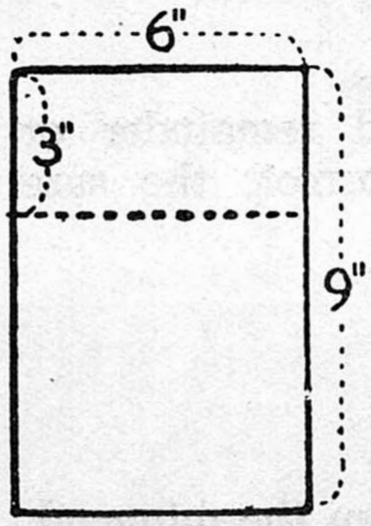
PRACTICAL HELPS *in Learning* SUBTRACTION

How to Solve a Problem that is Always Turning Up in Everyday Life—that of Taking One Number from Another and Finding Out What Number Remains

SUBTRACTION. Suppose we wish to know the distance between Carlisle and Glasgow. We find that Carlisle is 299 miles from London by railway, while Glasgow is 401 miles from London. The solution of this problem means that we must compare these two distances with a view to finding the *difference* between them, or, looking at it in another way, to finding how much greater 401 is than 299. To help us solve this problem let us first consider some simple examples of subtraction.

1. If a sheet of paper is 6 inches wide and 9 inches long, how may it be cut to make it square? Since we know from our study of addition that $9 = 6 + 3$, we cut off 3 inches from the longer side. When we place a 6-inch line beside a 9-inch line we find that 3 inches must be added to the 6-inch line to make it 9 inches long, or that 3 inches must be taken from the 9-inch line to make it equal to the 6-inch line. In other words, 3 is the *difference* between 6 and 9.



2. One basket of grapes weighs 9 lb., another 14 lb. How much more does the heavier one weigh? 5 lb. is the *difference* in weight.

3. It is 10 o'clock. How many more hours to 12 o'clock? 2 hours is the *difference* in time.

In the paper problem above, the difference can be measured directly. In the weight and time problems that follow it, the difference can be found by counting from 9 up to 14 or from 10 up to 12, as the case may be; for example, 10, 11, 12, 13, 14 (5 numbers counted, then 14 is 5 greater than 9). Differences, however, need not be counted if the *addition* facts are known. For example, since $9 + 5 = 14$, when 9 is given, it follows that, to make it into 14, 5 more are needed.

Remainders

4. If from a rope 15 feet long a piece 8 feet long is cut, how much rope remains?

Solution: Here we may count the numbers from 8 to 15 and find that there are 7 of them. Hence the *remainder* is 7 feet. A better way is to remember that if 8 is one of the two numbers whose sum is 15, the other is 7. It is clear that a remainder left after taking away part of a number is found just as an excess or a difference in value is found between two numbers.

5. Henry had 17 marbles and lost 9. How many had he left? We may count from 9 up to 17 and conclude that Henry had 8 marbles left; or we may set out 17 counters, then remove or subtract 9 of them and count the number left. The first method is adopted for further treatment of this subject.

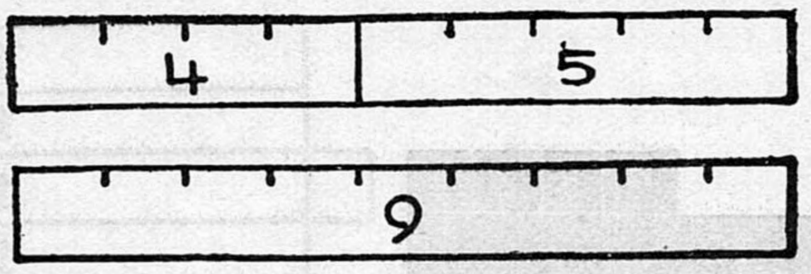
To compute *differences* or *remainders*, it is necessary to know 81 elementary subtraction facts or combinations, as follows:

2 − 1 = 1	3 − 1 = 2	4 − 1 = 3	5 − 1 = 4	6 − 1 = 5	7 − 1 = 6	8 − 1 = 7	9 − 1 = 8	10 − 1 = 9										
	3 − 2 = 1	4 − 2 = 2	5 − 2 = 3	6 − 2 = 4	7 − 2 = 5	8 − 2 = 6	9 − 2 = 7	10 − 2 = 8	11 − 2 = 9									
		4 − 3 = 1	5 − 3 = 2	6 − 3 = 3	7 − 3 = 4	8 − 3 = 5	9 − 3 = 6	10 − 3 = 7	11 − 3 = 8	12 − 3 = 9								
			5 − 4 = 1	6 − 4 = 2	7 − 4 = 3	8 − 4 = 4	9 − 4 = 5	10 − 4 = 6	11 − 4 = 7	12 − 4 = 8	13 − 4 = 9							
				6 − 5 = 1	7 − 5 = 2	8 − 5 = 3	9 − 5 = 4	10 − 5 = 5	11 − 5 = 6	12 − 5 = 7	13 − 5 = 8	14 − 5 = 9						
					7 − 6 = 1	8 − 6 = 2	9 − 6 = 3	10 − 6 = 4	11 − 6 = 5	12 − 6 = 6	13 − 6 = 7	14 − 6 = 8	15 − 6 = 9					
						8 − 7 = 1	9 − 7 = 2	10 − 7 = 3	11 − 7 = 4	12 − 7 = 5	13 − 7 = 6	14 − 7 = 7	15 − 7 = 8	16 − 7 = 9				
							9 − 8 = 1	10 − 8 = 2	11 − 8 = 3	12 − 8 = 4	13 − 8 = 5	14 − 8 = 6	15 − 8 = 7	16 − 8 = 8	17 − 8 = 9			
								10 − 9 = 1	11 − 9 = 2	12 − 9 = 3	13 − 9 = 4	14 − 9 = 5	15 − 9 = 6	16 − 9 = 7	17 − 9 = 8	18 − 9 = 9		

The thirty-six combinations on the right of the heavy lines are usually learned in second stage.

The forty-five combinations on the left of the heavy lines are usually learned in the first stage.

These must become thoroughly familiar, but they should require little practice if the addition facts are well committed. Since $4 + 5 = 9$, then it follows as a consequence that $9 - 5 = 4$; also $9 - 4 = 5$. If 4 and 5 put together make 9, then, when either is wanting, the other is needed to make 9.



Here is a drill chart for subtraction. Draw it on a large sheet of paper, put in the centre some number between 10 and 20, and give quickly the difference between this and the other numbers as they are pointed to. Change the number in the centre frequently.

3	7	4
6		8
2	9	5