Roche CP School’s Written and Mental Calculation Policy
National curriculum expectations

Add numbers with up to 3 digits using formal written methods of columnar addition.

Number Statements
- Add whole numbers with more than 4 digits including using formal written methods (columnar addition).

Addition

Year 1 + 2
Read, write and interpret mathematical statements involving addition and equals.
Recording addition in columns supports place value and prepares for formal written methods with larger numbers.

Year 3
Add numbers with up to 3 digits using formal written methods of columnar addition.

Partitioning
- 13 + 36 = 49
- 1 0 + 3
- + 3 0 + 6
- 4 0 + 9 = 49

Expanded method using columns
- 125 + 476 = 601
- 1 2 5
- + 4 7 6
- 1 1 1
- 9 0
- + 5 0 0
- 6 0 1

Year 4
Add numbers with up to 4 digits using the formal written methods of columnar addition where appropriate.

Year 5
Add whole numbers with more than 4 digits including using formal written methods (columnar addition).
Practise adding decimals including a mix of whole numbers and decimals, decimals with different numbers of decimal places and compliments of 1 e.g. 0.17 + 0.83 = 1.

Column method (With decimals)
- 47 + 76 = 123
- 1 2 5
- + 4 7 6
- 1 1 1
- 9 0
- + 5 0 0
- 6 0 1
- 1254 + 4767 = 6021

Formal written methods for calculation

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.

PROMOTE CHECKING ANSWERS USING THE INVERSE OPERATION THROUGHOUT.
## National Curriculum Expectations

**Year 1 + 2**
Read, write and interpret mathematical statements involving subtraction and equals.
Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.

**Number Statements**

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 - 3 = 3</td>
<td></td>
</tr>
<tr>
<td>12 - 5 = 7</td>
<td></td>
</tr>
</tbody>
</table>

**Setting out**

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 - 4 = 5</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>- 4</td>
<td>5</td>
</tr>
<tr>
<td>23 - 2 = 21</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>- 2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Year 3**
Subtract numbers with up to 3 digits using formal written methods of column subtraction.

### Example 1

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 + 60 + 3 - 200 + 40 + 1</td>
<td>300 + 20 + 2 = 322</td>
</tr>
</tbody>
</table>

**Example 2**
‘Borrowing’ from the hundreds.

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>400 + 160 + 3 - 200 + 70 + 1</td>
<td>200 + 90 + 2 = 292</td>
</tr>
</tbody>
</table>

**Example 3**
‘Borrowing’ from the hundreds to the tens and the tens to the units.

<table>
<thead>
<tr>
<th>Expression</th>
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<tbody>
<tr>
<td>400 + 60 + 3 - 200 + 70 + 8</td>
<td>200 + 80 + 5 = 285</td>
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**Example 4**
Dealing with zeros when ‘borrowing’.

<table>
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<tr>
<td>400 + 100 + 3 - 200 + 70 + 8</td>
<td>200 + 20 + 5 = 225</td>
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**Year 4**
Subtract numbers with up to 4 digits using the formal written methods of column subtraction where appropriate.

### Example 3

‘Borrowing’ from the hundreds to the tens and the tens to the units.

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**Year 5**
Subtract whole numbers with more than 4 digits including using formal written methods (column subtraction).

### Example 1

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>63.75 - 17.2</td>
<td></td>
</tr>
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</table>

### Example 2

<table>
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<td>400 + 160 + 3 - 200 + 70 + 8</td>
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Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.

**Promote checking answers using the inverse operation throughout**
### National Curriculum Expectations

**Year 2**
- Calculate mathematical statements for multiplication within the multiplication tables and write them using the signs x and =
  - Grid Method 2 x 1 example
    - 7 x 30 = 210
    - 7 x 8 = 56
    - 38 x 7 = 210 + 56
    - 38 x 7 = 266

**Year 3**
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for 2 digit numbers times 1 digit numbers.
  - Pupils develop reliable written methods for multiplication starting with calculations of 2 digit by 1 digit and progression to the formal written methods of short multiplication.
  - Multiplication 3 x 1 example
    - 123 x 4 = 492

**Year 4**
- Multiply 2 and 3 digit numbers by a 1 digit number using a formal written layout.
  - Pupils practise to become fluent in the formal written method of short multiplication with exact answers.
  - Grid Method 2 x 2 example
    - 27 x 56 = 1512

**Year 5**
- Multiply numbers up to 4 digits by a 1 or 2 digit number using a formal written method, including long multiplication for 2 digit numbers.
  - Grid Method 3 x 2 example
    - 245 x 4 = 980

**Year 6**
- Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication.
  - Multiply 1 digit numbers with up to 2 decimal places by whole numbers.
  - Long Multiplication 3 x 2 example
    - 123 x 4 = 492

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.

PROMOTE CHECKING ANSWERS USING THE INVERSE OPERATION THROUGHOUT.
Write and calculate mathematical statements for division using the multiplication tables that they know, including for 2 digit numbers times 1 digit numbers.

Pupils develop reliable written methods for division starting with calculations of 2 digit by 1 digit and progression to the formal written methods of short division.

First formal methods for recording

Number Statements

6 ÷ 2 = 3  
20 ÷ 5 = 4  
18 ÷ 2 = 9

Short Method

2 x 1 example

2 3
4 9 12

Short Method

3 x 1 example

3 0 9 8
3 2 9 4

Short Method 4 x 1 example

0 4 7 7
9 4 2 6 9 6 3

Short Method that will have a remainder

e.g. £465 ÷ 5 =

£465 ÷ 5 = £91.20

Promote checking answers using the inverse operation throughout.
**National curriculum expectations**

**DIVISION:**
- Begin to count in 2s, 5s, and 10s
- Find half of even numbers to 12 and know it is hard to halve odd numbers
- Begin to use visual and concrete arrays or ‘sets of’ to find how many sets of a small number make a larger number.

**MULTIPLICATION:**
- Begin to count in 2s, 5s, and 10s
- Begin to say what three 5s are by counting in 5s or what four 2s are by counting in 2s, etc.
- Double numbers to 10

**SUBTRACTION:**
- Represent and use number bonds and related subtraction facts within 20
- Count back in ones from any given 2-digit number
- Subtract 1-digit and 2-digit numbers to 20 including zero
- Count back in tens from any given 2-digit number
- Subtract 10 from any given 2-digit number
- Use number facts to subtract single-digit numbers from two-digit numbers, e.g. use 7 – 2 to work out 27 – 2, 37 – 2...

**ADDITION:**
- Represent and use number bonds within 20
- Count on in ones from a given 2-digit number
- Add 1-digit and 2-digit numbers to 20 including zero
- 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
- Use number facts to add single-digit numbers to two-digit numbers, e.g. use 4 + 3 to work out 24 + 3, 34 + 3...
- Add by putting the larger number first

**Example of Application:**
- Solve 1 step problems that involve addition and subtraction using concrete objects and pictorial representations and missing number problems such as 7 = ? - 9

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.
National curriculum expectations

**DIVISION:**
- Count in 2s, 5s and 10s
- Begin to count in 3s
- 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.)
- Relate division to grouping. (E.g. how many groups of five in fifteen?)
- Halve numbers to 20
- Begin to halve numbers to 40 and multiples of 10 to 100
- Find ½, 1/3, ¼ and ¾ of a quantity of objects and of amounts (whole number answers)

**MULTIPLICATION:**
- Count in 2s, 5s and 10s
- Begin to count in 3s.
- Begin to understand that multiplication is repeated addition and to use arrays (E.g. 3 x 4 is three rows of 4 dots)
- 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.
- Double numbers up to 20
- Begin to double multiples of 5 to 100
- Begin to double two-digit numbers less than 50 with 1s digits of 1, 2, 3, 4 or 5

**ADDITION:**
- Number bonds – knowing all the pairs of numbers which make all the numbers to 20 and derive and use related facts to 100
- Count on in ones and tens from any given 2-digit number
- Add two or three single-digit numbers
- Add a single-digit number to any 2-digit number using number facts, including bridging multiples of 10. (E.g. 45 + 4, 38 + 7)
- Add 10 and small multiples of 10 to any given 2-digit number
- Add any pair of 2-digit numbers

**SUBTRACTION:**
- Number bonds – knowing all the pairs of numbers which make all the numbers to 20 and derive and use related facts to 100
- Count back in ones and tens from any given 2-digit number
- Subtract a single-digit number from any 2-digit number using number facts, including bridging multiples of 10, e.g. 56 - 3, 53 - 5.
- Subtract 10 and small multiples of 10 from any given 2-digit number
- Subtract any pair of 2-digit numbers by counting back in tens and ones or by counting up.

**MENTAL METHODS FOR CALCULATION**

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.
### National Curriculum Expectations

#### Division:
- Know by heart all the division facts derived from the 2x, 3x, 4x, 5x, 8x and 10x tables.
- Divide whole numbers by 10 or 100, including those with remainders. (E.g. 57 ÷ 3 is 19 as 10 × 3 = 30 and 9 × 3 = 27)
- Halve even numbers to 100, halve odd numbers to 20.

#### Multiplication:
- Know by heart all the multiplication facts in the 2x, 3x, 4x, 5x, 8x and 10x tables.
- Multiply whole numbers by 10 and 100.
- Recognise that multiplication is commutative.
- Use place value and number facts in mental multiplication. (E.g. 30 × 5 is 15 × 10)
- Partition teen numbers to multiply by a single-digit number. (E.g. 3 x 14 as 3 x 10 and 3 x 4)
- Double numbers up to 50.

#### Subtraction:
- Subtract any two 2-digit numbers.
- Perform place value subtractions without a struggle. (E.g. 536 – 30 = 506, etc.)
- Subtract 2-digit numbers from numbers >100 by counting up. (E.g. 143 – 76 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 and £10.

#### Addition:
- 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. 300 + 8 + 50 = 358)
- Use place value and number facts to add a 1-digit or 2-digit number to a 3-digit number. (E.g. 104 + 56 is 160 since 104+50=154 and 6+4=10 and 676 + 8 is 684 since 8=4+4 and 76+4+4=84)
- Add pairs of ‘friendly’ 3-digit numbers, e.g. 320 + 450.
- Begin to add amounts of money using partitioning.

### Mental Methods for Calculation

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.

**Year 3**
**ADDITION:**
- Add any two 2-digit numbers by partitioning or counting on
- Know by heart/quickly derive number bonds to 100 and to £1
- Add to the next hundred, pound and whole number. (E.g. 234 + 66 = 300, 3.4 + 0.6 = 4)
- Perform place value additions without a struggle. (E.g. 300 + 8 + 50 + 4000 = 4358)
- Add multiples and near multiples of 10, 100 and 1000.
- Add £1, 10p, 1p to amounts of money
- Use place value and number facts to add 1-, 2-, 3- and 4-digit numbers where a mental calculation is appropriate. (E.g. 4004 + 156 by knowing that 6+4=10 and that 4004+150= 4154 so total is 4160)

**SUBTRACTION:**
- Subtract any two 2-digit numbers
- Know by heart/quickly derive number bonds to 100
- Perform place value subtractions without a struggle. (E.g. 4736 – 706 = 4030, etc.)
- Subtract multiples and near multiples of 10, 100 and 100
- Subtract by counting up. (E.g. 503 – 368 is done by adding: 368 +2 +30 +100 +3 so we added 135)
- Subtract, when appropriate, by counting back or taking away, using place value and number facts.
- Subtract £1, 10p, 1p from amounts of money
- Find change from £10, £20 and £50.

**MULTIPLICATION:**
- Know by heart all the multiplication facts up to 12 x 12.
- Recognise factors up to 12 of two-digit numbers.
- Multiply whole numbers and one-place decimals by 10, 100, 1000
- Multiply multiples of 10, 100, 1000 by single digit numbers. (E.g. 300 x 6 or 4000 x 8)
- Use understanding of place value and number facts in mental multiplication. (E.g. 36 x 5 is half of 36 x 10 and 50 x 60 = 3000)
- Partition 2-digit numbers to multiply by a single-digit number mentally. (E.g. 4 x 24 as 4 x 20 and 4 x 4)
- Multiply near multiples using rounding. (E.g. 33 x 19 as 33 x 20 – 33)
- Find doubles to double 100 and beyond using partitioning
- Begin to double amounts of money. (E.g. £35.60 doubled = £71.20.)

**DIVISION:**
- Know by heart all the division facts up to 144 ÷ 12.
- Divide whole numbers by 10, 100 to give whole number answers or answers with one decimal place
- Divide multiples of 100 by 1-digit numbers using division facts. (E.g. 3200 ÷ 8 = 400)
- Use place value and number facts in mental division. (E.g. 245 ÷ 20 is double 245 ÷ 10)
- Divide larger numbers mentally by subtracting the 10th or 20th multiple as appropriate. (E.g. 156 ÷ 6 is 20 + 6 as 20x6=120 and 6x6=36)
- Find halves of even numbers to 200 and beyond using partitioning
- Begin to halve amounts of money. (E.g. Half of £52.40 = £26.20)

Please use this as guidance but be prepared to use methods outside of your year group should pupils either progress beyond or not achieve the required progress.
National curriculum expectations

DIVISION:
• Know by heart all the division facts up to 144 ÷ 12.
• Divide whole numbers by 10, 100, 1000, 10,000 to give whole number answers or answers with 1, 2 or 3 decimal places.
• Use knowledge of factors and multiples in multiplication. (E.g. 43 x 6 is double 43 x 3, and 28 x 50 is ½ of 28 x 100 = 1400)
• Use knowledge of place value and rounding in mental multiplication. (E.g. 67 x 199 as 67 x 200 – 67)
• Use doubling and halving as a strategy in mental multiplication. (E.g. 58 x 5 = half of 58 x 10, and 34 x 4 is 34 doubled twice)
• Partition 2-digit numbers, including decimals, to multiply by a single-digit number mentally. (E.g. 6 x 27 as 6 x 20 (120) plus 6 x 7 (42) making 162 or 6.3 x 7 as 6 x 7 plus 0.3 x 7)
• Double amounts of money by partitioning. (E.g. £37.45 doubled = £37 doubled (£74) plus 45p doubled (90p) £74.90)

MULTIPLICATION:
• Know by heart all the multiplication facts up to 12 x 12.
• Multiply whole numbers and one-and two-place decimals by 10, 100, 1000, 10,000.
• Use knowledge of factors and multiples in multiplication. (E.g. 43 x 6 is double 43 x 3, and 28 x 50 is ½ of 28 x 100 = 1400)
• Use knowledge of place value and rounding in mental multiplication. (E.g. 67 x 199 as 67 x 200 – 67)
• Use doubling and halving as a strategy in mental multiplication. (E.g. 58 x 5 = half of 58 x 10, and 34 x 4 is 34 doubled twice)
• Partition 2-digit numbers, including decimals, to multiply by a single-digit number mentally. (E.g. 6 x 27 as 6 x 20 (120) plus 6 x 7 (42) making 162 or 6.3 x 7 as 6 x 7 plus 0.3 x 7)
• Double amounts of money by partitioning. (E.g. £37.45 doubled = £37 doubled (£74) plus 45p doubled (90p) £74.90)

SUBTRACTION:
• Subtract numbers with two significant digits only, using mental strategies. (E.g. 6.2 – 4.5 or 72,000 – 47,000)
• Subtract one or two-digit multiples of 100, 1000, 10,000 and 100,000. (E.g. 8000 – 3000 or 600,000 – 200,000)
• Subtract one or two digit near multiples of 100, 1000, 10,000 and 100,000 from other numbers. (E.g. 82,472 – 30,004)
• Subtract decimal numbers which are near multiples of 1 or 10, including money. (E.g. £6.34 – 1.99 or £34.59 – £19.95)
• Use counting up subtraction, with knowledge of number bonds to 10/100 or £1, as a strategy to perform mental subtraction. (E.g. £10 – £3.45 or 1000 – 782)
• Recognise fraction complements to 1 and to the next whole number. (E.g. 1/2 + 3/5 = 2 4 – 5)
### National curriculum expectations

#### ADDITION:
- Know by heart number bonds to 100 and use these to derive related facts. (E.g. 3.46 + 0.54 = 4)
- Derive quickly and without difficulty, number bonds to 1000
- Add small and large whole numbers where the use of place value or number facts makes the calculation doable ‘in our heads’. (E.g. 34,000 + 8000)
- Add multiples of powers of ten and near multiples of the same. (E.g. 6345 + 199)
- Add negative numbers in a context such as temperature where the numbers make sense.
- Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 (E.g. 4.5 + 6.3 or 0.74 + 0.33)
- Add positive numbers to negative numbers, e.g. calculate a rise in temperature, or continue a sequence beginning with a negative number

#### SUBTRACTION:
- Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition. (E.g. 1000 – 654 as 46 + 300 in our heads)
- Use number bonds to 1 and 10 to perform mental subtraction of any pair of one-place or two-place decimal numbers using complementary addition and including money. (E.g. 10 – 3.65 as 0.35 + 6; £50 – £34.29 as 71p + £15)
- Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to two places. (E.g. 467,900 – 3,005 or 4.63 – 1.02)
  - Subtract multiples of powers of ten and near multiples of the same.
  - Subtract negative numbers in a context such as temperature where the numbers make sense.

#### MULTIPLICATION:
- Know by heart all the multiplication facts up to 12 x 12.
- Multiply whole numbers and decimals with up to three places by 10, 100 or 1000, e.g. 234 x 1000 = 234,000 and 0.23 x 1000 = 230)
- Identify common factors, common multiples and prime numbers and use factors in mental multiplication. (E.g. 326 x 6 is 652 x 3 which is 1956)
- Use place value and number facts in mental multiplication. (E.g. 40,000 x 6 = 240,000 and 0.03 x 6 = 0.18)
- Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20 and 25. (E.g. 826 ÷ 8 is halved three times: 314, 157, 78.5)
- Use rounding in mental multiplication. (34 x 19 as (20 x 34) – 54)
- Multiply one and two-place decimals by numbers up to and including 10 using place value and partitioning. (E.g. 3.6 x 4 is 12 + 2.4 or 2.53 x 3 is 6 + 1.5 + 0.99)
- Double decimal numbers with up to two places using partitioning e.g. 36.73 doubled is double 36 (72) plus double 0.73 (1.46)

#### SUBTRACTION:
- Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition. (E.g. 1000 – 654 as 46 + 300 in our heads)
- Use number bonds to 1 and 10 to perform mental subtraction of any pair of one-place or two-place decimal numbers using complementary addition and including money. (E.g. 10 – 3.65 as 0.35 + 6; £50 – £34.29 as 71p + £15)
- Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to two places. (E.g. 467,900 – 3,005 or 4.63 – 1.02)
  - Subtract multiples of powers of ten and near multiples of the same.
  - Subtract negative numbers in a context such as temperature where the numbers make sense.

#### DIVISION:
- Know by heart all the division facts up to 144 ÷ 12.
- Divide whole numbers by powers of 10 to give whole number answers or answers with up to three decimal places.
- Identify common factors, common multiples and prime numbers and use factors in mental division. (E.g. 438 ÷ 6 is 219 ÷ 3 which is 73)
- Use tests for divisibility to aid mental calculation.
- Use doubling and halving as mental division strategies, e.g. to divide by 2, 4, 8, 5, 20 and 25. (E.g. 826 ÷ 8 is halved three times: 314, 157, 78.5)
- Divide one and two place decimals by numbers up to and including 10 using place value. (E.g. 2.4 ÷ 6 = 0.4 or 0.65 ÷ 5 = 0.13, £6.33 ÷ 3 = £2.11)
- Halve decimal numbers with up to 2 places using partitioning
  - e.g. Half of 36.86 is half of 36 (18) plus half of 0.86 (0.43)
- Know and use equivalence between simple fractions, decimals and percentages, including in different contexts.
  - Recognise a given ratio and reduce a given ratio to its lowest terms.

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