LESSON 3.5

NAME _____ DATE _____

Math and History Application

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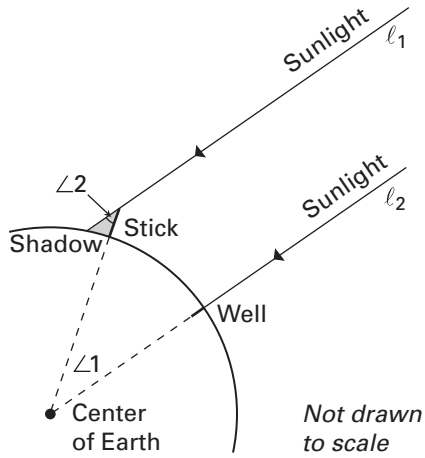
HISTORY Eratosthenes of Cyrene (276–194 B.C.) was an expert in many subjects, including mathematics, geography, astronomy, poetry, and athletics. People felt that Eratosthenes spread himself too thin by exploring so many different areas. They believed that, although Eratosthenes was second best at many things, he was first at none, and gave him the nickname "Beta" (the second letter in the Greek alphabet).

MATH Two subjects in which Eratosthenes was not merely second best, however, are mathematics and geography. Eratostheses estimated Earth's circumference by using the fact that the sun's rays are parallel.

Eratosthenes chose a day when the sun shone exactly down a vertical well in Syene at noon. On that day, he measured the angle the Sun's rays made with a vertical stick in Alexandria at noon. He discovered that $m\angle 2 \approx 7.2°$ (see figure).

At that time, the distance from Syene to Alexandria was believed to be 575 miles.



1. Explain why $m\angle 2 \approx \frac{1}{50}$ of a circle.
2. Explain why $\angle 1 \cong \angle 2$, and conclude that $m\angle 1 \approx \frac{1}{50}$ of a circle.
3. Explain why $\dfrac{575 \text{ miles}}{\text{Earth's circumference}} \approx \dfrac{1}{50}$.
4. Use the formula in Exercise 3 to estimate Earth's circumference to the nearest whole mile.
5. The actual distance from Alexandria to Syene (now called Aswan) is 500 miles. Use the distance in the formula in Exercise 3 to estimate Earth's circumference. (The modern day measurement of Earth's circumference is 24,902 miles.)