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## Description

We shall build a mathematical framework that is based on logic and reason. We shall learn how to make sound arguments and to detect where certain arguments go wrong. Thus, we shall discuss the basic principles of logic and the basic types of proofs. In doing so, we shall encounter numbers such as,  $e$ ,  $i$ , the *Fibonacci numbers*, and *the golden ratio*, and we shall examine what makes these numbers special. We will discuss the concepts of sets, relations, functions, permutations and combinations, and how they are used to describe certain phenomena. Our fundamental tool in all of this is plain common sense. You really do not need your toolbox of mathematical formulas learned in previous studies. Neither do you need a calculator. Pen and paper are the basic instruments needed. After having discussed any topic to some extent, tempting exercises will be provided to be made in class or at home, since Mathematics is mainly learned by practising over and over again.

## Knowledge and understanding

Students know how to use logic, functions, relations, sets, permutations and combinations and related mathematical symbols correctly. Besides they know how to apply several types of mathematical proofs.

## Making Judgements

Students should be able to decide whether an argument is mathematically, logically correct. They should have a critical attitude and an awareness of possible flaws in arguments.

## Communication

Students learn to discuss mathematical problems to each other.

## Skills

Students learn to think in a problem-solving way and learn to reason in a mathematically correct way.