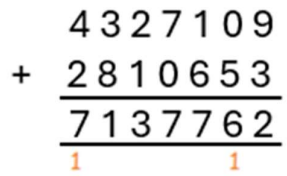
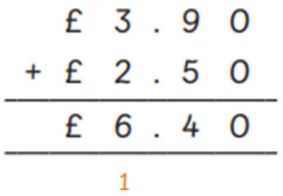
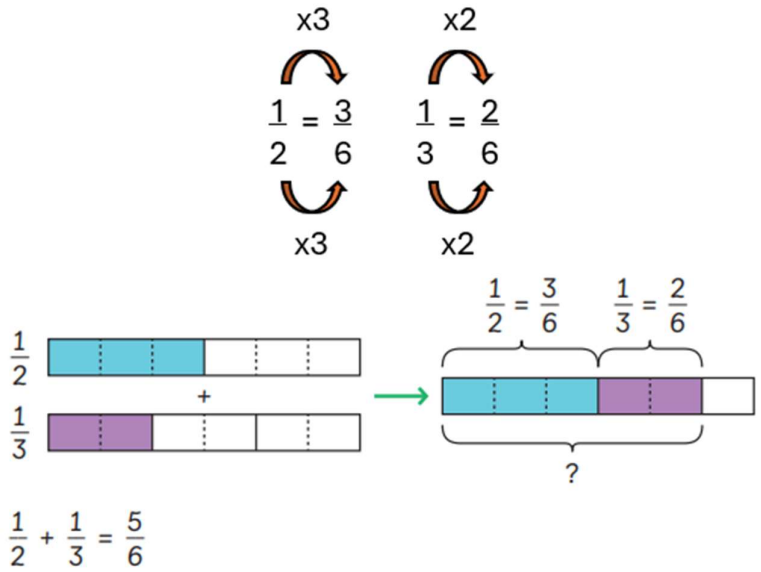
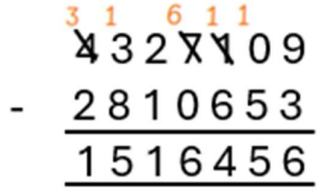
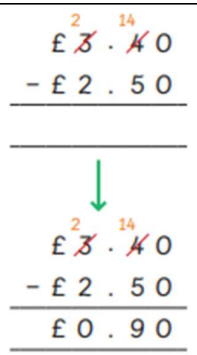
Excelsior MAT Calculation Policy 2025 – Formal Method Goals

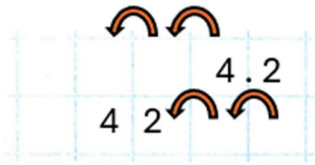
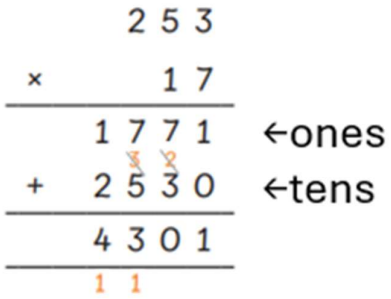
Maths — No Problem! materials use real-world contexts to help pupils understand the importance of mathematics in their everyday lives. The progression of calculation skills, focusing on addition, subtraction, multiplication and division is developed using a Concrete Pictorial Abstract (CPA) approach and delivered through problem solving. Over the course of each child's 7-year journey through primary education, the following formal written methods are included in the core procedural fluency required by the end of Year 6 / Key Stage 2. These are not taught in isolation, but are the result of investigation, exploration and mathematical thinking to ensure conceptual fluency is achieved in tandem with procedural.

Topic/Strand	Representation	Key Idea
Addition		
Addition of whole numbers with more than 4 digits		The sum of each place is shown as part of the total sum and a small number added to an existing place when a ten of one place is made. The procedure remains unchanged from Year 2. Formal written methods are used where a mental method is not efficient. Compensation methods may be used where accuracy could be compromised, eg 49999 + 29384 = 50000 + 29384 - 1
Adding decimals		Pupils use place–value knowledge and composing and decomposing at a rate of 10 when adding decimals. The procedure remains the same as adding whole numbers. The decimal point does not represent a place but separates the whole from the fractional part of a number. Careful alignment is needed.

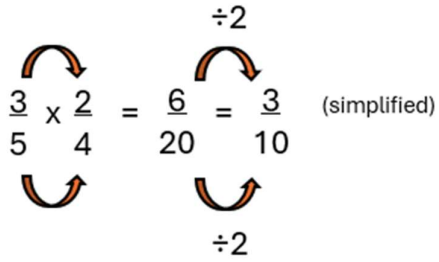
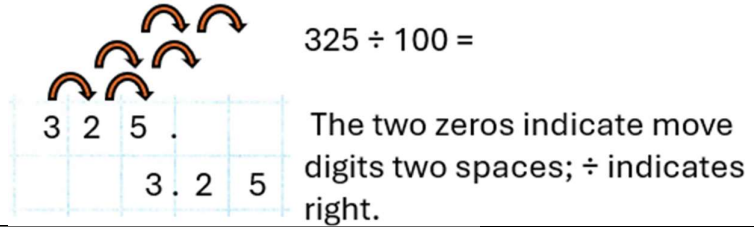
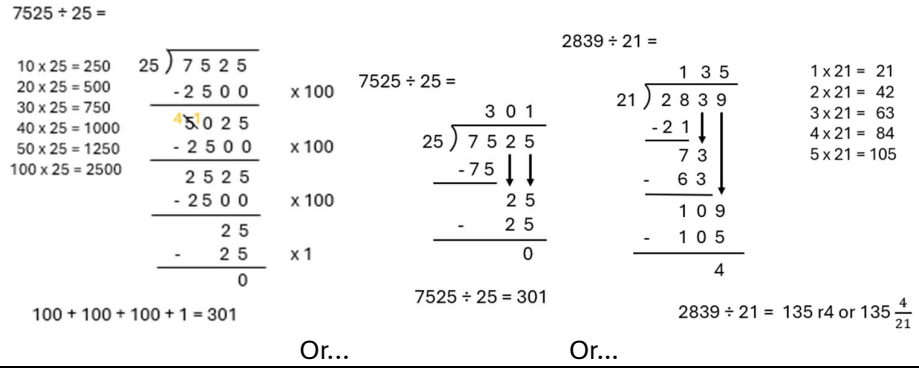
Topic/Strand	Representation	Key Idea
Adding fractions		In order to add related fractions, first convert one fraction so that both share the same denominator (a *'common denominator'*). The common denominator method can be extended to adding and subtracting non unit related fractions. Multiply the numerator and denominator by the same factor. To add *non-related* fractions, the product of the two denominators provides a common denominator. Pupils use their understanding of equivalence to ensure the nouns and the denominators are the same before the calculation is completed.
Addition within order of operations	First, carry out all the operations in ( ). Next, perform all the multiplication and division. Then, calculate all the addition and subtraction. Calculate. (a) $(1 + 3) \times 5 - 7 =$ ☐ (b) $1 + (3 \times 5) - 7 =$ ☐ (c) $(1 + 3) \times (7 - 5) =$ ☐	Pupils utilise the previous addition skills within mixed operation equations. Addition is carried out after multiplication and division. If only addition and subtraction are present in an equation, pupils work from left to right.

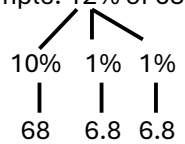
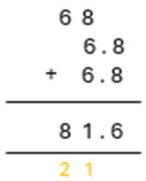
Topic/Strand	Representation	Key Idea
Subtraction		
Subtraction of whole numbers with more than 4 digits		The procedure to subtract using numbers up to 6-digits using the formal written method remains the same as when it was first introduced. Pupils begin at the least value place and work to the left through the places to find the difference. Renaming takes place when a calculation in a place cannot be done. Again, this procedure is the same as when this was first learned and requires the renaming of the minuend. Included the digit alone, or whole new number as below. Compensation methods may be used where accuracy could be compromised, eg 50000 – 29384 = 49999 – 29384 + 1 or 50000 – 29384 = 49999 – 29383
Subtracting decimals		Pupils use place–value knowledge and composing and decomposing at a rate of 10 when subtracting decimals. The procedure remains the same as subtracting whole numbers. The decimal point does not represent a place but separates the whole from the fractional part of a number. Careful alignment is needed.

Topic/Strand	Representation	Key Idea
Subtracting decimals	$\frac{1}{2} - \frac{1}{3} =$ x3 x2 $\frac{1}{2} = \frac{3}{6}$ $\frac{1}{3} = \frac{2}{6}$ x3 x2 $\frac{3}{6} - \frac{2}{6} = \frac{1}{6}$ $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$	In order to subtract related fractions, first convert one fraction so that both share the same denominator (a *'common denominator'*). The common denominator method can be extended to adding and subtracting non unit related fractions. Multiply the numerator and denominator by the same factor. To subtract *non-related* fractions, the product of the two denominators provides a common denominator. Pupils use their understanding of equivalence to ensure the nouns and the denominators are the same before the calculation is completed.
Subtraction within order of operations	First, carry out all the operations in ( ). Next, perform all the multiplication and division. Then, calculate all the addition and subtraction. Calculate. (a) $(1 + 3) \times 5 - 7 =$ ☐ (b) $1 + (3 \times 5) - 7 =$ ☐ (c) $(1 + 3) \times (7 - 5) =$ ☐	Pupils utilise the previous subtraction skills within mixed operation equations. Subtraction is carried out after multiplication and division. If only addition and subtraction are present in an equation, pupils work from left to right.

Topic/Strand	Representation	Key Idea
	Multiplication	
Multiplying by 10, 100, 1000	4.2 x 100 =  Step 1: The two zeros indicate move digits two spaces; x indicates left.  Step 2: Use zeros as place value holders where appropriate.	Pupils build on their understanding of multiplication by factors of 10. They see that when a factor is made 10 times greater, the product is 10 times greater. This translates into digits moving place values columns left by the number of factors of 10.
Formal written method	Multiply 253 by 17.  	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. Pupils apply all the multiplication tables and related division facts frequently, commit them to memory and use them confidently to make larger calculations. Links are made to the formal written procedure that they know. Pupils work systematically through the procedure progressing from multiplying by ones to multiplying by tens and ones.

Topic/Strand	Representation	Key Idea
Key vocabulary in multiplication:	Some multiples of 3 are: 3 (= 1 x 3) 6 (= 2 x 3) 9 (= 3 x 3) Factors of 12 are 1, 2, 3, 4, 6, 12 12 ÷ 1 = 12 12 ÷ 2 = 6 12 ÷ 3 = 4 12 ÷ 4 = 3 12 ÷ 6 = 2 5 is a prime number: 5 ÷ 1 = 5 5 ÷ 5 = 1 25 is a square number because it's 5 lots of 5: 5 x 5 27 is a cube number because it's 3 lots of 3 x 3: 3 x 3 x 3	A multiple is a number that may be divided by another smaller number or itself, an exact number of times without leaving a remainder. A factor of a number, is a whole number that divides exactly into it, without leaving a remainder. Prime numbers are whole numbers greater than 1 that can only be divided exactly by 1 and themselves. It has no other factors. Composite numbers have more additional factors (more than 2). A square number is the result (product) when a number has been multiplied by itself. A cube number is the product when a number has been multiplied by itself and then by itself again.
Multiplication within order of operations	First, carry out all the operations in ( ). Next, perform all the multiplication and division. Then, calculate all the addition and subtraction. Calculate. (a) $(1 + 3) \times 5 - 7 =$ ☐ (b) $1 + (3 \times 5) - 7 =$ ☐ (c) $(1 + 3) \times (7 - 5) =$ ☐	Pupils utilise the previous multiplication skills within mixed operation equations. Multiplication is carried out before addition and subtraction. If only multiplication and division are present in an equation, pupils work from left to right.

Topic/Strand	Representation	Key Idea
Multiplying fractions		Through the use of bar models these multiplications are represented pictorially, leading pupils to realise that the numerators can be multiplied and the denominators can be multiplied. Before this procedure is embedded, pupils must have a deep understanding of what the equation means.
Division		
Dividing by 10, 100, 1000		Pupils build on their understanding of division by factors of 10. They see that when a dividend is made 10 times less, the quotient is 10 times less. This translates into digits moving place values columns right by the number of factors of 10.
Formal written method		The procedure for long division with renaming does not change from what pupils have experienced previously. Long division is performed using partial times tables. Either the expanded or condensed versions are appropriate.

Topic/Strand	Representation	Key Idea
Division within order of operations	First, carry out all the operations in ( ). Next, perform all the multiplication and division. Then, calculate all the addition and subtraction. Calculate. (a) $(1 + 3) \times 5 - 7 =$ ☐ (b) $1 + (3 \times 5) - 7 =$ ☐ (c) $(1 + 3) \times (7 - 5) =$ ☐	Pupils utilise the previous division skills within mixed operation equations. Division is carried out before addition and subtraction. If only multiplication and division are present in an equation, pupils work from left to right.
Dividing fractions by whole numbers	$\frac{3}{4} \div 4 =$ ☐  $\frac{3}{4} \div 4 = \frac{1}{4} \times \frac{3}{4} = \frac{3}{16}$ **K** = Keep the first fraction **F** = Turn the whole number into a **F**raction (4 becomes 4/1) **C** = **C**hange the ÷ to x and invert the new fraction (explaining that this can be done because a unit fraction of a quantity is the same as division by the denominator – prove using CPA approach)	Pupils relate dividing fractions by a whole number to multiplying by its reciprocal. So, dividing by 4 is related to multiplying by ¼ . We also read this as ' ¼ of'. The procedure of dividing fractions by whole numbers is supported by the use of bar models and pictorial representation.
Percentages	For example: 12% of 680   	To find 1% divide by 100 To find 10% divide by 10 To find 25% divide by 4 To find 50% divide by 2