

Prerequisites

In terms of the *mathematical development* of this volume, only a knowledge of **whole numbers**, $0, 1, 2, 3, \dots$, is assumed. Thus along with place value, you are assumed to know the four arithmetic operations, their standard algorithms, and the concept of **division-with-remainder** and how it is related to the long division algorithm.¹ Division-with-remainder assigns to each pair of whole numbers b (the dividend) and d (the divisor), where $d \neq 0$, another *pair* of whole numbers q (the quotient) and r (the remainder), so that

$$b = qd + r \quad \text{where } 0 \leq r < d.$$

Some subtle points about the concept of *division* among whole numbers will be briefly recalled at the beginning of Section 1.5 on page 54. A detailed exposition of the concept of "division" among whole numbers is given in Chapter 7 of [Wu2011a].

Note that 0 is included among the whole numbers.

A knowledge of negative numbers, particularly integers, is not assumed. Negative numbers will be developed ab initio in Chapter 2.

Because every assertion in these three volumes (this volume, together with [Wu2020b] and [Wu2020c]) will be proved, students should be comfortable with mathematical reasoning. It is hoped that as they progress through the volumes, all students will become increasingly at ease with proofs. In terms of the *undergraduate curriculum*, readers of this volume—as a rule of thumb—should have already taken the usual two years of college calculus or their equivalents.

¹Unfortunately, a correct exposition of this topic is difficult to come by. Try Chapter 7 of [Wu2011a].