
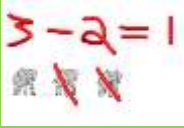
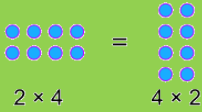




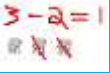
# MATHEMATICS OVERVIEW

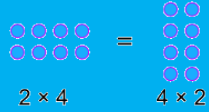

## KEY STAGE 1

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and beginning to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Y2 knowing the pairs of numbers which make all the numbers up to 10 at least. They will also have experienced and been taught pairs to 20. Their knowledge of number facts enables them to add several single-digit numbers, and to add/subtract a single digit number to/from a 2-digit number. Another important conceptual tool is their ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of this knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on or back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones. Children will be taught to count in 2s, 3s, 5s and 10s, and will have related this skill to repeated addition. They will have met and begun to learn the associated 2x, 3x, 5x and 10x tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division. They will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Year 1	Mental calculation	Written calculation	For all children
<p><b>Addition</b></p> 	<p>Number bonds ('story of' 5, 6, 7, 8, 9 and 10)            Count on in ones from a given 2-digit number            Add two single-digit numbers            Add three single-digit numbers spotting doubles or pairs to 10            Count on in tens from any given 2-digit number            Add 10 to any given 2-digit number</p>		<p>Pairs with a total of 10            Counting in ones            Counting in tens            Count on 1 from any given 2-digit number</p>

	<p>Use number facts to add single-digit numbers to two-digit numbers, e.g. use <math>4 + 3</math> to work out <math>24 + 3</math>, <math>34 + 3</math>...</p> <p>Add by putting the larger number first</p>		
<p><b>Subtraction</b></p> 	<p>Number bonds ('story of' 5, 6, 7, 8, 9 and 10)</p> <p>Count back in ones from a given 2-digit number</p> <p>Subtract one single-digit number from another</p> <p>Count back in tens from any given 2-digit number</p> <p>Subtract 10 from any given 2-digit number</p> <p>Use number facts to subtract single-digit numbers from two-digit numbers, e.g. use <math>7 - 2</math> to work out <math>27 - 2</math>, <math>37 - 2</math>...</p>		<p>Pairs with a total of 10</p> <p>Counting back in ones from 20 to 0</p> <p>Counting back in tens from 100 to 0</p> <p>Count back 1 from any given 2-digit number</p>
<p><b>Multiplication</b></p>  <p><math>2 \times 4</math>      <math>4 \times 2</math></p>	<p>Begin to count in 2s, 5s and 10s</p> <p>Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, etc.</p> <p>Double numbers to 10</p>		<p>Begin to count in 2s and 10s</p> <p>Double numbers to 5 using fingers</p>
<p><b>Division</b></p> 	<p>Begin to count in 2s, 5s and 10s</p> <p>Find half of even numbers to 12 and know it is hard to halve odd numbers</p> <p>Find half of even numbers by sharing</p> <p>Begin to use visual and concrete arrays or 'sets of'</p>		


	to find how many sets of a small number make a larger number.		
<b>Year 2</b>	<b>Mental calculation</b>	<b>Written calculation</b>	<b>For all children</b>
<b>Addition</b> 	<p>Number bonds – knowing all the pairs of numbers which make all the numbers to 12, and pairs with a total of 20</p> <p>Count on in ones and tens from any given 2-digit number</p> <p>Add two or three single-digit numbers</p> <p>Add a single-digit number to any 2-digit number using number facts, including bridging multiples of 10. (E.g. <math>45 + 4</math>, <math>38 + 7</math>)</p> <p>Add 10 and small multiples of 10 to any given 2-digit number</p> <p>Add any pair of 2-digit numbers</p>		<p>Know pairs of numbers which make each total up to 10</p> <p>Add two single digit numbers</p> <p>Add a single-digit number to a 2-digit number by counting on in ones</p> <p>Add 10 and small multiples of 10 to a 2-digit number by counting on in tens</p>
<b>Subtraction</b> 	<p>Number bonds – knowing all the pairs of numbers which make all the numbers to 12</p> <p>Count back in ones and tens from any given 2-digit number</p> <p>Subtract a single-digit number from any 2-digit number using number facts, including bridging multiples of 10, e.g. <math>56 - 3</math>, <math>53 - 5</math>.</p> <p>Subtract 10 and small</p>		<p>Know pairs of numbers which make each total up to 10</p> <p>Subtract a single-digit number from a 2-digit number by counting back in ones</p> <p>Subtract 10 and small multiples of 10 from a 2-digit number by counting back in tens</p>



	<p>multiples of 10 from any given 2-digit number</p> <p>Subtract any pair of 2-digit numbers by counting back in tens and ones or by counting up.</p>		
<p><b>Multiplication</b></p> 	<p>Count in 2s, 5s and 10s</p> <p>Begin to count in 3s.</p> <p>Begin to understand that multiplication is repeated addition and to use arrays (E.g. 3 x 4 is three rows of 4 dots)</p> <p>Begin to learn the 2x, 3x, 5x and 10x tables, seeing these as 'lots of', e.g. 5 lots of 2, 6 lots of 2, 7 lots of 2, etc.</p> <p>Double numbers up to 20</p> <p>Begin to double multiples of 5 to 100</p> <p>Begin to double two-digit numbers less than 50 with 1s digits of 1, 2, 3 4 or 5</p>		<p>Count in 2s, 5s and 10s</p> <p>Begin to use and understand simple arrays, e.g. 2 x 4 is two lots of four buns.</p> <p>Double numbers up to 10</p> <p>Double multiples of 10 to 50</p>
<p><b>Division</b></p> 	<p>Count in 2s, 5s and 10s</p> <p>Begin to count in 3s</p> <p>Using fingers, say where a given number is in the 2s, 5s or 10s count. (E.g. 8 is the fourth number when I count in twos.)</p> <p>Relate division to grouping. (E.g. how many groups of five in fifteen?)</p> <p>Halve numbers to 20</p> <p>Begin to halve numbers to 40 and multiples of 10 to 100</p> <p>Find <math>\frac{1}{2}</math>, <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math> and <math>\frac{3}{4}</math> of a</p>		<p>Count in 2s, 5s and 10s</p> <p>Say how many rows in a given array. (E.g. how many rows of 5 in an array of 3 x 5)</p> <p>Halve numbers to 12</p> <p>Find <math>\frac{1}{2}</math> of amounts</p>


quantity of objects and of amounts (whole number answers)

## LOWER KEY STAGE 2

In the lower juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced. This key stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers, e.g. when dividing by 5 or multiplying by 20. Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals, multiplying and dividing whole numbers by 10 and 100.

Year 3	Mental calculation	Written calculation	For all children
<p><b>Addition</b></p> 	<p>Know pairs with each total to 20            Know pairs of multiples of 10 with a total of 100            Add any two 2-digit numbers by counting on in 10s and 1s or by using partitioning            Add multiples and near multiples of 10 and 100            Perform place value additions without a struggle. (E.g. <math>300 + 8 + 50 = 358</math>)            Use place value and number facts to add a 1-</p>	<p>Use expanded column addition to add two or three 3-digit numbers or three 2-digit numbers            Begin to use compact column addition to add numbers with three digits.            Begin to add like fractions. (E.g. <math>\frac{3}{8} + \frac{1}{8} + \frac{1}{8}</math>)            Recognise fractions that add to 1. (E.g. <math>\frac{1}{4} + \frac{3}{4}</math> or <math>\frac{3}{5} + \frac{2}{5}</math>)</p>	<p>Know pairs of numbers which make each total up to 10, and which total 20            Add two 2-digit numbers by counting on in tens and ones (E.g. <math>56 + 35</math> is <math>56 + 30</math> and then add the 5)            Understand simple place value additions: <math>200 + 40 + 5 = 245</math>            Use place value to add multiples of 10 or 100</p>

	<p>digit or 2-digit number to a 3-digit number. (E.g. <math>104 + 56</math> is 160 since <math>104+50=154</math> and <math>6+4=10</math> and <math>676 + 8</math> is 684 since <math>8=4+4</math> and <math>76+4+4=84</math>)          Add pairs of 'friendly' 3-digit numbers, e.g. <math>320 + 450</math>          Begin to add amounts of money using partitioning.</p>		
<p><b>Subtraction</b></p> 	<p>Know pairs with each total to 20          Subtract any two 2-digit numbers          Perform place value subtractions without a struggle. (E.g. <math>536 - 30 = 506</math>, etc.)          Subtract 2-digit numbers from numbers <math>&gt;100</math> by counting up. (E.g. <math>143 - 76</math> is done by starting at 76, add 4 (80) then add 20 (100) then add 43 making the difference a total of 67)          Subtract multiples and near multiples of 10 and 100          Subtract, when appropriate, by counting back or taking away, using place value and number facts.          Find change from £1, £5, £10</p>	<p>Use counting up as an informal written strategy for subtracting pairs of three-digit numbers, e.g. <math>423 - 357</math> is</p> $  \begin{array}{ccccccc}  & +3 & & +40 & & +23 & = \\  66 & & & & & & \\  \hline  357 & 360 & & 400 & & 423 &  \end{array}  $ <p>Begin to subtract like fractions. (E.g. <math>\frac{7}{8} - \frac{3}{8}</math>)</p>	<p>Know pairs of numbers which make each total up to 10, and which total 20          Count up to subtract 2-digit numbers: <math>72 - 47</math> is</p> $  \begin{array}{ccccccc}  & +3 & & +10 & & +10 & +2 & = 25 \\  \hline  47 & 50 & & 60 & & 70 & 2 &  \end{array}  $ <p>Subtract multiples of 5 from 100 by counting up</p> $  \begin{array}{ccccccc}  & +5 & & +60 & & & = 65 \\  \hline  35 & 40 & & & & 100 &  \end{array}  $ <p>Subtract multiples of 10 and 100</p>
<p><b>Multiplication</b></p> 	<p>Know by heart all the multiplication facts in the 2x, 3x, 4x, 5x, 8x and 10x tables          Multiply whole numbers by 10 and 100</p>	<p>Use partitioning (grid multiplication) to multiply 2-digit and 3-digit numbers by 'friendly' single digit numbers.</p>	<p>Know by heart the 2x, 3x, 5x and 10x tables          Double given tables facts to get others          Double numbers up to 25 and multiples of 5 to 50</p>

	<p>Recognise that multiplication is commutative</p> <p>Use place value and number facts in mental multiplication. (E.g. <math>30 \times 5</math> is <math>15 \times 10</math>)</p> <p>Partition teen numbers to multiply by a single-digit number. (E.g. <math>3 \times 14</math> as <math>3 \times 10</math> and <math>3 \times 4</math>)</p> <p>Double numbers up to 50</p>		
<p><b>Division</b></p> 	<p>Know by heart all the division facts derived from the 2x, 3x, 4x, 5x, 8x and 10x tables.</p> <p>Divide whole numbers by 10 or 100 to give whole number answers</p> <p>Recognise that division is not commutative.</p> <p>Use place value and number facts in mental division. (E.g. <math>84 \div 4</math> is half of 42)</p> <p>Divide larger numbers mentally by subtracting the tenth multiple, including those with remainders. (E.g. <math>57 \div 3</math> is <math>10 + 9</math> as <math>10 \times 3 = 30</math> and <math>9 \times 3 = 27</math>)</p> <p>Halve even numbers to 100, halve odd numbers to 20</p>	<p>Perform divisions just above the 10<sup>th</sup> multiple using the written layout and understanding how to give a remainder as a whole number.</p> <p>Find unit fractions of quantities and begin to find non-unit fractions of quantities</p>	<p>Know by heart the division facts derived from the 2x, 3x, 5x and 10x tables</p> <p>Halve even numbers up to 50 and multiples of ten to 100</p> <p>Perform divisions within the tables including those with remainders, e.g. <math>38 \div 5</math>.</p>