

# Anstey Junior School

## Anstey Junior School

---

### Progression in calculation

Here are the stages in building up to a compact, efficient method for the four operations:

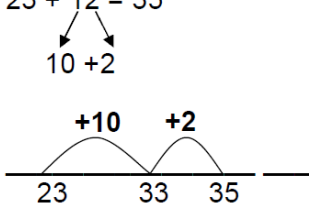
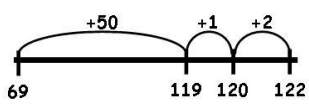
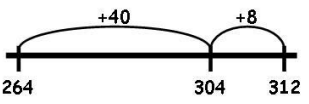
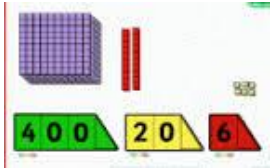
- Addition
- Subtraction
- Multiplication
- Division

Our aim is that children use mental methods when appropriate but for calculations that they cannot do in their heads they choose an appropriate written method which they can use accurately and with confidence.

Time must be taken to build up to the most efficient method to ensure complete understanding at each stage. When you move onto a next step in a calculation method, use a concrete resources to support learning. A guideline to when each method should be introduced is included but it will depend on the child and where the child is at with their understanding. Therefore a method may be introduced earlier than mentioned.

A vocabulary list is included for each operation for each year group.

# Addition

<p><u>Stage 1:</u> Numberlines.</p> <p>Partitioning 2 digit numbers and adding on a numberline.</p> $23 + 12 = 35$  <p>Bridging over boundaries:</p>  <p>Adding 3 digit numbers:</p>  <p>Use images:</p> 	<p><u>Stage 2:</u> Expanded column method.</p> <p>1) Partition numbers into columns – add the units first.</p> $425 + 143$ <table style="margin-left: 20px;"> <tr><td style="text-align: right;">H</td><td style="text-align: center;">U</td><td style="text-align: center;">T</td><td style="text-align: center;">U</td></tr> <tr><td style="text-align: right;">4</td><td style="text-align: center;">2</td><td style="text-align: center;">5</td><td></td></tr> <tr><td style="text-align: right;">1</td><td style="text-align: center;">4</td><td style="text-align: center;">3</td><td></td></tr> <tr><td style="text-align: right;">5</td><td style="text-align: center;">6</td><td style="text-align: center;">8</td><td></td></tr> </table> $500 + 60 + 8 = 568$ <p>2) Stack numbers vertically, add units, add tens, add both units and tens together and write answer underneath.</p> <table style="margin-left: 20px;"> <tr><td style="text-align: right;">43</td><td style="text-align: right;">274</td></tr> <tr><td style="text-align: right;">+ 23</td><td style="text-align: right;">+ 42</td></tr> <tr><td style="text-align: right;">6</td><td style="text-align: right;">6</td></tr> <tr><td style="text-align: right;">60</td><td style="text-align: right;">110</td></tr> <tr><td style="text-align: right;">66</td><td style="text-align: right;">200</td></tr> <tr><td></td><td style="text-align: right;">316</td></tr> </table>	H	U	T	U	4	2	5		1	4	3		5	6	8		43	274	+ 23	+ 42	6	6	60	110	66	200		316	<p><u>Stage 3:</u> Short column method.</p> <p>Add units first then 10s then 100s. Carry any tens or hundreds by writing that digit in the correct column.</p> <p>3 digit numbers:</p> $\begin{array}{r} 358 \\ + 33 \\ \hline 391 \\ 1 \end{array}$ <p>Extend to 4 digit numbers:</p> $\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$	<p><u>Stage 4:</u> Decimal column method</p> <p>Carry any tens or hundreds by writing that digit in the correct column above the answer line including decimals</p> <p>1 decimal place:</p> $\begin{array}{r} 72.5 \\ +54.6 \\ \hline 127.1 \\ 1 \end{array}$ <p>2 decimal places:</p> $\begin{array}{r} \text{£ } 73.42 \\ +\text{£ } 84.73 \\ \hline \text{£ } 158.15 \\ 1 \end{array}$
H	U	T	U																												
4	2	5																													
1	4	3																													
5	6	8																													
43	274																														
+ 23	+ 42																														
6	6																														
60	110																														
66	200																														
	316																														
Introduced in year 3 and 4	Introduced in year 4	Introduced in year 5	Introduced in year 5 + 6																												

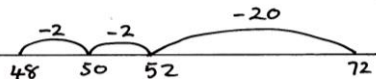
## Subtraction

### Stage 1:

#### Numberlines.

Counting back – start with the biggest number and subtract the smallest number.

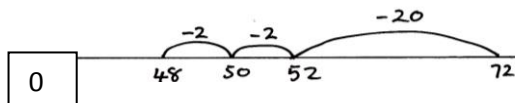
$$72 - 24 = 48$$



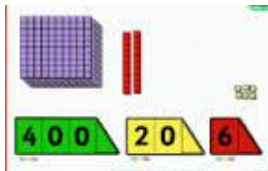
### Stage 2:

Begin with 0 and write the smallest number and the biggest number to find the difference.

$$72 - 24 = 48$$



Use Images:

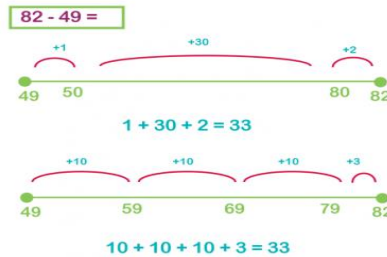


Introduced in year 3

### Stage 3:

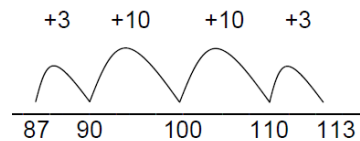
#### Number lines

Begin with the smallest number and count up to the biggest. Add up the jumps to find the difference.



Then move onto bridging over the hundreds.

$$113 - 87 = 26$$



Introduced in year 4

### Stage 5:

#### Expanded decomposition

Partition the numbers and place the biggest number on top. Subtract the units first.

1)

$$\begin{array}{r} \text{1st step} \quad 195 - 52 = \\ \begin{array}{r} \text{H} \quad \text{T} \quad \text{U} \\ 100 \quad 90 \quad 5 \\ - \quad 50 \quad 2 \\ \hline \end{array} \end{array}$$

2)

$$\begin{array}{r} 74 - 27 \\ \begin{array}{r} \overset{60}{70} + \overset{14}{4} \\ - 20 + 7 \\ \hline 40 + 7 \end{array} \end{array}$$

Then follow with 3 digits.

Introduced in year 5

### Stage 6

#### Decomposition

Exchange any tens and hundreds writing the amount exchanged clearly above the column. Follow with 4 digits.

$$\begin{array}{r} 5 \text{ 12} \\ \cancel{6} \cancel{2} 7 \\ - 1 \text{ 3 5} \\ \hline 4 \text{ 9 2} \end{array}$$

### Stage 7:

#### Decimal decomposition

Exchange any tens and hundreds writing the amount exchanged clearly above the column, including decimals

$$\begin{array}{r} 2 \text{ 15 11} \quad 1 \\ 362.3 \\ - 174.6 \\ \hline 187.7 \end{array}$$

Introduced in year 5 + 6

### Addition

1) Number lines

<http://www.youtube.com/watch?v=Kpb6MQQGMpU>

2) Expanded column method

[http://www.youtube.com/watch?v=GoxqMPpqm\\_4](http://www.youtube.com/watch?v=GoxqMPpqm_4)

3) Short column method

<http://www.youtube.com/watch?v=D3T14OwSZlc>

### Subtraction

1) Number lines

<http://www.youtube.com/watch?v=BepTP0VUxik>

2) Expanded decomposition method

<http://www.youtube.com/watch?v=PgC-EQsuA3c>

3) Compact decomposition

<http://www.youtube.com/watch?v=zAoAV1Za8Tc>

Vocabulary:

<u>Year 3</u>	<u>Year 4</u>	<u>Year 5</u>	<u>Year 6</u>
<p>+, add, addition, more, plus            make, sum, total            altogether            score            double, near double            one more, two more... ten more...            one hundred            more            how many more to make ...?            how many more is... than ...?            how much more is...?            -, subtract, take (away), minus            leave, how many are left/left over?            one less, two less... ten less... one            hundred less            how many fewer is... than ...?            how much less is...?            difference between            half, halve            =, equals, sign, is the same as            tens boundary, <i>hundreds boundary</i></p>	<p>add, addition, more, plus, <i>increase</i>            sum, total, altogether            score            double, near double            how many more to make...?            subtract, subtraction, take away,            minus, <i>decrease</i>            leave, how many are left/left over?            difference between            half, halve            how many more/fewer is... than...?            how much more/less is...?            is the same as, equals, sign            tens boundary, hundreds boundary  <i>inverse</i></p>	<p>add, addition, more, plus, <i>increase</i>            sum, total, altogether            score            double, near double            how many more to make...?            subtract, subtraction, take away,            minus, <i>decrease</i>            leave, how many are left/left over?            difference between            half, halve            how many more/fewer is... than...?            how much more/less is...?            is the same as, equals, sign            tens boundary, hundreds boundary  <i>inverse</i></p>	<p>add, addition, more, plus, <i>increase</i>            sum, total, altogether            score            double, near double            how many more to make...?            subtract, subtraction, take (away),            minus, <i>decrease</i>            leave, how many are left/left over?            difference between            half, halve            how many more/fewer is... than...?            how much more/less is...?            is the same as, equals, sign            tens boundary, hundreds boundary            units boundary, tenths boundary  <i>inverse</i></p>