Activity 49. Read the article to discriminate between arithmetic and number theory.

The branch of mathematics concerned with computations using numbers is called arithmetic. This can involve a number of specific topics — the study of operations on numbers, such as addition, multiplication, subtraction, division, and square roots, needed to solve numerical problems; the methods needed to change numbers from one form to another (such as the conversion of fractions to decimals and vice versa); or the abstract study of the number systems, number theory, and general operations on sets as defined by group theory and modular arithmetic, for instance.

The word arithmetic comes from the Greek word “arithmetiké”, constructed from “arithmós” meaning “number” and “techné” meaning “science.” In the time of ancient Greece, the term “arithmetic” referred only to the theoretical work about numbers, with the word “logistic” used to describe the practical everyday computations used in business. Today the term “arithmetic” is used in both contexts.

The study of the arithmetic properties of numbers is called number theory. The fact that many simple statements about numbers can be extraordinarily difficult to prove, if at all possible, makes this topic an alluring and stimulating subject for mathematicians. (Goldbach’s conjecture, for instance, remains unsolved.)

Elementary number theory is the study of those topics in number theory that utilize only the basic techniques of arithmetic and high-school mathematics in their solutions. For example, the classification of the Pythagorean triples would be considered a problem in elementary number theory, as would the solution of many Diophantine equations. (The use of the word “elementary” here by no means implies that the level of mathematical sophistication used is elementary.) Analytic number theory incorporates the notion of limit in the study of numbers, and algebraic number theory extends the study of number theory to a general study of algebraic numbers and new number systems that include solutions to otherwise unsolvable algebraic equations.

(from Encyclopaedia Britannica)