

Directions: Follow each of the following steps to begin to appreciate how Eratosthenes derived the circumference of the Earth back in 230 B.C.. Follow each step carefully!

1. In the center of a piece of paper, make a dark dot that is at least 1 mm in size.
2. Use a compass (not magnetic!) to draw a circle around the dot that has a diameter of at least 14 cm (you may make it bigger if you want).
3. From the dot in the center of the circle, use a ruler to draw a straight line all the way to the top of your paper.
4. The line you have just drawn touched the circle...label that spot "Well at Alexandria" (use a small arrow to point to the spot).
5. Make a small pen or pencil mark along the circle that is one penny distance (width) away from the "Well at Alexandria."
6. Draw a 2nd straight line that goes from the dot in the center through this newest mark and to the edge of the paper.
7. At the point where this line touches the circle label it "Wall at Syene (Aswan)."
8. Now place a pen or pencil mark on the last straight line you have drawn. Measure a distance of 2 cm from the circle towards the edge of your paper and make a small mark.
9. Now draw a straight line through this mark, but it must be parallel to the line that passes through the "Well at Alexandria." Draw this line the full length of the paper.
10. Label each of the parallel straight lines "Sunlight."
11. Use a protractor to measure the small angle that the 2 straight lines have made near the "Wall at Syene." **Record this angle:** _____
12. Measure the distance from the "Well" to the "Wall" in metric units. **Record this distance:** _____
13. The angle at the dot in the center of your circle has the same value as the angle you recently measured. Write the value of this angle near the dot and between the 2 lines.
14. Divide this angle into 360° **Record your answer:** _____
15. The number you just recorded is the number of "pieces of the pie" that make up the entire circle.
16. Multiply the number of pie pieces times the width of a penny. This is how Eratosthenes found the circumference of the Earth! **Record your answer:** _____
17. Determine the circumference mathematically by using the equation:
Circumference=(π)(diameter) (*show your math*) **Record your answer:** _____
18. Find the percent error by: (answerfrom17 - answerfrom16) ÷ answerfrom17 all times 100. This is the percent error. **What is your percent error:** _____
19. Eratosthenes calculated the circumference of the Earth within a 1.4% margin of error. Did you do better or worse? **Answer:** _____