

Year 6

Mental addition

In Year Six, the main mental addition strategies taught are:

Using place value

Count in 0-1s, 0-01s, 0-001s

e.g. *Know what 0-001 more than 6-725 is*

Partitioning

e.g. $9-54 + 3-23$ as $9 + 3$, $0-5 + 0-2$ and $0-04 + 0-03$, to give $12-77$

Counting on

Add two decimal numbers by adding the 1s, then the 0-1s/0-01s/0-001s

e.g. $6-314 + 3-006$ as $6-314 + 3$ ($9-314$) + $0-006 = 9-32$

Add near multiples of 1

e.g. $6-345 + 0-999$

e.g. $5-673 + 0-9$

Count on from large numbers

e.g. $16375 + 12003$ as $28375 + 3$

Using number facts

Number bonds to 1 and to the next multiple of 1

e.g. $0-63 + 0-37$

e.g. $2-355 + 0-645$



Add to the next 10

e.g. $4-62 + 5-38$

Written addition

By Year Six, the children should have a range of written methods that they are confident in using, and should be able to judge which is the most efficient method to use:

Compact column addition for adding several large numbers and decimal numbers with up to 2 decimal places

Compact column addition with money

e.g. $£14.64 + £28.78 + £12.26$

$$\begin{array}{r} £14.64 \\ + £28.78 \\ £12.26 \\ \hline 11.1 \\ \hline £55.68 \end{array}$$

Add unlike fractions, including mixed numbers

e.g. $\frac{1}{4} + \frac{2}{3} = \frac{11}{12}$

e.g. $2\frac{1}{4} + 1\frac{1}{3} = 3\frac{7}{12}$

Mental subtraction

In Year Six, the main mental subtraction methods taught are:

Taking away

Use place value to subtract decimals

e.g. $7.782 - 0.08$

e.g. $16.263 - 0.2$

Take away multiples of powers of 10

e.g. $132\,956 - 400$

e.g. $686\,109 - 40\,000$

e.g. $7.823 - 0.5$

Partitioning or counting back

e.g. $3964 - 1051$

e.g. $5.72 - 2.01$

Subtract near multiples of powers of 10

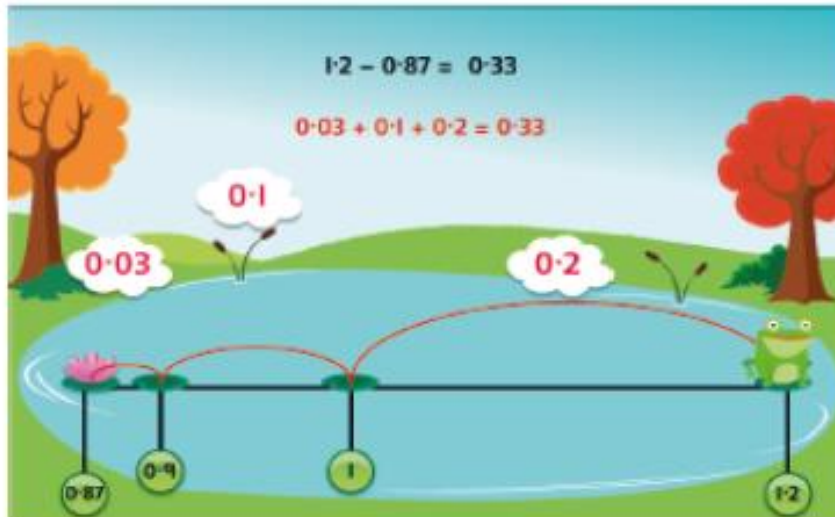
e.g. $360\,078 - 99\,998$

e.g. $12.831 - 0.99$

Counting up

Find a difference between two decimal numbers by counting up from the smaller to the larger

e.g. $1.2 - 0.87$

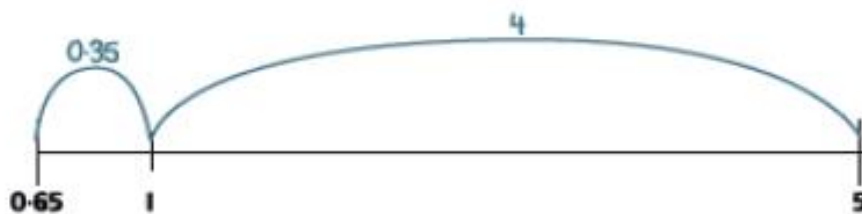


Using number facts

Derived facts from number bonds to 10 and 100

e.g. $0.1 - 0.075$ using $75 + 25 = 100$

e.g. $5 - 0.65$ using $65 + 35 = 100$



Number bonds to £1, £10 and £100

e.g. $£7.00 - £4.37$

e.g. $£100 - £66.20$ using $20p + 80p = £1$ and $£67 + £33 = £100$

Written subtraction

As with written addition, the Year Six children have a range of written methods of subtraction and should use the method that is most efficient:

Compact column subtraction for large numbers

e.g. $34\ 685 - 16\ 458$

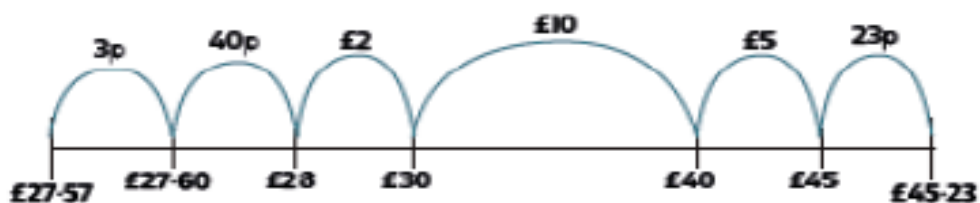
$$\begin{array}{r}
 2\ 14\ \quad 7\ 15 \\
 \cancel{3}\ \cancel{4}\ 6\ \cancel{8}\ \cancel{5} \\
 - 1\ 6\ 4\ 5\ 8 \\
 \hline
 1\ 8\ 2\ 2\ 7
 \end{array}$$

Use counting up for subtractions where the larger number is a multiple or near multiple of 1000 or 10 000

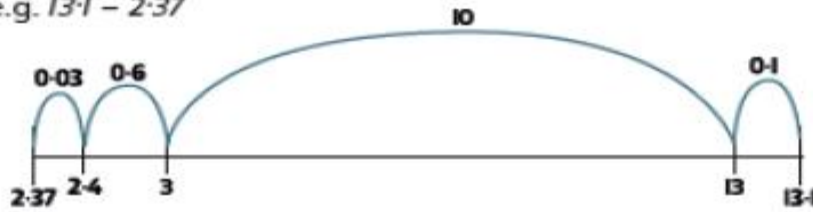
Use counting up subtraction when dealing with money

e.g. $£100 - £78.56$

e.g. $£45.23 - £27.57$



Use counting up subtraction to subtract decimal numbers
e.g. $13.1 - 2.37$



Subtract unlike fractions, including mixed numbers

e.g. $\frac{3}{4} - \frac{1}{3} = \frac{5}{12}$

e.g. $2\frac{3}{4} - 1\frac{1}{3} = 1\frac{5}{12}$

NB Counting up subtraction provides a default method for ALL children

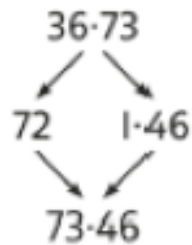
Mental multiplication

The mental multiplication methods taught in Year Six are:

Doubling and halving

Double decimal numbers with up to 2 places using partitioning

e.g. *double 36.73*



Use doubling and halving as strategies in mental multiplication

Grouping

Use partitioning as a strategy in mental multiplication, as appropriate

e.g. 3060×4 as 3000×4 (12 000) and 60×4 (240) = 12 240

e.g. 8.4×8 as 8×8 (64) and 0.4×8 (3.2) = 67.2

Use factors in mental multiplication

e.g. 421×6 as 421×3 (1263) doubled = 2526

e.g. 3.42×5 as half of 3.42×10 = 17.1

Multiply decimal numbers using near multiples by rounding

e.g. 4.3×19 as $(4.3 \times 20) - 4.3$ = 81.7

Written Multiplication

In Year Six, the children further develop their use of written methods of multiplication, including larger numbers with two decimal places:

Short multiplication of 2-, 3- and 4-digit numbers by 1-digit numbers
e.g. 3743×6

$$\begin{array}{r} 3743 \\ \times \quad 6 \\ \hline 4218 \\ \hline 22458 \end{array}$$

Long multiplication of 2-, 3- and 4-digit numbers by 2-digit numbers
e.g. 456×38

$$\begin{array}{r} 456 \\ \times 38 \\ \hline 13680 \\ 36480 \\ \hline 17328 \end{array}$$

Short multiplication of decimal numbers using $\times 100$ and $\div 100$
e.g. 13.72×6 as $(1372 \times 6) \div 100 = 82.32$

Short multiplication of money

e.g. $\pounds 13.72 \times 6$

$$\begin{array}{r} \pounds 13.72 \\ \times \quad 6 \\ \hline 2412 \\ \hline \pounds 82.32 \end{array}$$

Grid multiplication of numbers with up to 2 decimal places by 1-digit numbers

e.g. 6.76×4

x	6	0.7	0.06	= 27.04
4	24	2.8	0.24	

Multiply simple pairs of proper fractions

e.g. $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$

NB Grid multiplication provides a default method for ALL children

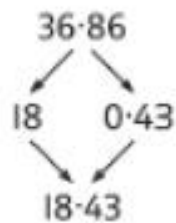
Mental division

Year Six children are taught to divide mentally by:

Doubling and halving

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)



Use doubling and halving as strategies in mental division

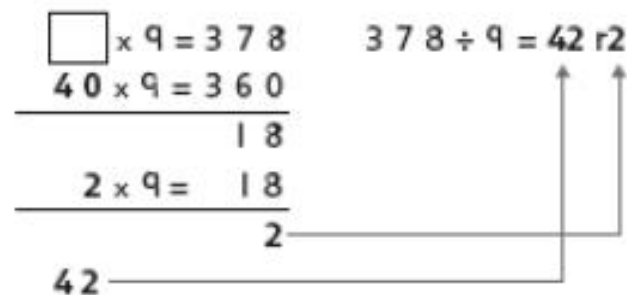
Grouping

Use the 10th, 20th, 30th, ... or 100th, 200th, 300th ... multiples of the divisor to divide large numbers

e.g. $378 \div 9$ as 40×9 (360) and 2×9 (18), remainder 2

$$378 \div 9 = \square$$

$\square \times 9 = 378$	$378 \div 9 = 42 \text{ r}2$
$40 \times 9 = 360$	
18	
$2 \times 9 = 18$	
2	
42	



Use tests for divisibility

e.g. 135 divides by 3, as $1 + 3 + 5 = 9$ and 9 is in the $\times 3$ table

Using number facts

Use division facts from the times-tables up to 12 x 12 to divide decimal numbers by 1-digit numbers

e.g. $117 \div 3$ is $\frac{1}{100}$ of $117 \div 3$ (39)

Know tests of divisibility for numbers divisible by 2, 3, 4, 5, 9, 10 and 25

Written division

In YearSix, the children continue to develop their use of short division and are introduced to long division for sums including bigger numbers:

:

Short division of 3- and 4-digit numbers by 1-digit numbers

e.g. $139 \div 3$

$$\begin{array}{r}
 46 \text{ r } 1 \\
 3 \overline{) 139}
 \end{array}$$

Long division of 3- and 4-digit numbers by 2-digit numbers

e.g. $4176 \div 13$

$$\begin{array}{r}
 300 + 20 + 1, \text{ r } 3 \\
 13 \overline{) 4176} \\
 \underline{-3900} \\
 276 \\
 \underline{-260} \\
 16 \\
 \underline{-13} \\
 3
 \end{array}
 \qquad
 4176 \div 13 = 321 \text{ r } 3$$

Give remainders as whole numbers, fractions or decimals

Use place value to divide 1- and 2-place decimals by numbers ≤ 12

e.g. $3.65 \div 5$ as $(365 \div 5) \div 100 = 0.73$

Divide proper fractions by whole numbers