

## Lesson 2

# SUBTRACT WHOLE NUMBERS

# SUBTRACT DECIMALS

In this Lesson, we will answer the following:

### HOW DO WE SUBTRACT BY REGROUPING?

To subtract means to find what number we must add to the smaller number. Thanks to the calculator, to find that number by a written method is fast becoming a historical subject. We will discuss here the most common method known as regrouping ("borrowing").

How do we subtract by regrouping?

$$\begin{array}{r} 42 \\ -16 \\ \hline \end{array} = \begin{array}{r} 4 \text{ tens} + 2 \text{ ones} \\ -1 \text{ ten} - 6 \text{ ones} \\ \hline \end{array} = \begin{array}{r} 3 \text{ tens} + 12 \text{ ones} \\ -1 \text{ ten} - 6 \text{ ones} \\ \hline \end{array}$$

When a digit in the bottom number is larger, decompose 1 unit of higher value into 10 units of the next lower value, and regroup.

### Example 1.

$$\begin{array}{r} 542 \\ -196 \\ \hline \end{array}$$

We cannot take 6 ones from 2 ones. Therefore, we must decompose 1 of the 4 tens -- break it up -- into 10 ones, and regroup them onto the ones column.

$$\begin{array}{r} 5 \overset{3}{\cancel{4}} 12 \\ -196 \\ \hline 6 \end{array}$$

We now have 3 tens and 12 ones. "6 ones from 12 ones are 6 ones."

Next, we cannot take 9 tens from 3 tens. So we decompose 1 of the 5 hundreds into 10 tens, and again regroup. We now have 4 hundreds and 13 tens:

$$\begin{array}{r} 4 \ 13 \\ \cancel{5} \ \cancel{4} \ 12 \\ \underline{1 \ 9 \ 6} \\ 4 \ 6 \end{array}$$

"9 tens from 13 tens are 4 tens."

Finally,

$$\begin{array}{r} 4 \ 13 \\ \cancel{5} \ \cancel{4} \ 12 \\ \underline{1 \ 9 \ 6} \\ 3 \ 4 \ 6 \end{array}$$

"1 hundred from 4 hundred is 3 hundred."

We can always check the difference 346 by *adding* it to the smaller number. "6 plus 6 is 12. 4 plus 9 is 13, plus 1 is 14." And so on.

Now, this is the *concept* of subtraction with regrouping. In actual practice, the student should try not to write the crossings out or the regrouped numbers. The student should practice those steps mentally. The answer can always be checked by adding.

In other words, with practice the student should be able to say:

$$\begin{array}{r} 5 \ 4 \ 2 \\ \underline{1 \ 9 \ 6} \\ 3 \ 4 \ 6 \end{array}$$

"6 from 12 is 6."

"9 from 13 is 4."

"1 from 4 is 3."

We will do the following example completely in the expanded form.

## Example 2.

$$\begin{array}{r} 6000 \\ -1234 \\ \hline \end{array}$$

$$\begin{array}{r} 6 \text{ thousands} + 0 \text{ hundreds} + 0 \text{ tens} + 0 \text{ ones} \\ - 1 \text{ thousand} - 2 \text{ hundreds} - 3 \text{ tens} - 4 \text{ ones} \\ \hline \end{array}$$

The problem will appear, of course, like this:

$$\begin{array}{r} 6000 \\ 1234 \\ \hline 4766 \end{array}$$

And with practice, the student should be able to say,

"4 from 10 is 6."

"3 from 9 is 6."

"2 from 9 is 7."

"1 from 5 is 4."

Again, we can always check the answer by adding.

As in addition, we must align the digits that have the same place value.

Example. Your checking account has a balance of \$310.12, and you write a check for \$45.24. Then you make a deposit of 126.75, and you write another check for \$22.50. What is your present balance?

**Answer.** Each time you write a check, you must subtract. And each time you make a deposit, you add. Here then is the sequence of subtractions and additions:

$$\begin{array}{r} 310.12 \quad \text{Opening balance} \\ - \underline{45.24} \quad \text{Check} \\ 264.88 \\ + \underline{126.75} \quad \text{Deposit} \\ 391.63 \\ - \underline{22.50} \quad \text{Check} \\ 369.13 \quad \text{Present balance} \end{array}$$