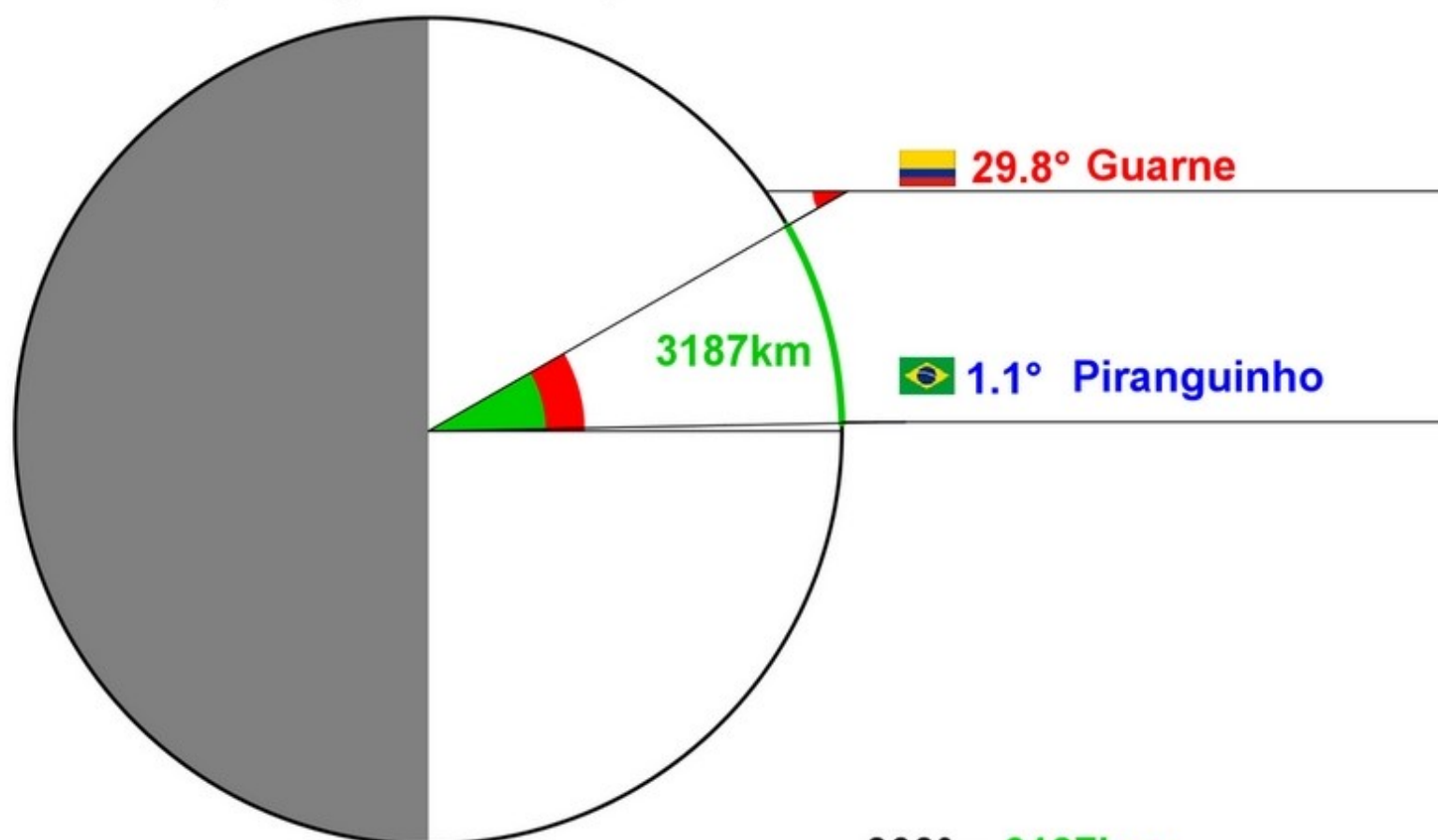


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Guarne	Colombia	Grupo Astrofanáticos	6.274	-75.449

Date	Gnomon	Shadow	Angle
16 December 2019	12.9cm	7.3cm	29.5°
24 December 2019	12.9cm	7.4cm	29.8°
25 December 2019	30.5cm	17.4cm	29.7°

24/12/2019 (Guarne-Colombia) Latitude: 6.274°

24/12/2019 (Piranguinho-Brazil) Latitude: -22.411°



Distance	Angle
circumference	360°
3187km	29.8° - 1.1°

$$\text{circumference} = \frac{360^\circ \times 3187\text{km}}{29.8^\circ - 1.1^\circ} = 39976 \text{ km}$$



Jajjah Abbasian, Pakistan



Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Jajjah Abbasian	Pakistan	Government Boys Secondary School	28.754	70.569

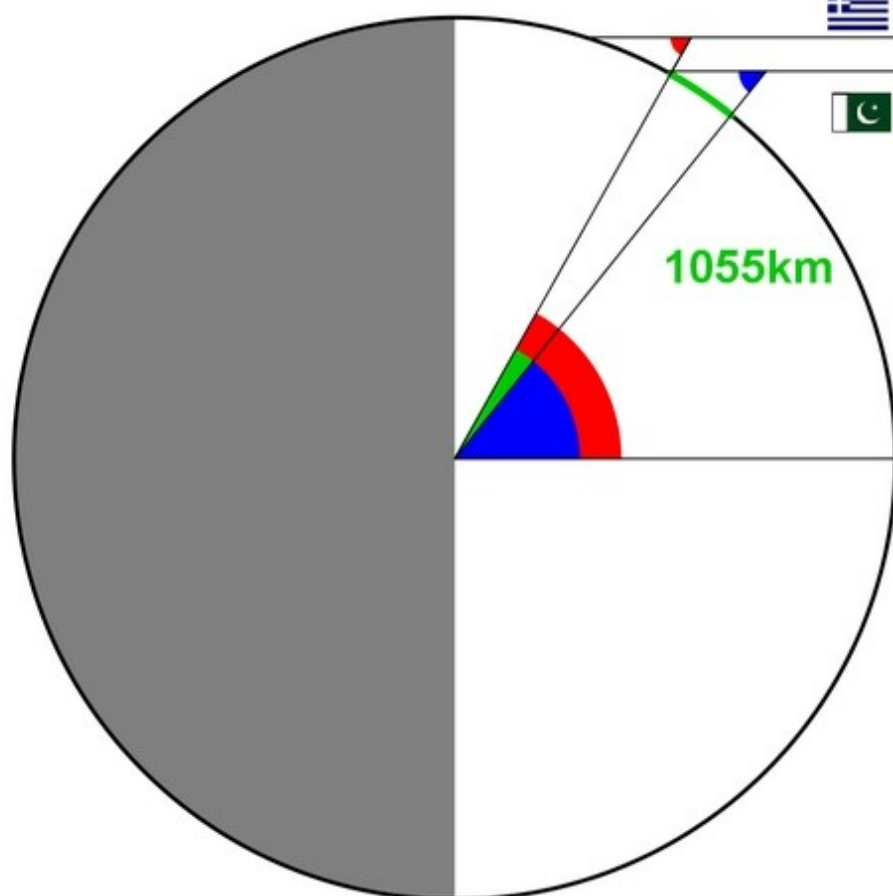
Date	Gnomon	Shadow	Angle
02 December 2019	100.0cm	122.0cm	50.7°
04 December 2019	100.0cm	123.2cm	50.9°
06 December 2019	100cm	124.2cm	51.2°
07 December 2019	100cm	124.8cm	51.3°
09 December 2019	100.0cm	125.7cm	51.5°
10 December 2019	100cm	126.2cm	51.6°
14 December 2019	100cm	127.6cm	51.9°
16 December 2019	100cm	128.1cm	52°
17 December 2019	100.0cm	128.3cm	52.1°
21 December 2019	100.0cm	128.8cm	52.2°

06/12/2019 (Aigio-Greece) Latitude: 38.252°

06/12/2019 (Jajjah Abbasian-Pakistan) Latitude: 28.754°

60.7° Aigio

51.2° Jajjah Abbasian



$$\text{circumference} = \frac{360^\circ \times 1055\text{km}}{60.7^\circ - 51.2^\circ} = 39979 \text{ km}$$

Distance	Angle
circumference	360°
1055km	60.7° - 51.2°



Lafrançaise, France



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

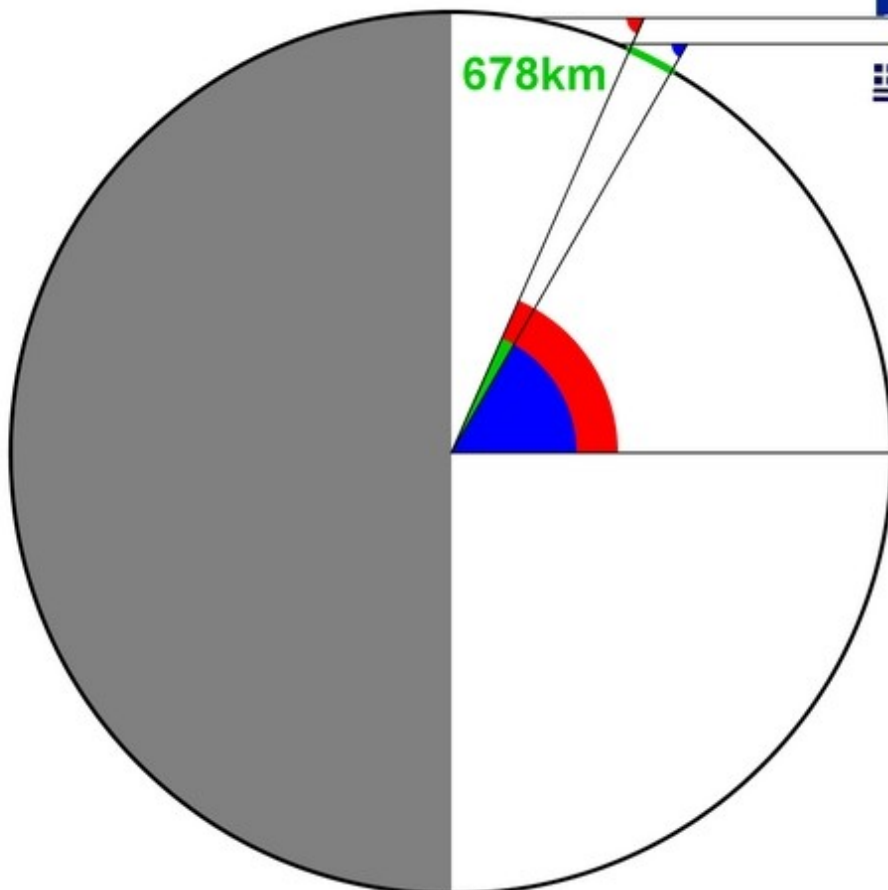
Date	Gnomon	Shadow	Angle
02 December 2019	100.0cm	226.0cm	66.1°
06 December 2019	100.0cm	230.0cm	66.5°
09 December 2019	100cm	240cm	67.4°
19 December 2019	100.0cm	241.0cm	67.5°

02/12/2019 (Lafrançaise-France) Latitude: 44.127°

02/12/2019 (Athens-Greece) Latitude: 38.027°

 66.1° Lafrançaise

 60° Athens



$$\text{circumference} = \frac{360^\circ \times 678\text{km}}{66.1^\circ - 60^\circ} = 40013 \text{ km}$$

Distance	Angle
circumference	360°
678km	66.1° - 60°



Mărgineni, Romania

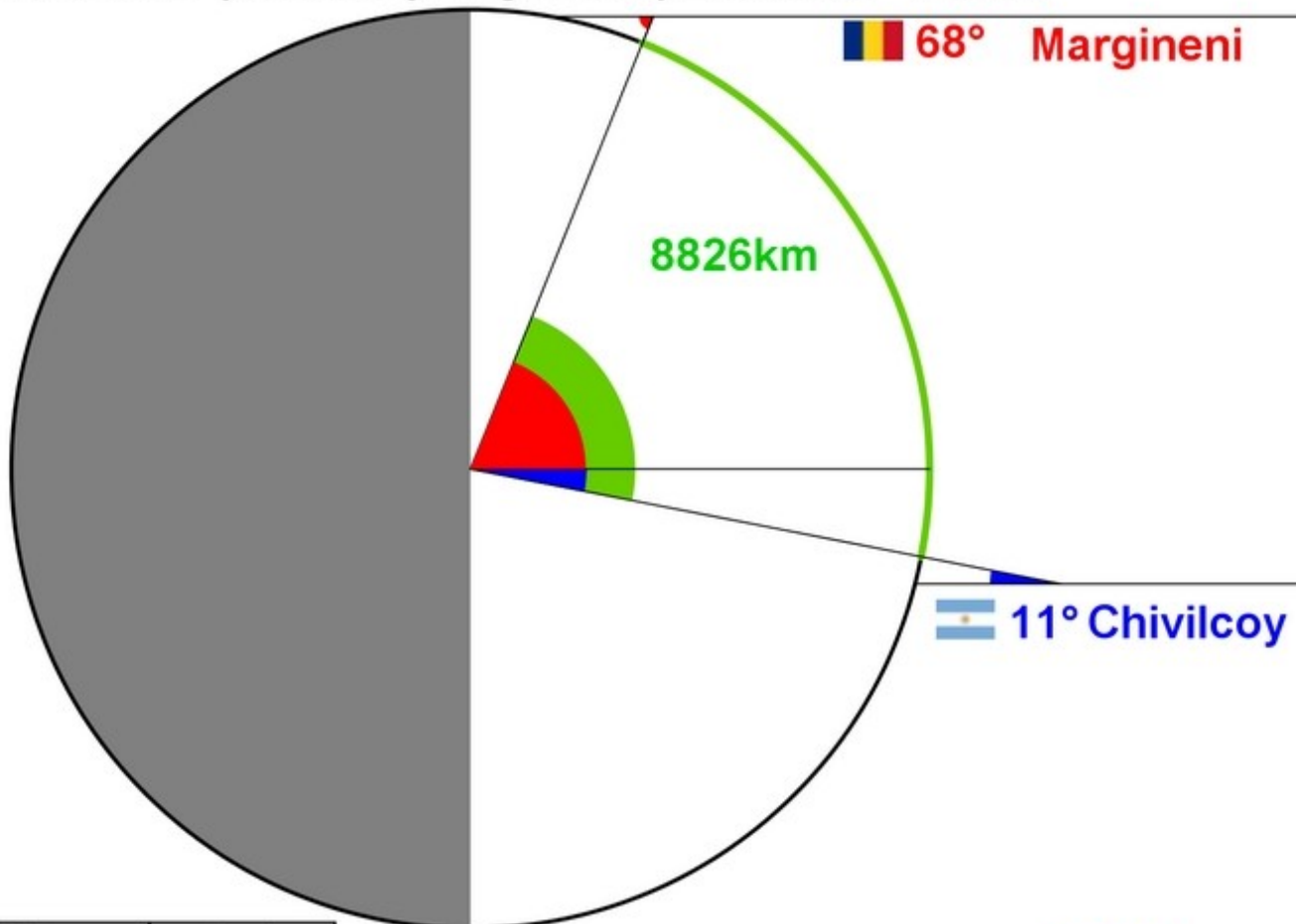


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Mărgineni	Romania	Gh. Popescu School	44.533	24.554

Date	Gnomon	Shadow	Angle
22 December 2019	100.0cm	247.0cm	68.0°

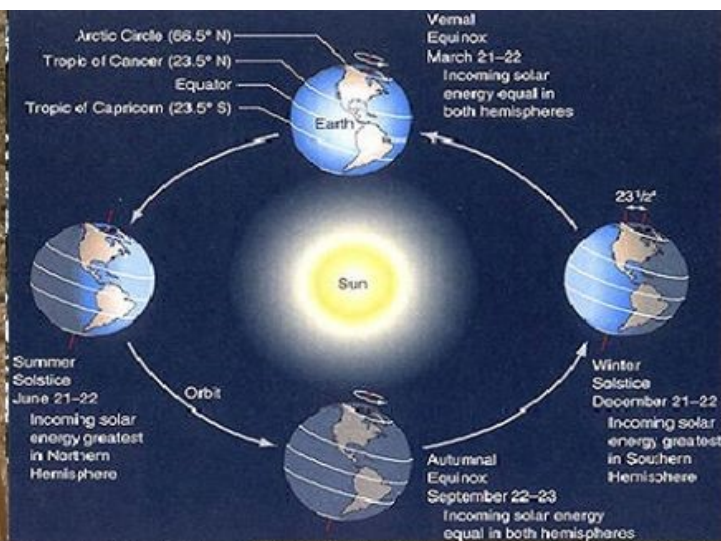
22/12/2019 (Margineni-Romania) Latitude: 44.533°

22/12/2019 (Chivilcoy-Argentina) Latitude: -34.911°



Distance	Angle
circumference	360°
8826km	68° + 11°


$$\text{circumference} = \frac{360^\circ \times 8826\text{km}}{68^\circ + 11^\circ} = 40220 \text{ km}$$



Secondary School Gh. Popescu, Romania
22.12.2019

Maricá, Brazil



Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Maricá	Brazil	Grupo 84 Cidade de Maricá	-22.919	-42.817

Date	Gnomon	Shadow	Angle
29 December 2019	12.0cm	1.5cm	7.1°





Petroupoli, Greece

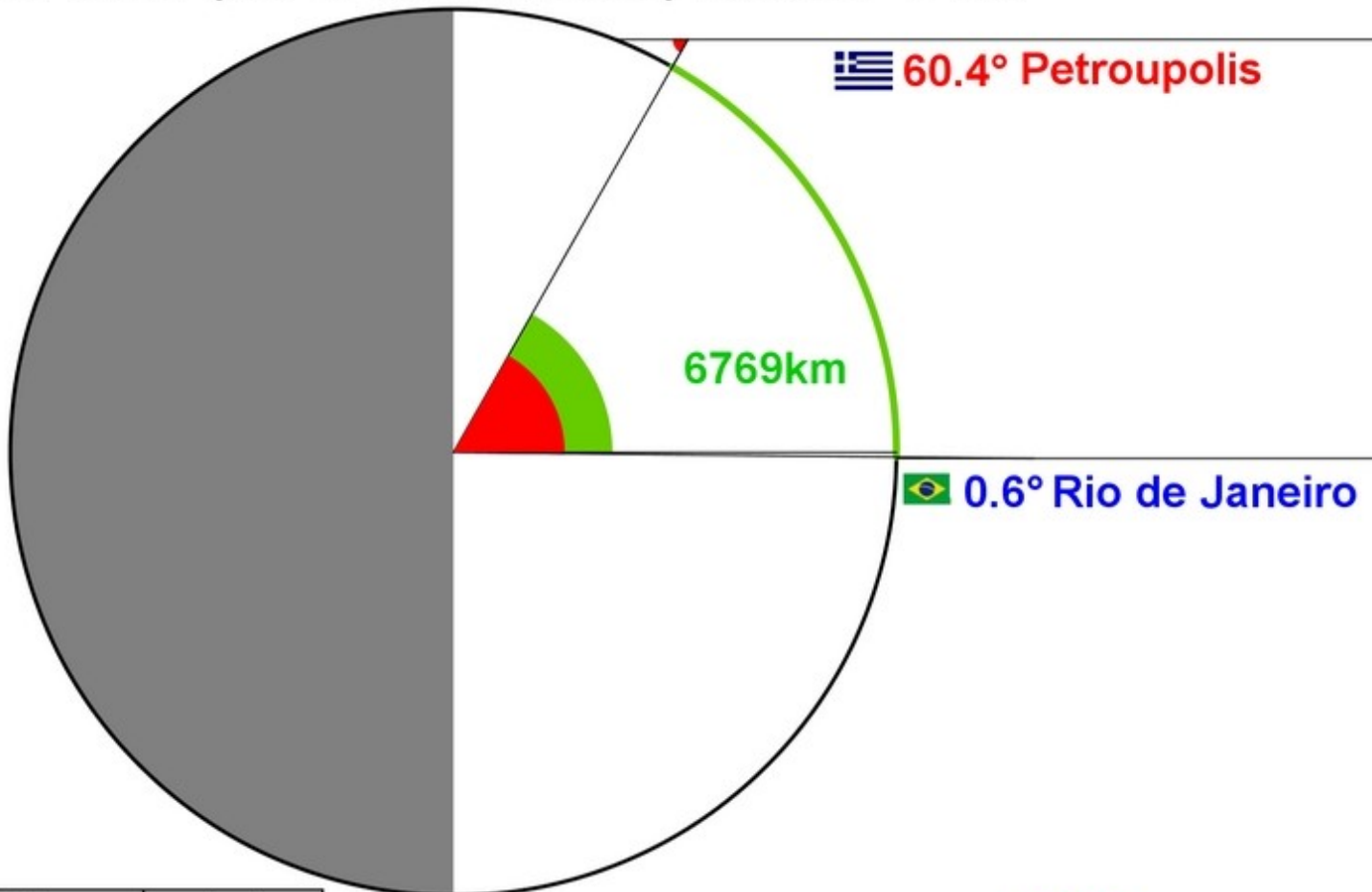


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Petroupoli	Greece	4o Junior High School	38.036	23.674

Date	Gnomon	Shadow	Angle
05 December 2019	52.3cm	92.0cm	60.4°
09 December 2019	52.3cm	93.5cm	60.8°
16 December 2019	52.3cm	96.0cm	61.4°
20 December 2019	52.3cm	96.3cm	61.5°
25 December 2019	31.5cm	57.5cm	61.3°

05/12/2019 (Petroupolis-Greece) Latitude: 38.036°

05/12/2019 (Rio de Janeiro-Brazil) Latitude: -22.89°

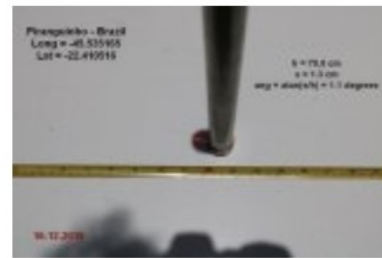


Distance	Angle
circumference	360°
6769km	60.4° + 0.6°

$$\text{circumference} = \frac{360^\circ \times 6769\text{km}}{60.4^\circ + 0.6^\circ} = 39948 \text{ km}$$



Piranguinho, Brazil

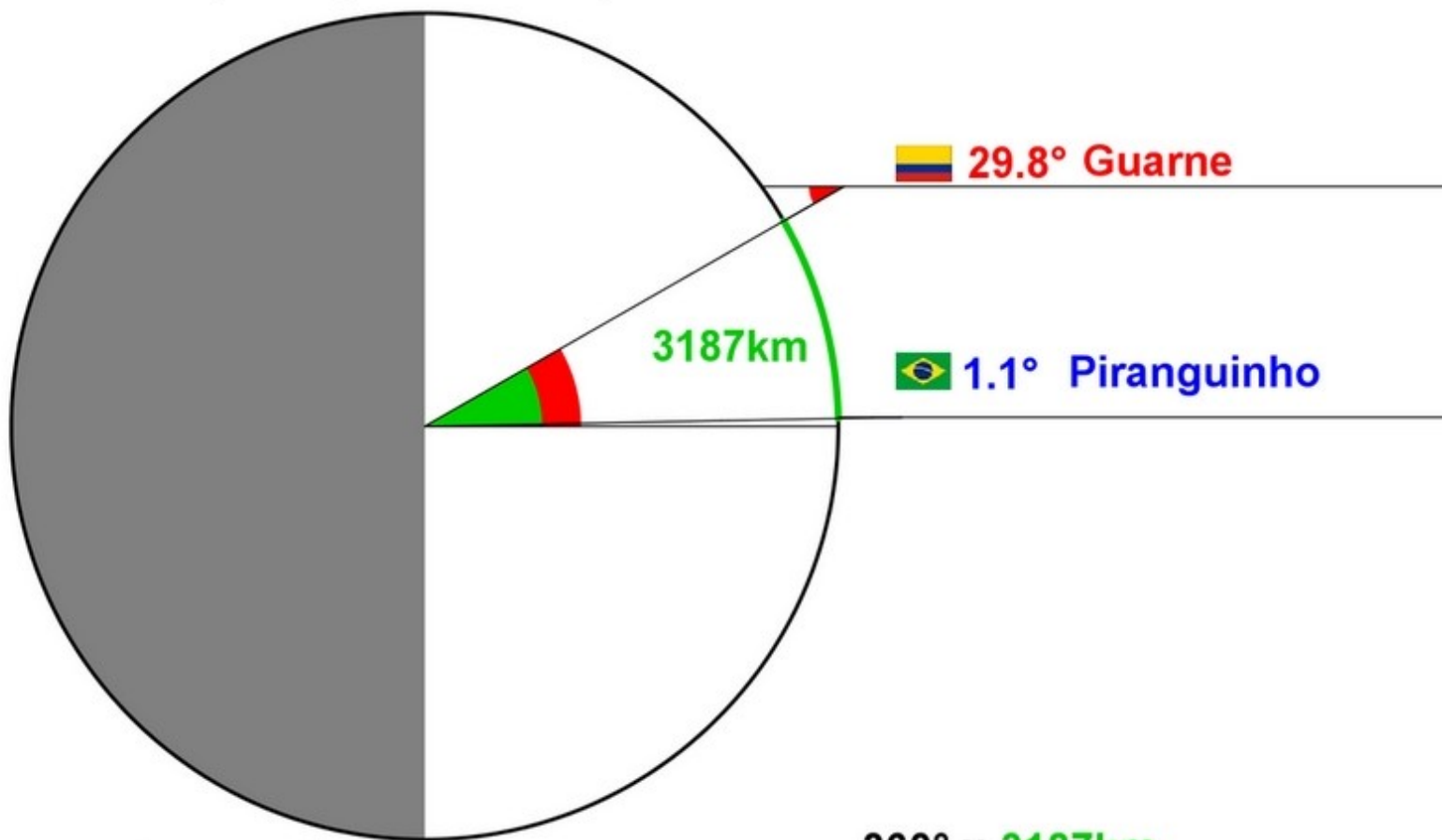


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Piranguinho	Brazil	Universidade Federal de Itajubá	-22.411	-45.535

Date	Gnomon	Shadow	Angle
02 December 2019	70.0cm	-0.7cm	-0.6°
16 December 2019	70cm	1.3cm	1.1°
24 December 2019	70cm	1.4cm	1.1°

24/12/2019 (Guarne-Colombia) Latitude: 6.274°

24/12/2019 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 3187\text{km}}{29.8^\circ - 1.1^\circ} = 39976 \text{ km}$$

Distance	Angle
circumference	360°
3187km	29.8° - 1.1°

Piranguinho, Brazil

Long = -45.535165

Lat = -22.410516

$h = 70.0 \text{ cm}$

$s = 1.4 \text{ cm}$

$\text{ang} = \text{atan}(s/h) = 1.1 \text{ degrees}$



24.12.2019

Piranguinho - Brazil

Long = -45.535165

Lat = -22.410516

$h = 70.0 \text{ cm}$

$s = 0.7 \text{ cm}$


$\text{ang} = \text{atan}(s/h) = 0.6 \text{ degrees}$



02.12.2019

Rio de Janeiro CENOM, Brazil

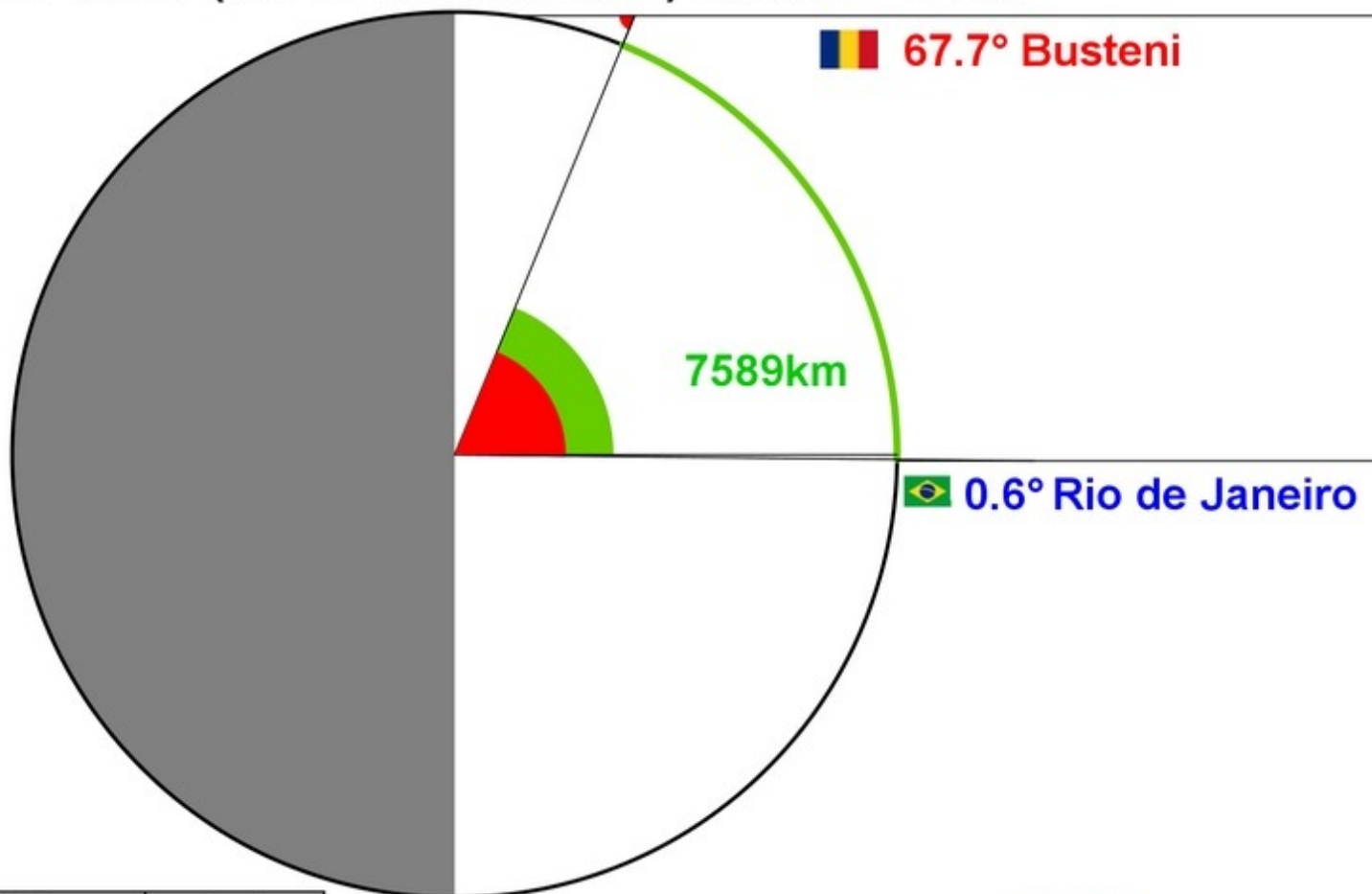


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Rio de Janeiro	Brazil	Centro Educacional Nosso Mundo	-22.890	-43.317

Date	Gnomon	Shadow	Angle
04 December 2019	20.0cm	-0.3cm	-0.9°
05 December 2019	20.0cm	-0.2cm	-0.6°
09 December 2019	20.0cm	-0.2cm	-0.6°
18 December 2019	20.0cm	0.1cm	0.3°
20 December 2019	20.0cm	0.1cm	0.3°
25 December 2019	80.0cm	2cm	1.4°

05/12/2019 (Busteni-Romania) Latitude: 45.416°

05/12/2019 (Rio de Janeiro-Brazil) Latitude: -22.89°



Distance	Angle
circumference	360°
7589km	67.7° + 0.6°

$$\text{circumference} = \frac{360^\circ \times 7589\text{km}}{67.7^\circ + 0.6^\circ} = 40001 \text{ km}$$



Tandi Nani, India



Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Tandi Nani	India	Govt senior secondary school Tandi Nani	23.346	92.483

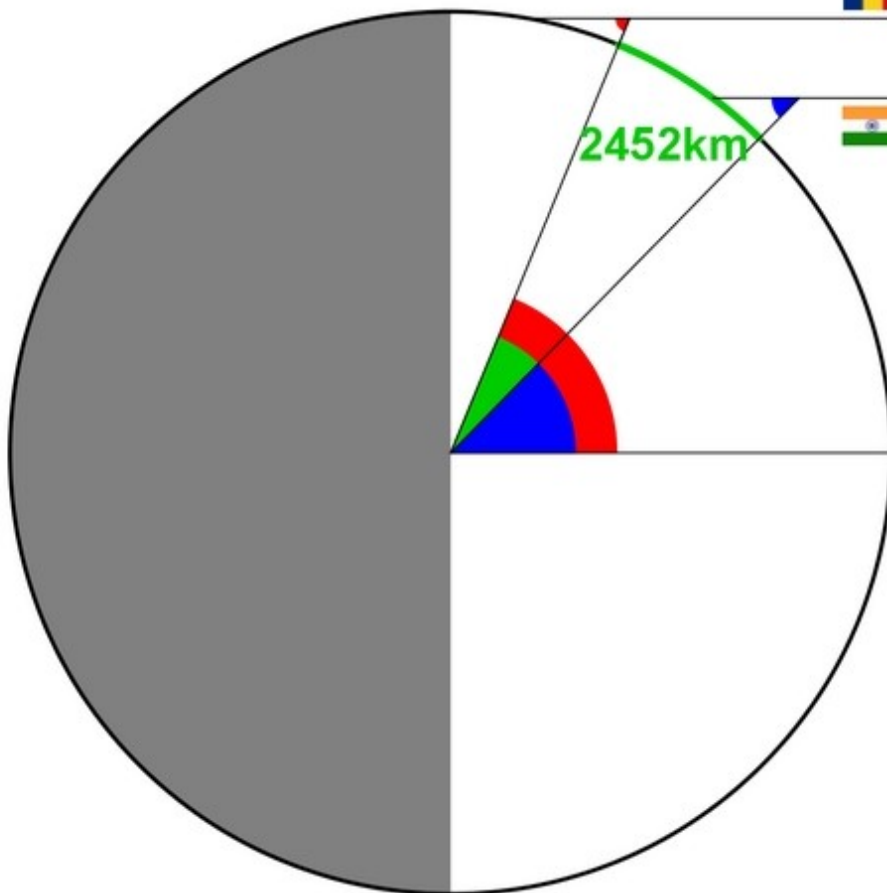
Date	Gnomon	Shadow	Angle
04 December 2019	58.0cm	59.0cm	45.5°

04/12/2019 (Busteni-Romania) Latitude: 45.416°

04/12/2019 (Tandi Nani-India) Latitude: 23.346°

67.6° Busteni

45.5° Tandi Nani




$$\text{circumference} = \frac{360^\circ \times 2452\text{km}}{67.6^\circ - 45.5^\circ} = 39942 \text{ km}$$

Distance	Angle
circumference	360°
2452km	67.6° - 45.5°



Úbeda, Spain

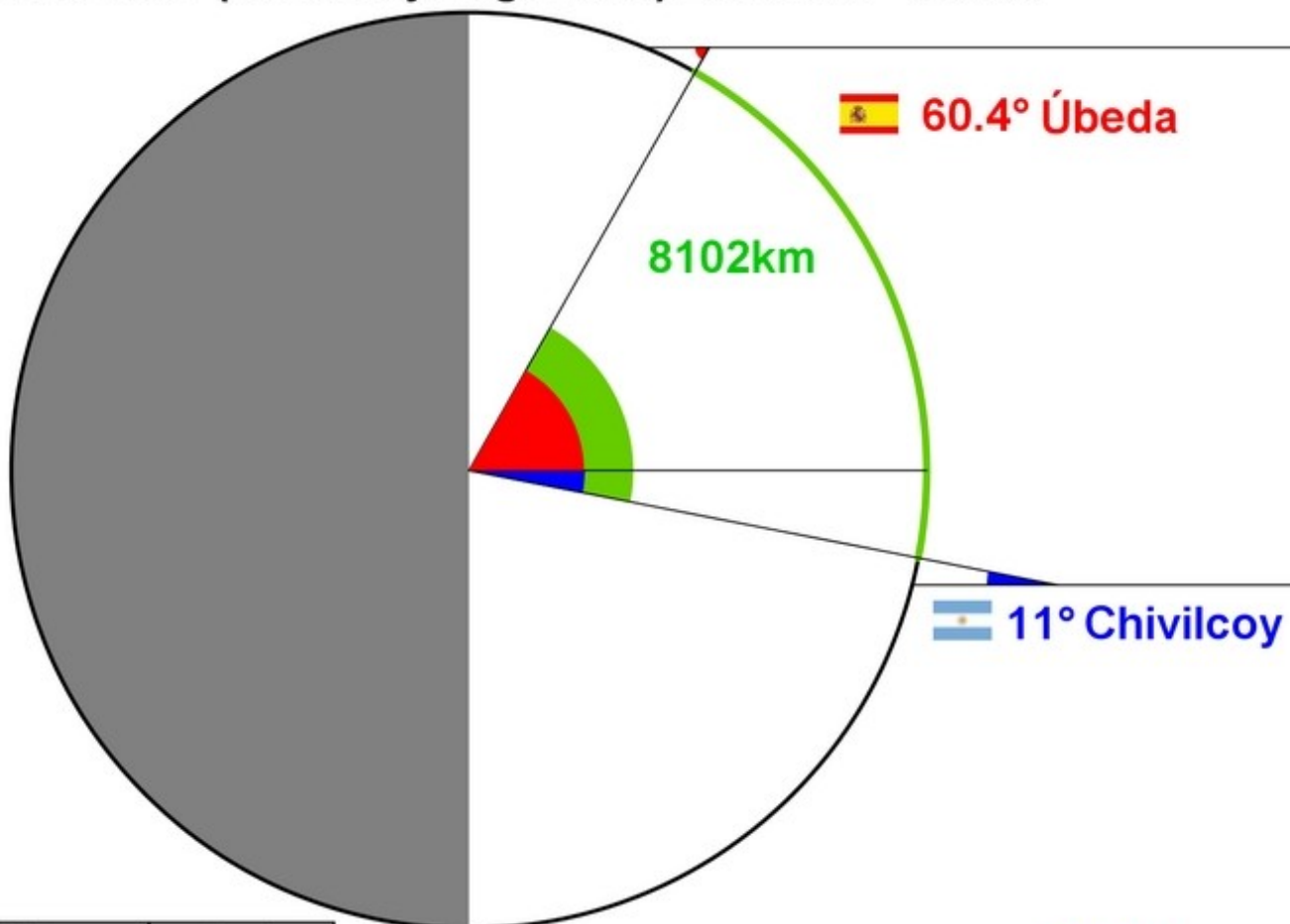


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Úbeda	Spain	Colegio Salesiano Santo Domingo Savio	38.017	-3.367

Date	Gnomon	Shadow	Angle
22 December 2019	37.0cm	65.1cm	60.4°

22/12/2019 (Úbeda-Spain) Latitude: 38.017°

22/12/2019 (Chivilcoy-Argentina) Latitude: -34.911°



Distance	Angle
circumference	360°
8102km	60.4° + 11°

$$\text{circumference} = \frac{360^\circ \times 8102\text{km}}{60.4^\circ + 11^\circ} = 40850 \text{ km}$$



Yamunanagar CVRSC, India

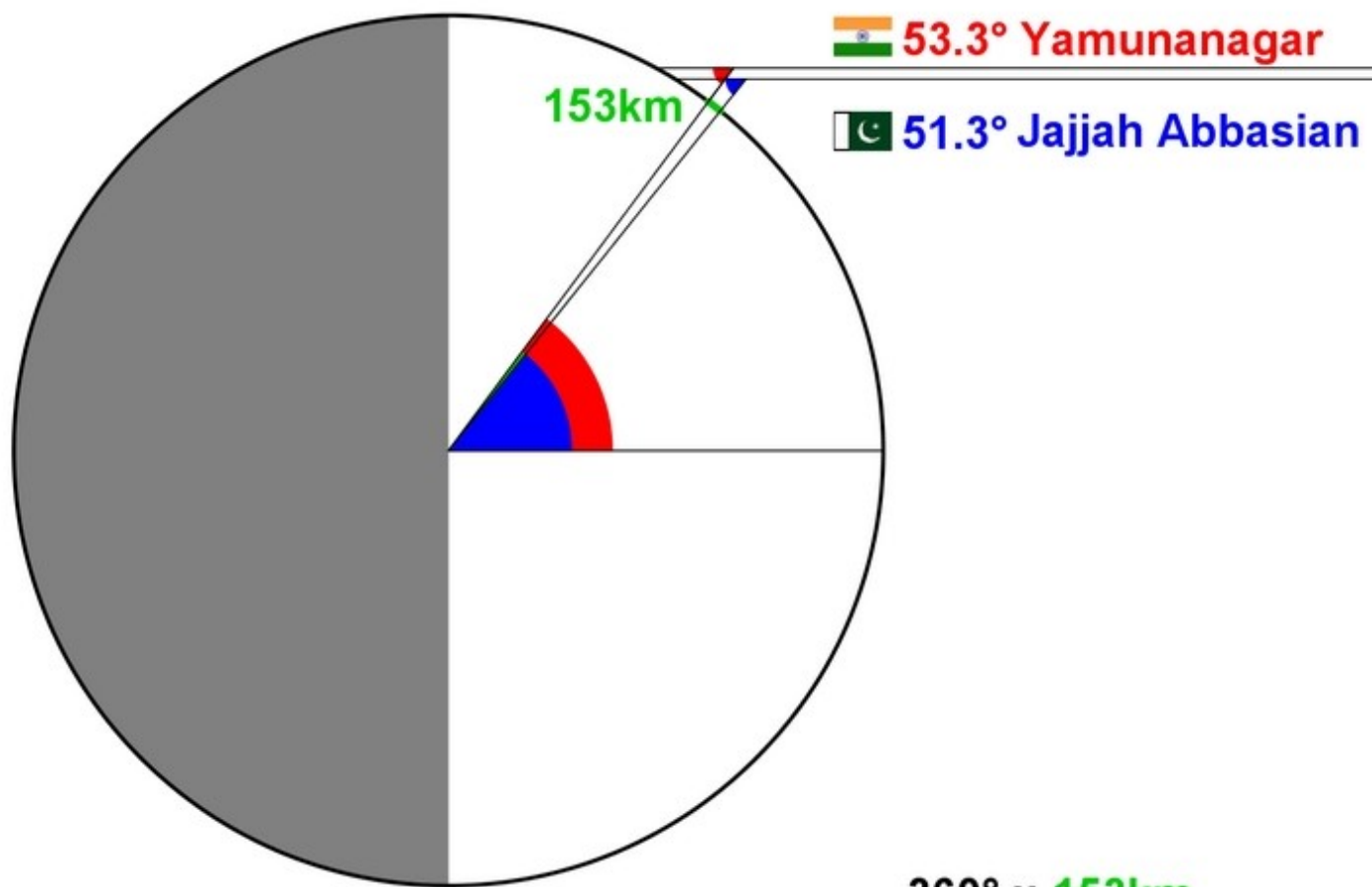


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Yamunanagar	India	C V Raman Science Club	30.140	77.274

Date	Gnomon	Shadow	Angle
07 December 2019	19cm	25.5cm	53.3°

07/12/2019 (Yamunanagar-India) Latitude: 30.133°

07/12/2019 (Jajjah Abbasian-Pakistan) Latitude: 28.754°



Distance	Angle
circumference	360°
153km	53.3° - 51.3°

$$\text{circumference} = \frac{360^\circ \times 153\text{km}}{53.3^\circ - 51.3^\circ} = 27540 \text{ km}$$



Yamunanagar SD, India

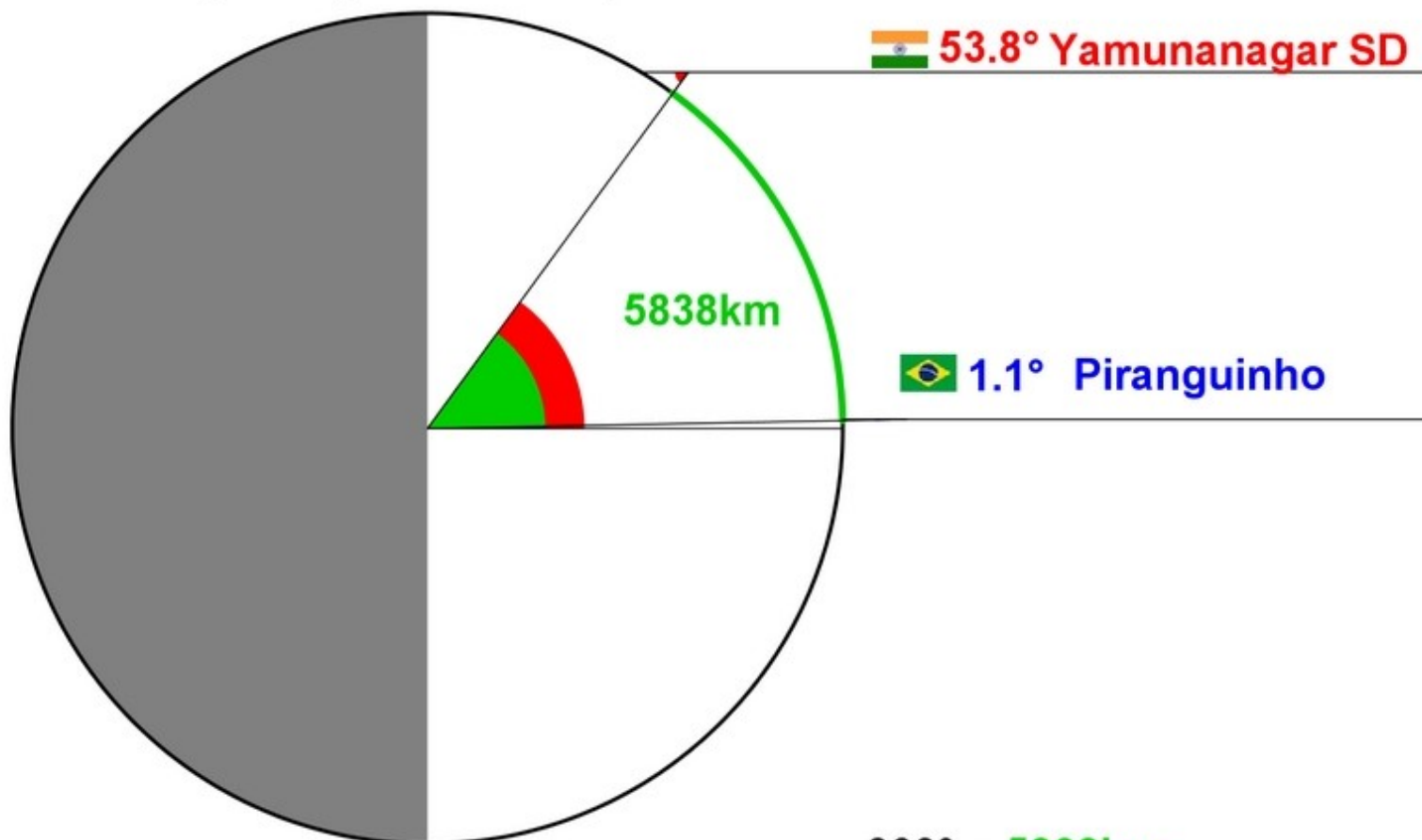


Flag	City	Country	School	Latitude (°) +N/-S	Longitude (°) +E/-W
	Yamunanagar SD	India	Spring Dales Public School	30.133	77.250

Date	Gnomon	Shadow	Angle
24 December 2019	49.0cm	67.0cm	53.8°

24/12/2019 (Yamunanagar SD-India) Latitude: 30.133°

24/12/2019 (Piranguinho-Brazil) Latitude: -22.411°



$$\text{circumference} = \frac{360^\circ \times 5838\text{km}}{53.8^\circ - 1.1^\circ} = 39880 \text{ km}$$

Distance	Angle
circumference	360°
5838km	53.8° - 1.1°



Dec 24, 2019

PLACE - SPRING DALES PUBLIC SCHOOL
 VISHNU NAGAR, WORKSHOP ROAD
 YAMUNA NAGAR

LONGITUDE : $77^{\circ} 25'' E$

LATITUDE : $30^{\circ} 13'' N$

LENGTH OF GINOMON : 49 cm

READINGS

TIME	SHADOW LENGTH (in cm)
11:56	69 cm
12:00	68 cm
12:04	67.9 cm
12:08	67.4 cm
12:12	67.2 cm
12:16	67.2 cm
12:20	67 cm
12:24	67.5 cm
12:28	67.9 cm
12:32	68 cm
12:36	68 cm
12:40	68.2 cm
12:44	68.4 cm
12:48	68.6 cm
12:52	68.8 cm
12:56	68.9 cm



