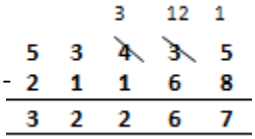
YEAR 6

Addition		
Mental Strategies	**Informal Written Methods**	**Formal Written Methods**
Recognise the most efficient method to use		
• Continue to use models and images when necessary  • perform mental calculations, including with mixed operations, large numbers, decimals and more complex calculations • Continue to apply knowledge of the commutative law, e.g. - put the larger number first and count on in steps of 1, 10, 100 or 1000 • Identify near doubles, using doubles already known, e.g. 5·7 + 5·8 • Add the nearest multiple of 10, 100 or 1000, and adjust • Use patterns of similar calculations, e.g. 9 + 7 = 16 and 0·09 + 0·07 = 0·16 • Use knowledge of the associative law when adding more than two numbers • mentally partition additions into hundreds, tens and ones, then recombine • Develop further the relationship between addition and subtraction	**Note: Not used in Year 6**	**• Add numbers with more than four digits** **• Add decimals with up to three decimal places, including a mix of whole numbers and decimals, and decimals with different numbers of decimal places** • Estimate and check the answer to a calculation **Formal written method of columnar addition** 456 287 + 359 849 456 287 + 359 849 816 136 1 1 1 1 1 57·486 + 45·378 57·486 + 45·378 102·864 1 1 1 **Note: position of carry digit**

Subtraction

Mental Strategies	Informal Written Methods	Formal Written Methods
Recognise the most efficient method to use		
• Continue to use models and images when necessary • perform mental calculations, including with mixed operations, large numbers, decimals and more complex calculations • Calculate mentally a difference such as 23 004 – 18 998 by counting up from the smaller to the larger number • Subtract the nearest multiple of 10, 100 or 1000, and adjust • Use patterns of similar calculations, e.g. 16 – 9 = 7 and 0·16 – 0·09 = 0·07 • Use mental partitioning, e.g. 4656 – 358 = 4656 – 300 – 50 – 8 = 4356 – 58 = 4298 • Develop further the relationship between addition and subtraction	**Note: Not used in Year 6**	**• Subtract numbers with more than four digits** **• Subtract decimals with up to three decimal places, including a mix of whole numbers and decimals, and decimals with different numbers of decimal places** • Estimate and check the answer to a calculation **Formal written method of columnar subtraction (decomposition)**  **Note: position of borrowed digit**

YEAR 6

Multiplication

Mental Strategies

Recognise the most appropriate and efficient method to use

• Continue to use models and images when necessary

• quick recall of the multiplication facts for multiplication tables up to 12 × 12

• use multiples and factors

• recognise and use square and cube numbers

• use known multiplication facts to derive related facts involving multiples of 10, 100 and 1000, and decimals, e.g. 70 × 80 =
5600, 0·8 × 6 = 4·8

• perform mental calculations, including with mixed operations, large numbers, decimals and more complex calculations

• Use related facts and doubling and halving

• Use closely related facts

• Continue to use and apply the commutative law

• Understand and use the associative law,
e.g. 10·6 × 30 = 10·6 × (10 × 3)
or = (10·6 × 10) × 3

Informal Written Methods

• Estimate and check the answer to all calculations

• Long multiplication (whole numbers and decimals):

Partitioning
Understand and use the distributive law, e.g. partitioning when multiplying a three-digit number by a two-digit number, and partitioning when multiplying a decimal number by a one-digit number, e.g.

4·83 × 6
= (4 × 6) + (0·8 × 6) + (0·03 × 6)
= 24 + 4·8 + 0·18
= 28·98

• Long multiplication (whole numbers):
- Multiply multi-digit numbers up to four digits by a two-digit number (TO × TO / HTO × TO)

Expanded written method

285 × 63

285		
× 63		
$8^{2}5^{1}5$	(285 × 3)	
$17^{5}1^{3}00$	(285 × 60)	
17955		

• Long multiplication (Decimals):
- Multiply one-digit numbers with up to two decimal places by a two-digit number

Converting decimals to whole numbers before calculating, then converting the answer back to decimals

Expanded written method

7·56 × 34 is equivalent to 756 × 34 ÷ 100

756		
× 34		
$30^{3}2^{2}4$	(756 × 4)	
$22^{1}6^{1}80$	(756 × 30)	
25704		
1		

25 704 ÷ 100 = 257·04

Formal Written Methods

• Estimate and check the answer to all calculations

• Short multiplication (whole numbers):
- Multiply multi-digit numbers up to 4 digits by a two-digit whole number

Formal written method of short multiplication

5643 × 8

	5	6	4	3
×				8
	4	5	1	4 4

• Short multiplication (Decimals):
- Multiply one-digit or two-digit numbers with up to two decimal places by a one-digit number

• Long multiplication (whole numbers):
- Multiply multi-digit numbers up to four digits by a two-digit number (TO × TO/ HTO × TO/ ThHTO x TO)

Formal written method of long multiplication

285 × 63

285	
× 63	
$8^{2}5^{1}5$	
$17^{5}1^{3}00$	
17955	

• Long multiplication (Decimals):
- Multiply one-digit numbers with up to two decimal places by a two-digit number

• Converting decimals to whole numbers before calculating, then converting the answer back to decimals

Division

Mental Strategies	Informal Written Methods	Formal Written Methods
Recognise the most appropriate and efficient method to use		
• Continue to use models and images when necessary • quick recall of the division facts for multiplication tables up to 12 × 12 • use multiples and factors • use known division facts to derive related facts involving multiples of 10, 100 and 1000, and decimals, e.g. 6300 ÷ 90 = 70, 6·3 ÷ 9 = 0·7 • perform mental calculations, including with mixed operations, large numbers, decimals and more complex calculations • Continue to use halving •Relate division to fractions, decimals and percentages • Continue to use the inverse relationship between multiplication and division • Understand and use the distributive law, e.g. partitioning when dividing a three-digit number by a one-digit number •Relate division to fractions, decimals and percentages	• Estimate and check the answer to all calculations **• Long division, including with remainders expressed as a whole number, fraction or decimal (Whole numbers)** - Divide numbers up to 4 digits by a two-digit number (HTO ÷TO/ ThHTO ÷ TO) **Expanded written method of long division** 3 2 4 r 4 18) 5 8 3 6 − 5 4 0 0 (300 × 18) 4 3 6 − 3 6 0 (20 × 18) 7 6 − 7 2 (4 × 18) 4 5836 ÷ 18 = 324 r 4 or $324\frac{2}{9}$ **• Long division (Decimals)** - Divide numbers with up to two decimal places by a two-digit whole number (TO·th ÷ TO) **Expanded written method of long division** 58·32 ÷ 18 3 · 2 4 18) 5 8 · 3 2 − 5 4 · 0 0 (3 × 18) 4 · 3 2 − 3 · 6 0 (0·2 × 18) 0 · 7 2 − 0 · 7 2 (0·04 × 18) 0 · 0 0 or Converting decimals to whole numbers before calculating, then converting the answer back to decimals	• Estimate and check the answer to all calculations **• Short division, including with remainders expressed as a whole number, fraction or decimal (whole numbers)** - Divide numbers up to 4 digits by a one-digit number **Formal written method of short division** **• Short division (Decimals)** - Divide numbers with up to two decimal places by a one-digit number (O·th ÷ O/ TO·th ÷ O) 7 · 5 6 6) 4 5 · 3 3 6 or **Converting decimals to whole numbers then converting the answer back to decimals** **• Long division, including with remainders expressed as a whole number, fraction or decimal (Whole numbers)** - Divide numbers up to 4 digits by a two-digit number **Formal written method of long division** 3 2 4 r 4 18) 5 8 3 6 − 5 4 ↓ 4 3 − 3 6 ↓ 7 6 − 7 2 4 5836 ÷ 18 = 324 r 4 or $324\frac{2}{9}$ **• Long division (Decimals)** - Divide numbers with up to two decimal places by a two-digit whole number (TO·th ÷ TO) **Formal written method of long division** or Converting decimals to whole numbers before calculating, then converting the answer back to decimals