

The Golden Age of Greece 10

Many early civilizations believed that the natural phenomena they observed and the mystery of human existence were in the hands of a variety of gods. For a particularly creative period in Greek history (ca 600–200 B.C.), Greek scholars traveled extensively, absorbing a rich variety of ideas and ways of thinking. Building upon both new and established knowledge, they began to expand upon the concept that humans have an intellect that can discover truths through observation and experimentation.

Mathematicians in Greece, including Thales, Pythagoras, Plato, Aristotle, Euclid, Eratosthenes, and Archimedes, developed and promoted the thesis that the world was mathematically designed and that human reasoning powers could comprehend this design. These mathematicians sought to use mathematics as a tool to pursue truth, and they developed a system of thinking that explained the motions of the sun, the moon, and the planets, as well as the general construction of the universe. This system, called deduction, allowed them to show that the truth of a statement was a logical consequence of previously established statements. Because a chain of statements needs a starting point, they established axioms, or postulates, that were accepted as true without proof. All other statements followed logically from them.

In the first century A.D., several forces, such as the Roman conquest of Greece and the rise of Christianity, resulted in the destruction of many Greek accomplishments. The Christians and the Romans burned thousands of “heathen” Greek books, believing that faith, not reason, would lead to truth. Additionally, the Muslims who conquered Egypt in A.D. 640 believed that Greek literature conflicted with the teachings of the Koran, and another destruction of Greek books took place in Alexandria. Fortunately, about a century later the city of Baghdad (the capital of what is now Iraq) became a flourishing intellectual center and established a library. Librarians collected many classic Greek texts from scholars who had fled the destruction of the early Greek and Alexandrian academies and libraries. By the end of the ninth century, the texts had been preserved, translated into Arabic for future study. (For more on Islamic mathematics, see vignettes 27, 29, 30, 31, 35, and 40.)

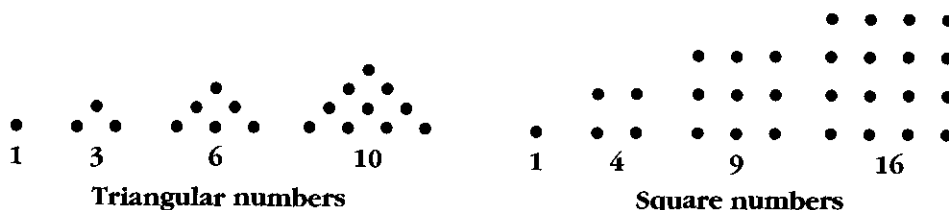
For more on the mathematics of ancient Greece and Alexandria, see vignettes 9, 11, 12, 13, 15–20, 23, 64, and 73. ★



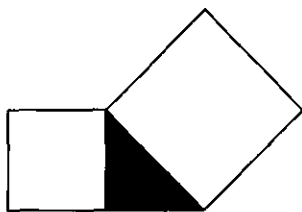
Map of ancient Greece, engraved by Petrus Kerius for A Universal History (Edinburgh, 1776).

Activities

1. Pythagoras and his followers were fascinated by number patterns, such as those shown.
 - a. Find the fifth and sixth triangular numbers.
 - b. Find the fifth and sixth square numbers.



2. Can you find the number sets from Activity 1 in Pascal's triangle?
3. In Plato's dialogue *Meno*, a young slave concludes that a square constructed on the hypotenuse of an isosceles right triangle has twice the area of a square constructed on one of the legs.
 - a. Construct an isosceles right triangle and the squares on both legs. Cut out the two smaller squares, then cut them into pieces that demonstrate that the sum of the areas is the area of the square on the hypotenuse.
 - b. Prove that this assertion is true for any isosceles right triangle.
4. What were some of the important mathematical concepts developed by **Aristotle** (384–322 B.C.)?



Related Reading

Aaboe, Asger. *Episodes from the Early History of Mathematics*. Washington, DC: Mathematical Association of America, 1978.

Bell, E. T. *The Last Problem*. Washington, DC: Mathematical Association of America, 1990.

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