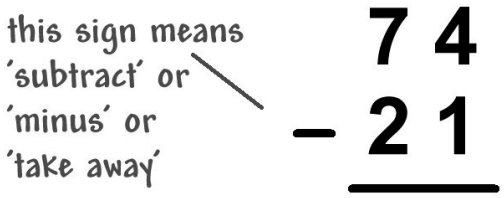
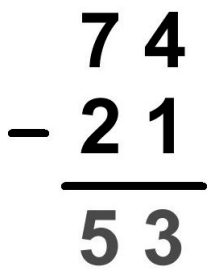
SUBTRACTION – THE 'PAIR OF 1s' METHOD

Although everyone uses calculators these days, it's worth knowing how to do arithmetical procedures such as **addition**, **subtraction** (a.k.a. **minus** or **taking away**), **multiplying** and **dividing**. To start with, you might lose your calculator or it may have got broken. Also, these exercises will keep your brain sharp and improve your thinking processes. Use it or lose it!

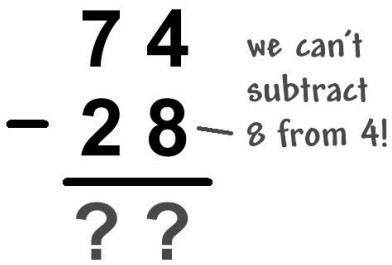
Let's start off with an easy sum: **74 subtract** (or **minus** or **take away**) **21**. We would write:



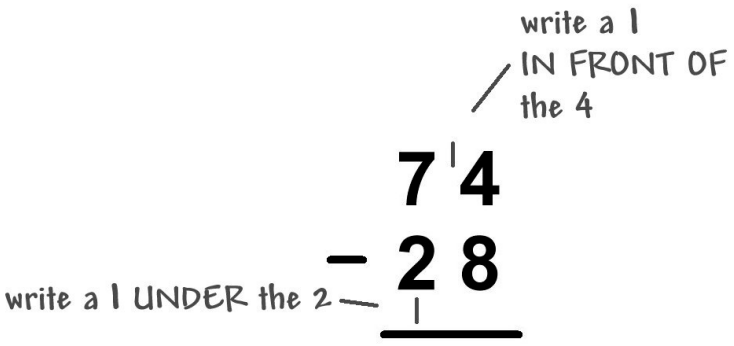
Easy, isn't it? Start at the right side, with **4** subtract **1**, which leaves **3**. Then **7** subtract **2**, which leaves **5**. Answer: **53**. We would write:



Here's another sum, **74** subtract **28**. We have a problem as soon as we start: We can't subtract 8 from 4.



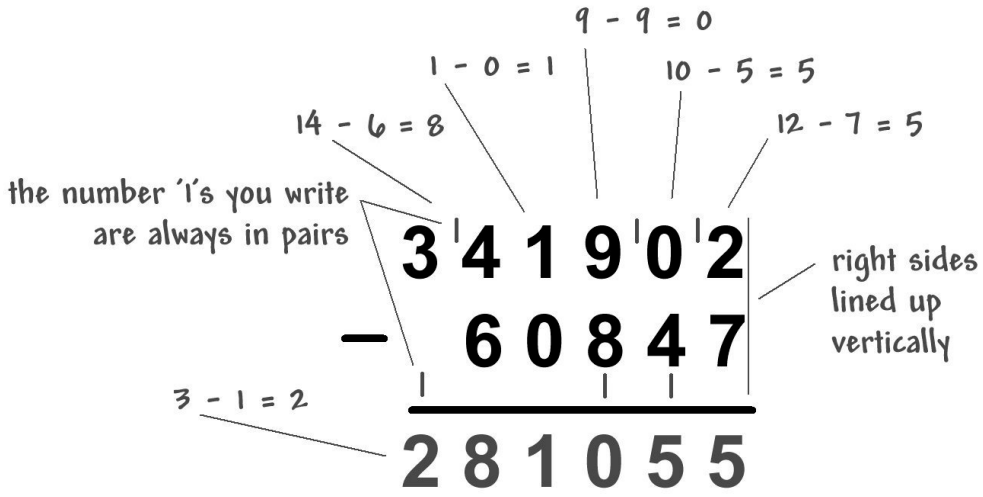
But now watch: Let's write a number **1** **<u>in front of</u>** the **4** and another number **1** **<u>under</u>** the **2**, like this:



We've made the **4** into **14** and the **2** into **2+1**, which is **3**. Now we can complete the sum. **14 – 8** is **6**, and **7 – 3** is **4**. We would write:

$$\begin{array}{r} {}^{1}7\,{}^{1}4 \\ -\ 2\ 8 \\ \hline 4\ 6 \end{array}$$

To find out why this works, look at the next page. Now let's try a bigger sum:



Let's summarise the method:

- the number you're subtracting another number from is written at the top
- the number you're subtracting is written at the bottom
- write the numbers so that the right hand numbers are lined up vertically and the other numbers are also correctly lined up in their columns so you don't make mistakes
- if you can't subtract the bottom number from the top number in a column, write a 1 **in front of** the top number and write a 1 **under** the bottom number in the column to the **left** of the one you're working on. Remember, these 1s are **always** in **pairs**
- check your answer by adding it to the bottom number. If you arrive back at the top number you have done the sum correctly

HOW DOES IT WORK?

Why does the 'pair of 1s' method work? Taking one of our previous examples, we can say that **74** equals **70 + 4** and **28** equals **20 + 8**. So we can write:

$$\begin{array}{r} 74 \\ -\ 28 \\ \hline \end{array} \quad \text{is the same as} \quad \begin{array}{r} (70 + 4) \\ -\ (20 + 8) \\ \hline \end{array}$$

We added 10 to make the 4 into 14 so we must somehow remove it again to keep everything balanced. So instead of subtracting 20 from 70, we must subtract 30. So we can write:

$$\begin{array}{r} (70 + 4) \\ -\ (20 + 8) \\ \hline \end{array} \quad \text{is the same as} \quad \begin{array}{r} (70 + 14) \\ -\ (30 + 8) \\ \hline 40 + 6 \end{array}$$

And so we arrive at the correct answer:

$$\begin{array}{r} 7\,{}^{1}4 \\ -\ 2\,{}_{1}8 \\ \hline 46 \end{array}$$