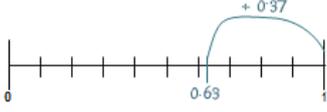
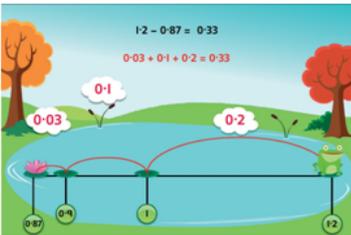
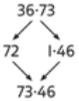


Year 6 Mental Methods

+	<p>Using place value Count in 0.1s, 0.01s, 0.001s e.g. <i>Know what 0.001 more than 6.725 is</i> Partitioning e.g. $9.54 + 3.23$ as $9 + 3$, $0.5 + 0.2$ and $0.04 + 0.03$, to give 12.77</p> <p>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. $16.375 + 12.003$ as $28.375 + 3$</p> <p style="text-align: center;">using number facts Number bonds to 1 and to the next multiple of 1 e.g. $0.63 + 0.37$ e.g. $2.355 + 0.645$</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Add to the next 10 e.g. $4.62 + 5.38$</p>	<ul style="list-style-type: none"> • Know by heart number bonds to 100 and use these to derive related facts e.g. $3.46 + 0.54$ • Derive, quickly and without difficulty, number bonds to 1000 • Add small and large whole numbers where the use of place value or number facts makes the calculation do-able mentally e.g. $34\ 000 + 8000$ • Add multiples of powers of 10 and near multiples of the same e.g. $6345 + 199$ • Add negative numbers in a context such as temperature where the numbers make sense • Add two 1-place decimal numbers or two 2-place decimal numbers less than 1 e.g. $4.5 + 6.3$ • Add positive numbers to negative numbers
-	<p>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. $12.831 - 0.99$</p> <p style="text-align: center;">Counting up Find a difference between two decimal numbers by counting up from the smaller to the larger e.g. $1.2 - 0.87$</p> <div style="text-align: center;">  </div> <p style="text-align: center;">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 $65 + 35 = 100$</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Number bonds to £1, £10 and £100 e.g. $£7.00 - £4.37$ e.g. $£100 - £66.20$ using $20p + 80p = £1$ and $£67 + £33 = £100$</p>	<ul style="list-style-type: none"> • Use number bonds to 100 to perform mental subtraction of any pair of integers by complementary addition e.g. $1000 - 654$ as $46 + 300$ in our heads • Use number bonds to 1 and 10 to perform mental subtraction of any pair of 1-place or 2-place decimal numbers using complementary addition and including money e.g. $10 - 3.65$ as $0.35 + 6$ • Use number facts and place value to perform mental subtraction of large numbers or decimal numbers with up to 2 places e.g. $467\ 900 - 3005$ e.g. $4.63 - 1.02$ • Subtract multiples of powers of 10 and near multiples of the same • Subtract negative numbers in a context such as temperature
X	<p>Doubling and halving Double decimal numbers with up to 2 places using partitioning e.g. double 36.73</p> <div style="text-align: center;">  </div> <p>Use doubling and halving as strategies in mental multiplication</p> <p>Grouping Use partitioning as a strategy in mental multiplication, as appropriate e.g. 3060×4 as $3000 \times 4 (12\ 000)$ and $60 \times 4 (240) = 12\ 240$ e.g. 8.4×8 as $8 \times 8 (64)$ and $0.4 \times 8 (3.2) = 67.2$ Use factors in mental multiplication e.g. 421×6 as $421 \times 3 (1263)$ doubled = 2526 e.g. 3.42×5 as half of $3.42 \times 10 = 17.1$ Multiply decimal numbers using near multiples by rounding e.g. 4.3×19 as $(4.3 \times 20) - 4.3 = 81.7$</p> <p>Using number facts Use times-tables facts up to 12×12 in mental multiplication of large numbers or numbers with up to 2 decimal places e.g. $6 \times 4 = 24$ and $0.06 \times 4 = 0.24$</p>	<ul style="list-style-type: none"> • Know all the multiplication facts up to 12×12 Multiply whole numbers and decimals with up to 3 places by 10, 100 or 1000 e.g. $0.23 \times 1000 = 230$ • Identify common factors, common multiples and prime numbers e.g. 326×6 is 652×3 which is 1956 • Use place value and number facts in mental multiplication e.g. $4000 \times 6 = 24\ 000$ e.g. $0.03 \times 6 = 0.18$ • Use doubling and halving as mental multiplication strategies, including to multiply by 2, 4, 8, 5, 20, 50 and 25 e.g. 28×25 is a quarter of $28 \times 100 = 700$ • Use rounding in mental multiplication e.g. 34×19 as $(34 \times 20) - 34$ • Multiply 1- and 2-place decimals by numbers up to and including 10 using place value and partitioning e.g. 3.6×4 is $12 + 2.4$ • Double decimal numbers with up to 2 places using partitioning e.g. 36.73 doubled is double 36 (72) plus double 0.73 (1.46)



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 $40 \times 9 (360)$ and $2 \times 9 (18)$, remainder 2

$$378 \div 9 = \square$$

$\square \times 9 = 378$	$378 \div 9 = 42 \text{ r}2$
$40 \times 9 = 360$	
$2 \times 9 = 18$	
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 12×12 to divide decimal numbers by 1-digit numbers

e.g. $1.17 \div 3$ is $1/100$ of $117 \div 3 (39)$

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

- Know by heart all the division facts up to $144 \div 12$
- Divide whole numbers by powers of 10 to give whole number answers or answers with up to 3 decimal places
- Identify common factors, common multiples and primes numbers and use factors in mental division
e.g. $438 \div 6$ is $219 \div 3$ which is 73
- Use doubling and halving as mental division strategies, for example to divide by 2, 4, 8, 5, 20 and 25
e.g. $628 \div 8$ is halved three times:
 $314, 157, 78.5$
- Divide 1- and 2-place decimals by numbers up to and including 10 using place value
e.g. $2.4 \div 6 = 0.4$
e.g. $0.65 \div 5 = 0.13$
- 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)*
- Know and use equivalence between simple fractions, decimals and percentages
- Recognise a given ratio and reduce a given ratio to its lowest terms