MR. NUSSBAUM
LEARNING + FUN

Eratosthenes Reading Comprehension
Name _____

Eratosthenes was a librarian, poet, mathematician, and astronomer. He was born in a Greek colony called Cyrene—located in modern day Libya—in 276 BC. When he was 40 years old, he became the chief librarian of the Library of Alexandria, an enormous repository of information from a myriad of locations and intellects. He continued collecting information throughout his lifetime and eventually contributed some findings of his own.

Eratosthenes is credited with inventing the filed of geography and developed the first system of latitude and longitude for plotting precise locations on Earth. In his system it was possible to estimate the distance from any known points on Earth at the time. He also calculated the angle of Earth's tilt and documented a catalog of 675 stars. His "sieve," known today in math classrooms as the Sieve of Eratosthenes is a method to quickly and efficiently find prime numbers. In the sieve, a list of consecutive integers is generated starting with two and ending with any number (n). After two, every second number of the list is crossed out (even numbers). Since the next number is three, every third number is crossed out in the next step. Four is crossed out, but five is next, so every fifth number is crossed out. As the pattern continues, composite (non-prime) numbers are crossed out and prime numbers such as 5, 7, 9, 11, 13, 17, and onward are left behind.

Eratosthenes' most important contribution, however, may have been his calculation of Earth's circumference using geometry and trigonometry. Eratosthenes noticed that at noon on the summer solstice in an Egyptian well, the sun's rays shone directly into the well and lit up the water—meaning that at that day and time, the sun was right above the well. He then put up a tall pole in Alexandria that cast a shadow on the summer solstice, meaning that the sun was positioned slightly south from the pole. After measuring the distance between the well and the pole and taking into account the Earth's spherical nature, Eratosthenes measured the angle of the sun's rays on the day of the solstice and related that in a proportion to the circumference of the Earth. His calculation, while not totally airtight, yielded a high degree of accuracy. The same calculations performed today, with accurate data, result in the circumference of the Earth measuring only 66 kilometers off from its actual, accepted circumference.

Eratosthenes died at the age of 82. Although most of his original writings have been lost to history, we do have evidence of his mathematical work and astronomical findings which are highly relevant in both fields today.

1. **Which of the following is OMITTED from the passage?**
   A. Information about the childhood of Eratosthenes
   B. Information about Eratosthenes's job in Alexandria
   C. Information about his contributions to the field of geography
   D. Information about his contributions to mathematics

2. **What does "repository" mean in the following sentence?**

   When he was 40 years old, he became the chief librarian of the Library of Alexandria, an enormous **repository** of information from a myriad of locations and intellects.

   A. mystery
   B. place where things are stored
   C. sanctuary
   D. religious dome

3. **Which of the following best describes how the Sieve of Eratosthenes works?**
   A. Multiples of composite numbers are used to filter out prime numbers
   B. Multiples of some prime numbers and some composite numbers are used to filter out the prime numbers
   C. Multiples of prime numbers are used to filter out composite numbers
   D. Multiples of prime numbers are used to filter out the remaining prime numbers

4. **Which of the following is true about the Sieve of Eratosthenes?**
   A. It starts with "n" and end in 100
   B. It stars with 2 and ends in "n"
   C. It starts with 2 and ends in 100
   D. It starts and ends with any numbers (n)

5. **Which of the following would most likely be taught in a geography class?**
   A. The calculation of the Earth's circumference
   B. The Sieve of Eratosthenes
   C. The catalog of stars
   D. The development of latitude and longitude

6. **Which of the following is a reasonable inference?**
   A. Most of the discoveries made by Eratosthenes were relatively simple and required little knowledge of mathematics.
   B. The angle of the sun's rays on the summer solstice could not be related to the circumference of the Earth because of the Earth's spherical nature
   C. The method Eratosthenes used to calculate the circumference of the Earth was sound, although the data available may have been inaccurate
   D. The method Eratosthenes used to calculate the Earth has proven to be somewhat flawed, although the data he used was accurate

7. **In which of the following textbooks would you expect to learn about Eratosthenes?**
   A. Greek History: The Rise and Fall of an Incredible Empire
   B. The New World: How the Discovery of Ancient Texts Influenced World Progress
   C. Early Progress: How Greek Mathematicians Used Advanced Math to Understand Properties of Earth
   D. The Sun, the Moon, and The Stars: A Beginner's Guide to Understanding Space