

# Addition

## Year 6 Add several numbers of increasing complexity



$$\begin{array}{r}
 23.361 \\
 9.080 \\
 59.770 \\
 + 1.300 \\
 \hline
 93.511 \\
 212
 \end{array}$$

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.

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

$$\begin{array}{r}
 81,059 \\
 3,668 \\
 15,301 \\
 + 20,551 \\
 \hline
 120,579 \\
 1111
 \end{array}$$

Adding several numbers with more than 4 digits.

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

### Key skills for addition at Y6:

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

# Subtraction

Year 6 Subtracting with increasingly large and more complex numbers and decimal values.

$$\begin{array}{r} \cancel{9}^{\text{th}} \cancel{8}^{\text{th}} \cancel{10}^{\text{th}}, 699 \\ - 89,949 \\ \hline 60,750 \end{array}$$

Using the compact column method to subtract more complex integers

$$\begin{array}{r} \cancel{1}^{\text{th}} \cancel{0}^{\text{th}} 5 \cdot \cancel{4}^{\text{th}} 19 \text{ kg} \\ - 36 \cdot 080 \text{ kg} \\ \hline 69 \cdot 339 \text{ kg} \end{array}$$

Using the compact column method to subtract money and measures, including decimals with different numbers of decimal places.

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

Pupils should be able to apply their knowledge of a range of mental strategies, mental recall skills, and informal and formal written methods when selecting the most appropriate method to work out subtraction problems.

Approximate,  
Calculate,  
Check it mate!

**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 decrease, hundreds, value, digit, inverse, tenths, hundredths, decimal point, decimal

**Key skills for subtraction at Y6:**

exchange,

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals
- across zero.
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

See previous videos for introducing the compact column method.

# Multiplication

Year 6 Short and long multiplication as in Y5, and multiply decimals with up to 2d.p by a single digit.

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

Remind children that the single digit belongs in the units column.

Line up the decimal points in the question and the answer.

This works well for multiplying money (£.p) and other measures.

Children will be able to:

- Use rounding and place value to make approximations before calculating and use these to check answers against.
- Use short multiplication (see Y5) to multiply numbers with **more than 4-digits** by a **single digit**; to multiply money and measures, and to **multiply decimals** with up to 2d.p. by a single digit.
- Use long multiplication (see Y5) to multiply numbers with **at least 4 digits** by a **2-digit number**.

Approximate,  
Calculate,  
Check it mate!

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

**Key skills for multiplication at Y6:**

- Recall multiplication facts for all times tables up to  $12 \times 12$  (as Y4 and Y5).
- Multiply multi-digit numbers, up to 4-digit  $\times$  2-digit using long multiplication.
- Perform mental calculations with mixed operations and large numbers.
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
- Round any integer to a required degree of accuracy.

Video clips:

Moving from grid method to a compact method (youtube)

Reinforcing rapid times table recall: (youtube)

Demonstration of long multiplication (SLEP)



# Division

**Year 6** Divide at least 4 digits by both single digit & 2-digit numbers (including decimal remainders).



**Short division**, for dividing by a single digit: e.g.  $6497 \div 8$

$$\begin{array}{r} 0812.125 \\ 8 \overline{) 6497000} \end{array}$$

**Short division with remainders:** Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, decimals, whole number remainders, or rounded numbers. Real life problem solving contexts need to be the starting point, where pupils have to consider the most appropriate way to express the remainder.

**Calculating a decimal remainder:** In this example, rather than expressing the remainder as  $\frac{1}{8}$ , a decimal point is added after the units because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved.

Introduce '**Formal**' long division for dividing by 2-digits

$$\begin{array}{r} 0146 \\ 26 \overline{) 3796} \\ \underline{-26} \phantom{00} \\ 119 \phantom{0} \\ \underline{-104} \phantom{0} \\ 156 \\ \underline{-156} \\ 0 \end{array}$$

Approximate,  
Calculate,  
Check it  
mate!

The main difference of the formal method is that the remainders are worked out below the calculation rather than taking them to the top.

Teachers help pupils work out 26x tables eg. 1x, 2x by doubling- repeat for 4x & 8x. Work out 10x then half for 5x. 3x is 1x + 2x then double for 6x. 9x is 6x + 3x. This leaves 7x and lots of options.

The pattern is: Divide and put answer above bus stop. Use this answer to multiply by the divisor and then subtract. When the remainder has been worked out drop down the next digit and repeat until there are no more digits to drop down. Anything left over after the last subtraction is the remainder (zero in this eg).

**Key Vocabulary:** *As previously, & common factor*

**Key number skills needed for division at Y6:**

- Recall and use multiplication and division facts for all numbers to  $12 \times 12$  for more complex calculations
- 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. Use short division where appropriate.
- Perform mental calculations; including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Solve problems involving all 4 operations.
- Use **estimation** to check answers to calculations and determine accuracy, in the context of a problem.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.