

Can you build and break down numbers?

CAPS Statement

Numbers operations and relationships

Whole numbers: addition and subtraction

Building up and breaking down numbers

Note

When we work with numbers we can split the number into units, tens, hundreds, thousands, ten thousands and hundred thousands. For example:

Number	Hundred thousands (100 000)	Ten thousands (10 000)	Thousands (10000)	Hundreds (100)	Tens (10)	Units (1)
3960	0		3	9	6	0
13480	0	1	3	4	8	0
120321	1	2	0	3	2	1
420321	4	2	0	3	2	1
25008	0	2	5	0	0	8
97032	0	9	7	0	3	2

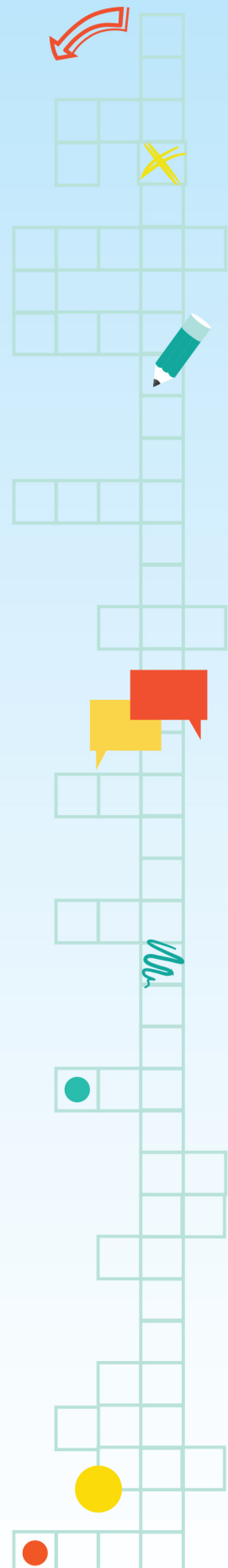
When the numbers are written like this it is easy to add and subtract them. The method of breaking up or breaking down numbers to add and subtract will be shown below:

Adding in a row (horizontally)

Example: $49642 + 32916 + 21713$

$$\begin{aligned}
 &= 40000 + 9000 + 600 + 40 + 2 + 30000 + 2000 + 900 + 10 + 6 + 20000 + 1000 + 700 \\
 &\quad + 10 + 3 \\
 &= 40000 + 30000 + 20000 + 9000 + 2000 + 1000 + 600 + 900 + 700 + 40 + 10 + 10 + 2 \\
 &\quad + 6 + 3 \\
 &= 90000 + 12000 + 2200 + 60 + 11 \\
 &= 90000 + 10000 + 2000 + 2000 + 200 + 60 + 10 + 1 \\
 &= 100000 + 4000 + 200 + 70 + 1 = 104271
 \end{aligned}$$

The above method can get messy if more than 4 digit numbers must be added together.





Breaking down all the numbers to add. Expanded vertical method.

$$\begin{aligned}
 49642 &= 40000 + 9000 + 600 + 40 + 2 \\
 + 32916 &= 30000 + 2000 + 900 + 10 + 6 \\
 + 21713 &= 20000 + 1000 + 700 + 10 + 3 \\
 \hline
 &= 90000 + 12000 + 2200 + 60 + 11 \\
 &= 90000 + 10000 + 2000 + 2000 + 200 + 60 + 10 + 1 \\
 &= 100000 + 4000 + 200 + 70 + 1 \\
 &= 104271
 \end{aligned}$$

Adding on (by breaking down the number to be added).

Only use this method when two numbers are added.

$$\begin{aligned}
 49642 + 21713 &= 49642 + 20000 \\
 &= 69642 + 1000 \\
 &= 70642 + 700 \\
 &= 71342 + 10 \\
 &= 71352 + 3 \\
 &= 71355
 \end{aligned}$$

Let us turn our focus to subtraction. Remember that when we subtract we are not allowed to subtract a bigger number from a smaller number. We cannot subtract 80 from 60.

Breaking down all the numbers according to place value parts to subtract using compensation (counterbalance).

Let us subtract 21713 from 49642: $49642 - 21713$.

This method breaks up the number into ten thousands, thousands, hundreds, tens and units. We can see that in this calculation we need to subtract 700 from 600 (hundreds) and 3 from 2 (units), which we cannot do. Therefore we need to break up 49642 in a clever way. This is how it is done:

$$\begin{aligned}
 49642 - 21713 &= 40000 + 8000 + 1600 + 30 + 12 - 20000 - 1000 - 700 - 10 - 3 \\
 &= 40000 - 20000 + 8000 - 1000 + 1600 - 700 + 30 - 10 + 12 - 3 \\
 &= 20000 + 7000 + 900 + 20 + 9 = 27929
 \end{aligned}$$

Breaking down numbers and using the expanded column method.

$$\begin{array}{rcllcl}
 49642 & = & 40000 & + 8000 & + 1600 & + 30 & + 12 \\
 -21713 & = & -20000 & -1000 & -700 & -10 & -3 \\
 \hline
 & & 20000 & + 7000 & + 900 & + 20 & + 9 \\
 & = & 27929 & & & &
 \end{array}$$



Activity 1

Do the following calculations. Use any of the above methods.

$$72121 + 69525 + 81818 =$$

$$76890 - 26778 =$$

$$99767 + 23424 =$$

$$43167 - 15682 =$$

$$72734 + 46340 + 59740 + 10101 =$$

$$12765 - 9567 =$$

Teacher Tip

Let learners use these methods in class, this is a way to strengthen learners' mental calculations.

