

Addition

Pupils should be taught to:

- Perform mental calculations, including with mixed operations and large numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Adding several numbers with different numbers of decimal places (including money and measures):

Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically, including in the answer row. Zeros could be added into any empty decimal places, to show there is no value to add.

$$\begin{array}{r}
 23.361 \\
 9.080 \\
 59.770 \\
 + 1.300 \\
 \hline
 93.511
 \end{array}$$

Empty decimal places can be filled with zero to show the place value in each column.

Adding several numbers with an increasing level of complexity

Adding several numbers with more than 4 digits.

$$\begin{array}{r}
 81,059 \\
 3,668 \\
 15,301 \\
 + 20,551 \\
 \hline
 120,579
 \end{array}$$

Use bar modelling

There are 147 daisy plants and 32 tulip plants in Nursery X.

Nursery Y has 66 fewer daisy and tulip plants than Nursery X.

How many daisy and tulip plants are there in Nursery Y?

Mastery in addition - see

NCETM website for more examples

Calculate $36.2 + 19.8$

- with a formal written column method
- with a mental method, explaining your reasoning.

Key vocabulary: add, more, plus, and, make, altogether, total equal to, equals, double, most, count on, number line, sum, tens, units, partition, addition, column, tens boundary, hundreds boundary, increase, vertical, carry, expanded, compact, thousands, hundreds, digits, inverse, decimal places, decimal point, tenths, hundredths, thousandths

Subtraction

Pupils should be taught to:

- Perform mental calculations, including with mixed operations and large numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

Subtracting with increasingly large and more complex numbers and decimal values.

Using the Compact Column Method to subtract more complex integers:

$$\begin{array}{r} \cancel{7} \cancel{8} \cancel{0}, 699 \\ - \quad 89,949 \\ \hline 60,750 \end{array}$$

Using the Compact Column Method to subtract money and measures, including decimals with different numbers of decimal places:

$$\begin{array}{r} \cancel{7} \cancel{0} 15 \cdot \cancel{4} 19 \text{ kg} \\ - \quad 36 \cdot 08 \text{ kg} \\ \hline 69 \cdot 339 \text{ kg} \end{array}$$

Pupils should apply their knowledge of a range of mental strategies, mental recall skills, informal and formal written methods when selecting the appropriate method to work out subtraction problems. Opportunities to discuss the appropriateness of methods need to be planned for.

Empty decimal places can be filled with zero to show the place value in each column

Bar modelling

Jacob cuts 4 metres of ribbon into **three** pieces.

The length of the first piece is **1.28** metres.

The length of the second piece is **1.65** metres.

Mastery in addition - see

NCETM website for more examples

Compare $31 + 9 \times 7$ and $(31 + 9) \times 7$
What's the same? What's different?

Choose operations to go in the empty boxes to make these number sentences true.

$6 \square 3 \square 7 = 16$

$6 \square 3 \square 7 = 27$

$6 \square 3 \square 7 = 9$

Put brackets in these number sentences so that they are true.

$12 - 2 \times 5 = 50$

$12 - 8 - 5 = 9$

$10 \times 8 - 3 \times 5 = 250$

Key Vocabulary: equal to, take, take away, less, minus, subtract, leaves, distance between, how many more, how many fewer / less than, most, least, count back, how many left, how much less is?, difference, count on, strategy, partition, tens, units exchange, decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

Multiplication

Pupils should be taught to:

- Multiply multi-digit numbers up to 4 digits by a 2 digit whole number using the formal written method of long multiplication.
- Perform mental calculations, including with mixed operations and large numbers.
 - Identify common factors, common multiples and prime numbers.
- Use their knowledge of the order of operations to carry out calculations involving the four operations.

Use both of these methods. Use short multiplication

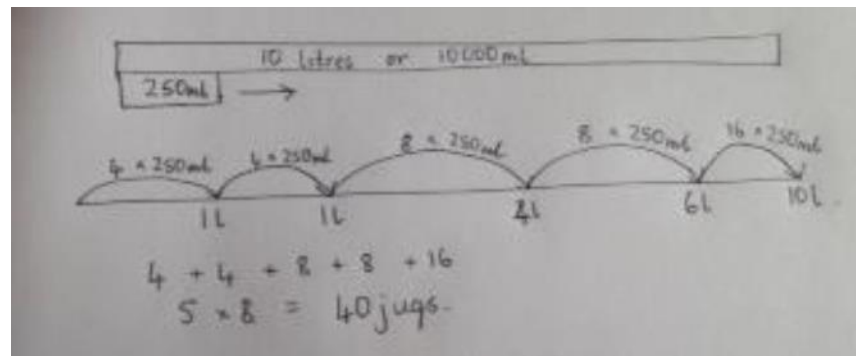
to multiply decimals, with up to 2 decimal places, by a single digit.

Children will apply written methods when solving a range of mathematical problems across a variety of contexts. Children should develop a deep understanding of the methods and will be able to debug the

$$\begin{array}{r} 3.19 \\ \times 8 \\ \hline 25.52 \end{array}$$

Bar modelling -

e.g. How many jugs with a capacity of 250ml could you fill with 10 litres of water?



Mastery in multiplication - see

NCETM website for more examples

Fill in the missing numbers to make these number sentences true.

$$\square \times \square = 864$$

$$\square \times \square \times \square = 864$$

Key vocabulary: Groups of, lots of, times, array, altogether, multiply, count, multiplied by, repeated addition, column, row, commutative, sets of, equal groups, as big as, once, twice, three times..., partition, grid method, multiple, product, tens, units, value, sets of, inverse, square, factor, integer, decimal, short/long multiplication, carry, tenths, hundredths, decimal

Division

Year 6

Pupils should be taught to:

- Divide numbers up to 4-digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers
- Use their knowledge of the order of operations to carry out calculations involving the four operations.
- Solve multi-step problems in context, deciding which operations to use and why.

The focus in year 6 is not so much the method of short division but how the remainders are expressed- children need to express remainders as decimals and fractions- depending on the context of the question.

The remainder in this answer would have been 1 but it has been expressed as a decimal. To do this, children need to insert a decimal point next to the units and carry the remainder over the decimal point. Zeroes are inserted to the right of the decimal point to show that there was no value.

$$\begin{array}{r} 0812.125 \\ 8 \overline{)6497.000} \end{array}$$

Long division by chunking

$$\begin{array}{r} 27 \\ 36 \overline{)972} \\ - 720 \\ \hline 252 \\ - 252 \\ \hline 0 \end{array}$$

Answer : 27

20x
7x

Mastery in division - see

NCETM website for more examples

A box of labels costs £63.

There are 140 sheets in the box.

There are 15 labels on each sheet.

Sara, Ramesh and Trevor want to calculate the cost of one label, in pence.

Ramesh uses the number sentence $(6300 \div 140) \times 15$.

Sara uses the number sentence $63 \div 1.4 \div 15$.

Trevor uses the number sentence $(15 \times 140) \div 6300$.

Who is using the right number sentence? Explain your choice.

Key vocabulary: Share, share equally, one each, two each... group, groups of, lots of, array, divide, divided by, divided into, division, grouping, number line, left, left over, inverse, short division, carry, remainder, multiple, divisible by, factor, inverse, quotient, prime number, prime factors, composite number (non-prime), common factor