

Long Division: How It Works

Four steps, over and over: divide, multiply, subtract, bring down.

1. The parts of a division problem

$$\begin{array}{r} 23 \\ 4 \overline{)92} \end{array}$$

divisor dividend

—— quotient (the answer)

$92 \div 4$ asks: **how many 4s are in 92?** The number being divided goes inside. The number you divide by goes outside. The answer is written on top, one digit at a time.

2. Four steps, then repeat

1. Divide

$$\begin{array}{r} 2 \\ 4 \overline{)92} \end{array}$$

How many 4s are in 9? Two. Write 2 above the 9.

2. Multiply

$$\begin{array}{r} 2 \\ 4 \overline{)92} \\ - 8 \end{array}$$

$2 \times 4 = 8$. Write 8 under the 9.

3. Subtract

$$\begin{array}{r} 2 \\ 4 \overline{)92} \\ - 8 \\ \hline 1 \end{array}$$

$9 - 8 = 1$. Write 1 under the line.

4. Bring down

$$\begin{array}{r} 2 \\ 4 \overline{)92} \\ - 8 \\ \hline 12 \end{array}$$

Bring down the next digit, 2. Now you have 12.

Repeat

$$\begin{array}{r} 23 \\ 4 \overline{)92} \\ - 8 \\ \hline 12 \\ - 12 \\ \hline 0 \end{array}$$

Same steps with 12. Three 4s are 12, and $12 - 12 = 0$. The answer is 23.

The order never changes: **D**ivide, **M**ultiply, **S**ubtract, **B**ring down. Some people remember it as **Dad, Mom, Sister, Brother**.

3. When there is something left over

$$\begin{array}{r} 25 \text{ R } 2 \\ 3 \overline{)77} \\ - 6 \\ \hline 17 \\ - 15 \\ \hline 2 \end{array}$$

After the last subtraction there is 2 left and no more digits to bring down. That 2 is the **remainder**. Write it beside the answer: 25 R 2.

Check with multiplication

Multiply the answer by the divisor, then add the remainder. You should get the number you started with.

$$25 \times 3 = 75$$

$$75 + 2 = 77$$



Watch out

When the divisor does not go into the number, **write a 0** in the answer, then bring down the next digit. In $612 \div 6$ there are no 6s in 1, so a 0 goes above the 1.

Leave it out and you get 12 when the answer is 102.

Keep every digit in its own column. Graph paper helps.

$$\begin{array}{r} 102 \\ 6 \overline{)612} \\ - 6 \\ \hline 12 \\ - 12 \\ \hline 0 \end{array}$$