

Long Division

What is Long Division?

Long division is a mathematical method we use to divide large numbers. It helps us figure out how many times one number can be divided by another number without leaving any remainder.

Steps of Long Division

Long division has four main steps: Divide, Multiply, Subtract, and Bring down. Let's look at each step in more detail:

1. **Divide:** We start by dividing the first digit(s) of the dividend (the number we want to divide) by the divisor (the number we are dividing by). We write the answer above the dividend.

For example, let's say we have to divide 432 by 6. We divide 4 by 6 first. The largest whole number we can divide 4 by is 0 (because 6 is bigger than 4), so we write 0 above the 4.

$$0 \quad \text{----} \quad 6 \mid 432$$

2. **Multiply:** Next, we multiply the divisor (6) by the first digit of the answer we wrote above (which is 0). We write the product (the answer when we multiply) under the dividend.

In our example, we multiply 6 by 0, which gives us 0. We write 0 under the 4.

$$0 \quad \text{----} \quad 6 \mid 432 \quad - 0$$

3. **Subtract:** Now, we subtract the product we just found (0) from the digit(s) of the dividend above it. We write the difference (the answer when we subtract) below the line.

In our example, we subtract 0 from 4, which gives us 4. We write 4 below the line.

$$0 \quad \text{----} \quad 6 \mid 432 \quad - 0 \quad \text{---} \quad 4$$

4. **Bring down:** If there are more digits left in the dividend, we bring them down next to the remainder we just found.

In our example, we bring down the 3 next to the 4.

$$0 \quad \text{----} \quad 6 \mid 432 \quad - 0 \quad \text{---} \quad 43$$

Now, we repeat the process by starting again from step 1. We divide 43 by 6 and continue until we have no more digits to bring down.

Repeat until Done

We keep following the four steps of long division until there are no more digits to bring down. We divide, multiply, subtract, and bring down until we have finished dividing or until we get a remainder of 0.

Let's continue our example:

$$0 \quad \text{-----} \quad 6 \mid 432 \quad - 0 \quad \text{---} \quad 43 \quad 42 \quad \text{----} \quad 1$$

We divide 42 by 6 and get 7. Then we bring down the final digit, 2. Since 2 is smaller than 6, we can't divide it evenly anymore. So, our last answer is 72 with a remainder of 1.

Practice Makes Perfect

Long division can seem tricky at first, but with practice, it becomes easier. You can use division grids, number lines, or base ten blocks to help you understand and solve long division problems.

Try working on some long division problems with your teacher or classmates. The more you practice, the more confident you will be!

Remember, you have the power to divide and conquer!