

Progression in calculation

Subtraction

Children need to understand the concept of addition, that it is:

- Removal of an amount from a larger group (take away)
- Comparison of two amounts (difference)

They also need to understand and work with certain principles:

- Inverse of addition
- Is not commutative
i.e. $5 - 3 \neq 3 - 5$
- Is not associative
i.e. $(9 - 3) - 2 \neq 9 - (3 - 2)$

Key vocabulary

- subtract, take away, minus, decrease leave,
- how many are left/left over?
- difference between
- how many fewer is... than...?
- how much more/less is...?
- equals, sign, is the same as
- borrow

Progression in calculation - subtraction

	Mental strategies	Written strategies
Reception	Count back from 20 One less than a given number Number songs, rhymes and stories Practical subtraction	
Year 1	Number bonds and related subtraction facts for 10 and 20 Practically subtract 1 and 2 digit numbers from numbers up to 20 Subtracting 0	Read, write and interpret mathematical statements using - and = Singles jumps on a number track
Year 2	Fluently recall subtraction facts for numbers to 20 and use to derive facts to 100 TU - U Multiples of 10	Empty number line TU - TU
Year 3	HTU - U HTU - multiples of 10 HTU - multiples of 100	Introduce expanded method HTU - HTU
Year 4	Take away multiples of 1000 Count through 0 to negative numbers	Expanded method ThHTU - ThHTU Borrowing
Year 5	Mentally subtract increasingly larger numbers	Column subtraction ThHTU - ThHTU
Year 6	Mixed operations	BODMAS Column subtraction More than four digits including decimals

Written calculation methods for subtraction

Using a number line

1. Extend the number sentence by partitioning the second number in the number sentence into tens and units.

$$73 - 35$$
$$73 - 30 - 5$$

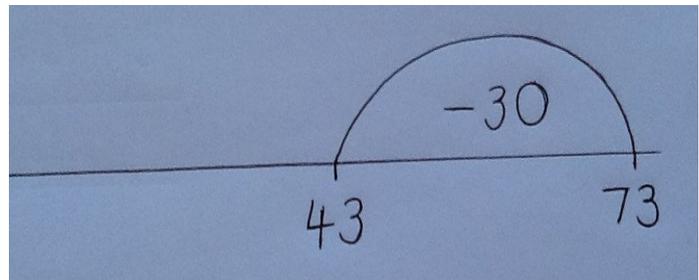
2. Draw a horizontal line using a ruler.



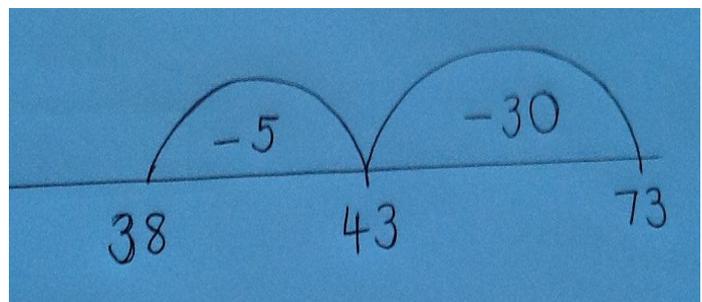
3. Write the first number of the number sentence to the right hand end of the number line.



4. Subtract the tens number (in one jump or as smaller jumps of 10). Record the value of the jump inside the jump and the number left underneath the line.



5. Subtract the units number (in one jump or as smaller jumps of 1). Record the value of the jump inside the jump and the number you land on underneath the line.



6. Complete the number sentence.

$$73 - 35 = 38$$

Prior learning/skills and concepts they need to understand:

- place value
- partitioning
- mental subtraction

Written calculation methods for subtraction

Expanded method

1. Partition each number in the calculation and use place value to line them up underneath each other.

$$\begin{array}{r} 347 - 162 \\ 300 \quad 40 \quad 7 \\ 100 \quad 60 \quad 2 \end{array}$$

2. Draw a big take away sign to the left hand side and a set of equals bars.

$$\begin{array}{r} 347 - 162 \\ - \quad 300 \quad 40 \quad 7 \\ \quad 100 \quad 60 \quad 2 \\ \hline \end{array}$$

3. Take away the bottom number from the top number starting with the units.

$$\begin{array}{r} 347 - 162 \\ - \quad 300 \quad 40 \quad 7 \\ \quad 100 \quad 60 \quad 2 \\ \hline \qquad \qquad \qquad 5 \\ \hline \end{array}$$

4. If the top number is smaller than the bottom number 'borrow' from the column to the left.

$$\begin{array}{r} 347 - 162 \\ \quad 200 \\ \quad \cancel{300} \quad 140 \quad 7 \\ - \quad 100 \quad 60 \quad 2 \\ \hline \qquad \qquad \qquad 80 \quad 5 \\ \hline \end{array}$$

5. Continue across to complete the calculation.

$$\begin{array}{r} 347 - 162 \\ \quad 200 \\ \quad \cancel{300} \quad 140 \quad 7 \\ - \quad 100 \quad 60 \quad 2 \\ \hline \quad 100 \quad 80 \quad 5 \\ \hline \end{array}$$

6. Recombine the numbers between the equals bars and complete your number sentence.

$$347 - 162 = 185$$

Prior learning/skills and concepts that they need to understand:

- place value
- partitioning
- mental calculation of units and multiples of 10

Written calculation methods for subtraction

Formal written method (column subtraction)

1. Set out calculation using place value columns.

$$\begin{array}{r} 5347 - 2173 \\ - \quad 2173 \\ \hline \\ \hline \end{array}$$

2. Take away the bottom number from the top number starting with the units.

$$\begin{array}{r} 5347 \\ - 2173 \\ \hline \\ \hline \quad 4 \end{array}$$

3. If the top number is smaller than the bottom number 'borrow' from the column to the left.

$$\begin{array}{r} ^2 \\ 5\cancel{3}^147 \\ - 2173 \\ \hline \\ \hline \quad 74 \end{array}$$

4. Continue across.

$$\begin{array}{r} ^2 \\ 5\cancel{3}^147 \\ - 2173 \\ \hline 3174 \\ \hline \end{array}$$

5. Complete your number sentence.

$$5347 - 2173 = 3174$$

Prior learning/skills and concepts that they need to understand:

- place value
- expanded method
- columns
- borrowing
- mental subtraction

What is BODMAS? It stands for 'brackets', 'other', division', 'multiplication', 'addition' and 'subtraction'. The order in which we carry out a calculation is important.

Order of operation

What is $2 + 3 \times 4$?

If we calculate the '2 + 3' part first, we get:

$$(2 + 3) \times 4 = 5 \times 4 \\ = 20$$

If we calculate the '3 x 4' part first, we get:

$$2 + (3 \times 4) = 2 + 12 \\ = 14$$

These are obviously two different answers — but which one is correct?

BODMAS tells us that 'multiplication' comes before 'addition', so the **second** answer is correct:

$$2 + 3 \times 4 = 2 + 12 = 14$$