

Assumptions & Context

This is the background that I'm assuming would already have been built up before introducing the students to long division:

- The multiplication table, what I here refer to as *facts* (e.g. $3 \times 4 = 12$)
- The division *facts* that correspond to entries on the multiplication table (e.g. $3 \times 4 = 12 \rightarrow 12 \div 4 = 3$ and $12 \div 3 = 4$)
- The idea of an *algorithm* as a list of steps that can be mechanically applied to perform some arithmetic. By now the students will have already encountered the algorithms for addition, subtraction, and multiplication.
- The subject of remainders will be left until the lesson after the introduction to the division algorithm. For this intro all examples and homework problems will be constructed to divide evenly.
- We are working in the set of natural numbers. Discussions involving
- I am writing this content as a section in a chapter on division. Here is a rough outline of the chapter I envision:
 - §1: Division Facts
Learn all the division math facts associated with the corresponding math facts from the multiplication table
 - §2: Remainders
Use multiplication facts and skip counting to answer the questions “how many times does n fit into m ?” and “what is the remainder afterward?”
 - §3: The Division Algorithm (← **You are here**)
Introduction to the standard “long” division algorithm using divisors from the multiplication table
 - §4: Remainders & The Division Algorithm
Continued practice with the division algorithm now allowing for nonzero remainders
 - §5: Divisibility Rules
Rules that allow determining whether a divisor divides a dividend “evenly” (with zero remainder) without executing the division algorithm.
 - §6: Shortcuts For The Division Algorithm
Demonstrate tips for simplifying the application of the division algorithm as well as when to apply them.

The Long Division Algorithm

Remember!

We have already seen that *division* is the undoing of a multiplication:

$$3 \times 4 = 12 \rightarrow 12 \div 4 = 3$$

Example

	2	7	5
3	8	2	5
-	6		
	2	2	
-	2	1	
		1	5
	-	1	5
			0