Sissinghurst (VA) Church of England Primary School

Enjoy, Achieve and Celebrate Together in Faith

The Governors and Staff of Sissinghurst VA Church of England Primary School believe the policies and procedures we write help us to continuously improve the school and develop our pupils to become life-long learners and valuable citizens of the future.

We are dedicated to providing an education of the highest quality within the context of Christian belief and practice. Our Christian values of:

Endurance · Koinonia · Friendship · Wisdom

- underpin all our policies. We actively reject any form of discrimination.

Policy Title:	**Calculations Policy**
Date:	**June 2017**
Review Date:	**June 2019**
Reviewed by:	**Teaching and Learning**
Approved by:	**Teaching and Learning**

ADDITION

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

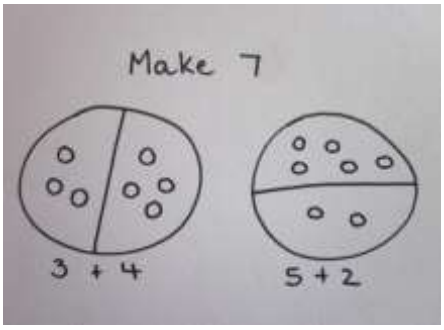
Foundation/Y1

Children should respond to vocabulary involving addition. They use rhymes and songs such as 5 Speckled Frogs and 10 Green Bottles; they use role play to find one more or one less.

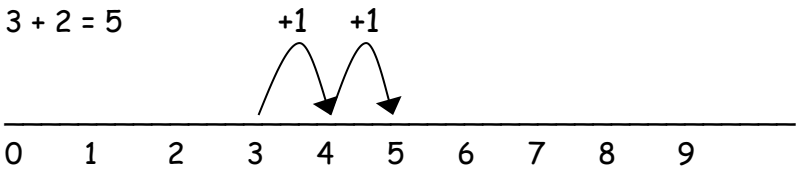
They find one more/one less of up to 5 objects initially and then up to 20 objects.

Children relate addition to combining 2 groups: they use everyday objects to combine groups and then count to find a total.

Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures, etc.

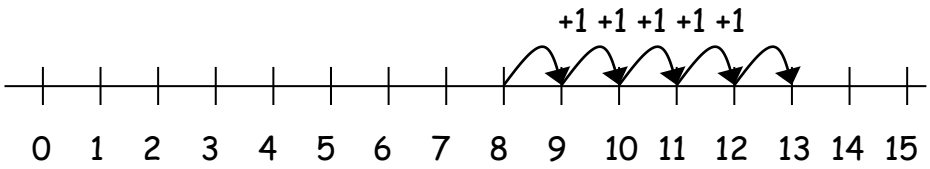


They use numberlines and practical resources to support calculation and teachers *demonstrate* the use of the numberline.



Children then begin to use numbered lines to support their own calculations using a numbered line to count on in ones.

8 + 5 = 13



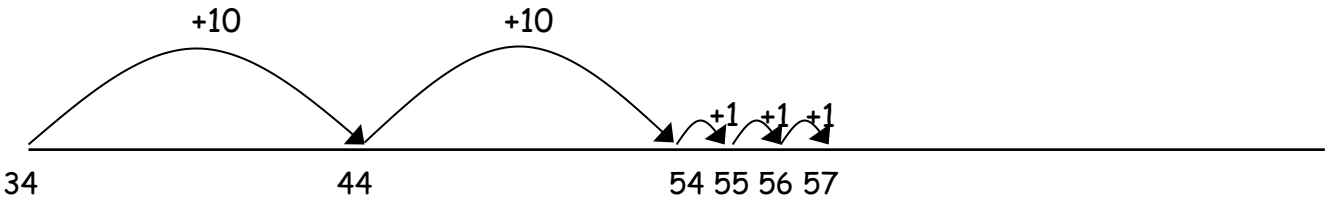
By the end of Reception, most children should know the numbers bonds to 3, 4 and 5.
By the end of Year 1, most children should know their number bonds to 10 and use known facts to calculate 14+3, for example.

Y2

Children will begin to use 'empty number lines' themselves starting with the larger number and counting on.

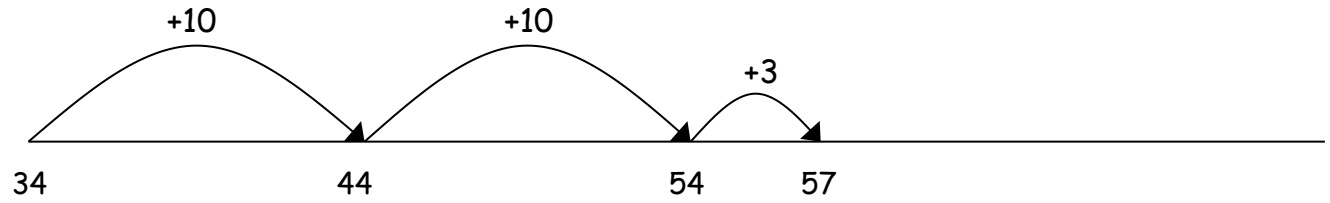
✓ First counting on in tens and ones.

34 + 23 = 57



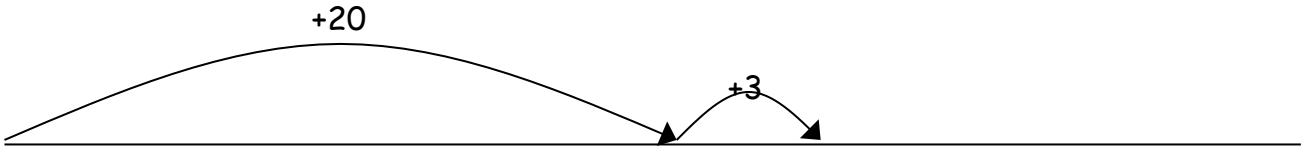
✓ Then helping children to become more efficient by adding the units in one jump (by using the known fact 4 + 3 = 7).

34 + 23 = 57



✓ Followed by adding the tens in one jump and the units in one jump.

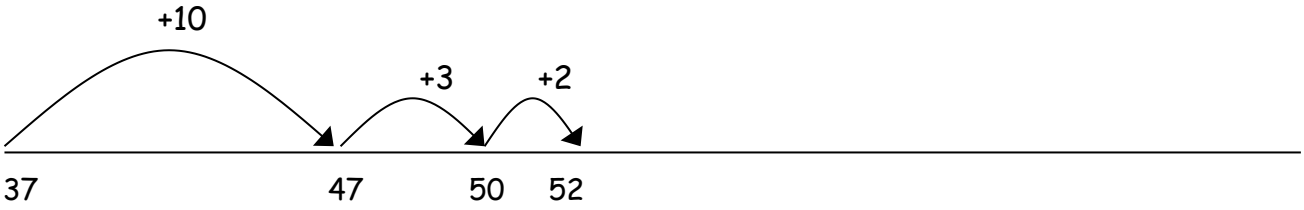
34 + 23 = 57



34 54 57

✓ Bridging through ten can help children become more efficient.

37 + 15 = 52



✓ Adding ten and then compensating when adding 9, 11, 19, 21 etc

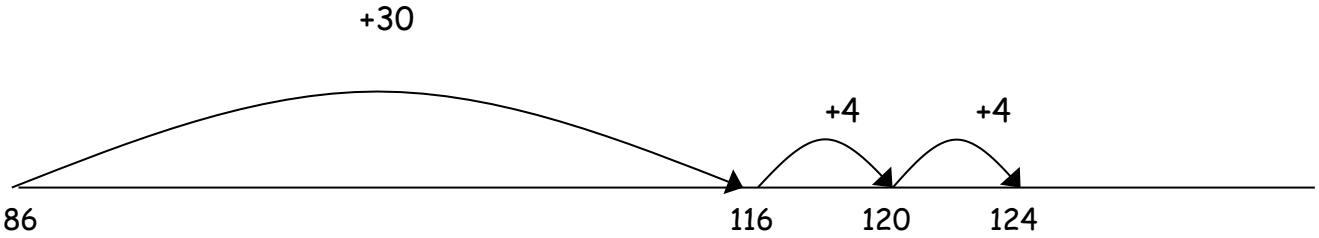
36 + 9 = 45

Y3

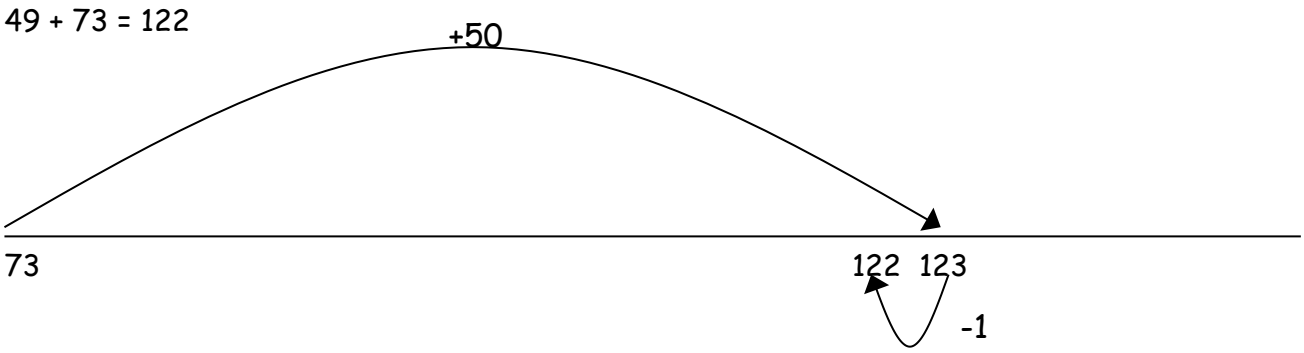
Children will continue to use empty number lines with increasingly large numbers, including compensation where appropriate.

✓ Count on from the largest number irrespective of the order of the calculation.

38 + 86 = 124

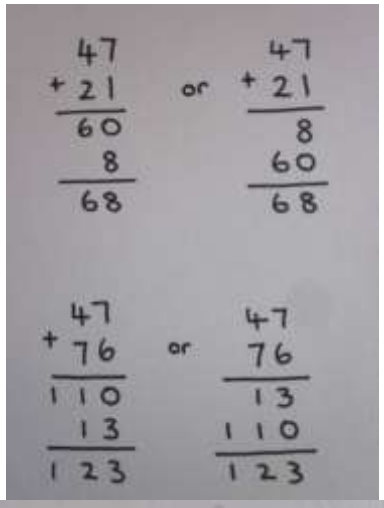


✓ Compensation



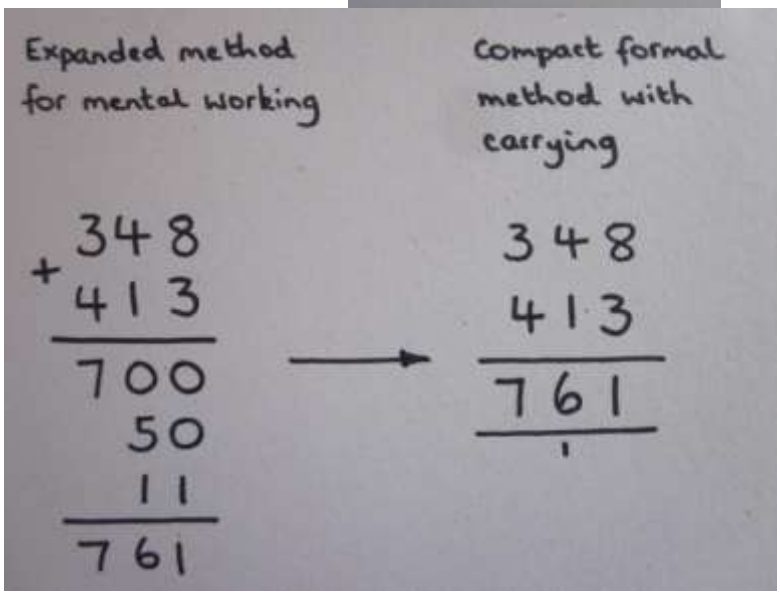
Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

From this children will move on to a vertical layout where tens or units could be added in any order since children may wish to add tens first when performing the calculation mentally.



Y4

Children will move from the expanded method of addition to the compact method where carrying is introduced. The numbers involved will be hundreds (and thousands if appropriate).



Using similar methods, children will:

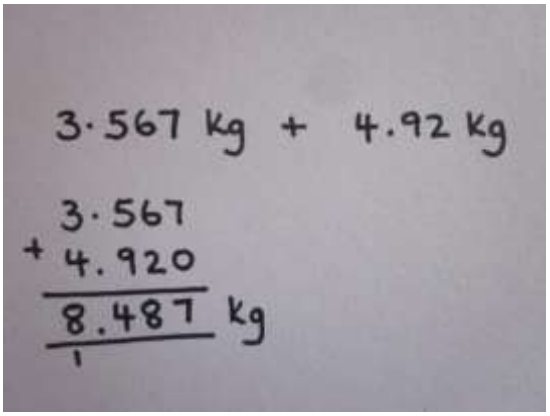
✓ *add several numbers with different numbers of digits, e.g. 34 + 128 + 55;*

- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*
- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.*

Children should add fractions with the same denominator, e.g. $\frac{3}{5} + \frac{1}{5} = \frac{4}{5}$

Y5

Children should extend the carrying method to numbers with at least four digits and use decimals up to 3 decimal places.



Using similar methods, children will:

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more decimal fractions with up to three digits and three decimal places;*
- ✓ *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 3.2 m – 280 cm.*

Children should add fractions with the same denominator, recognising mixed numbers, or add those with denominators that are multiples of the same number, e.g.

$\frac{4}{5} + \frac{2}{5} = \frac{6}{5} = 1\frac{1}{5}$ and $\frac{1}{3} + \frac{2}{6} = \frac{1}{3} + \frac{1}{3} = \frac{2}{3}$

Y6

Children will solve multi-step problems that may involve addition.
They will explore the order of operations using brackets, e.g. 2 + 1 x 3 = 5 and (2 + 1) x 3 =9

Children will add fractions with different denominators, e.g.

$\frac{1}{3} + \frac{1}{4} = \frac{4}{12} + \frac{3}{12} = \frac{7}{12}$

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.
Children should not be made to go onto the next stage if:

1) **they are not ready.**
2) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

SUBTRACTION

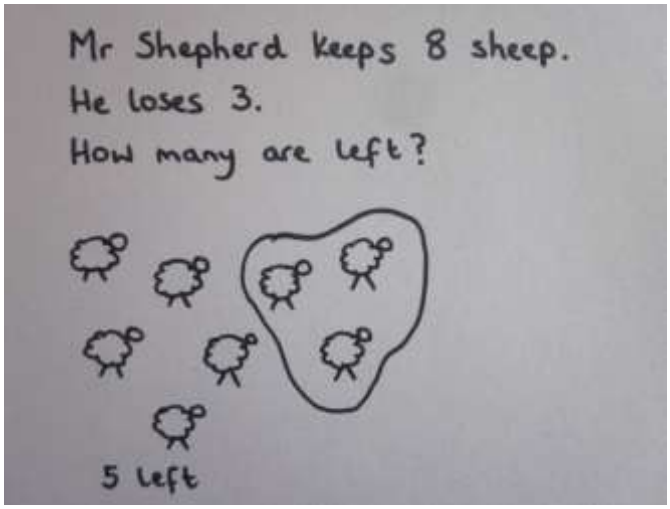
THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

Foundation

Children should respond to vocabulary involving subtraction. They use rhymes and songs such as 5 Speckled Frogs and 10 Green Bottles; they use role play to find one more or one less.

They find one more/one less of up to 5 objects initially and then up to 20 objects.

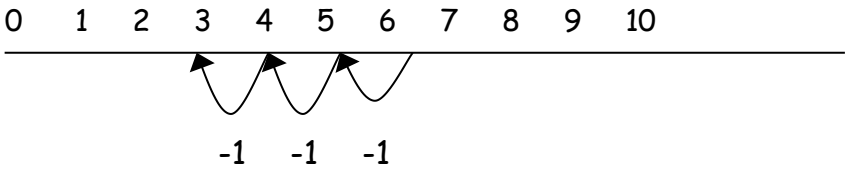
Children are encouraged to develop a mental picture of the number system in their heads to use for calculation. They develop ways of recording calculations using pictures etc.



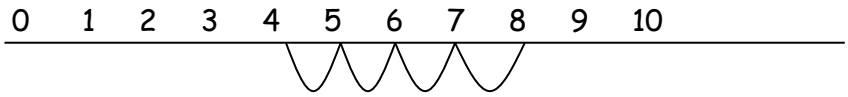
Y1

They use numberlines and practical resources to support calculation. Teachers *demonstrate* the use of the numberline.

6 – 3 = 3



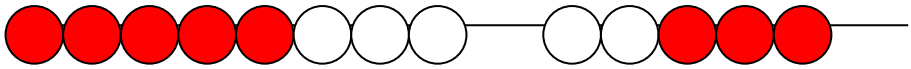
The numberline should also be used to show that 8 - 4 means the 'difference between 8 and 4' or how many jumps they are apart. Children count on from 4 to reach 8.



This leads to children recognising subtraction as the inverse of addition and understanding related facts, e.g. 2 + 3 = 5; 5 – 3 = 2; 3 + 2 = 5; 5 – 2 = 3

Bead strings or bead bars can be used to illustrate subtraction including bridging through ten by counting back 3 then counting back 2.

13 – 5 = 8



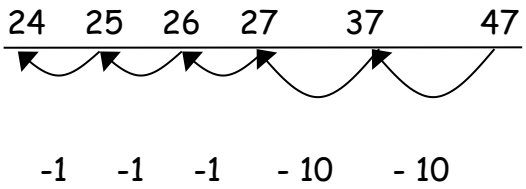
Y2

Children will begin to use empty number lines to support calculations.

Counting back

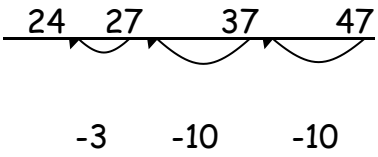
✓ First counting back in tens and ones.

47 – 23 = 24



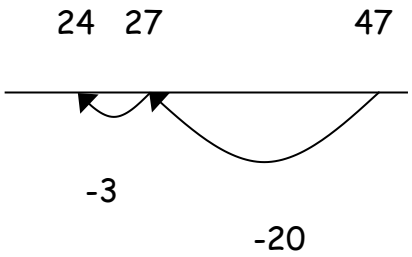
✓ Then helping children to become more efficient by subtracting the units in one jump (by using the known fact 7 – 3 = 4).

47 – 23 = 24



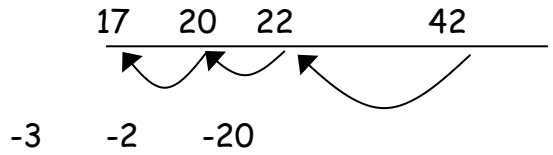
✓ Subtracting the tens in one jump and the units in one jump.

47 – 23 = 24



✓ Bridging through ten can help children become more efficient.

42 – 25 = 17



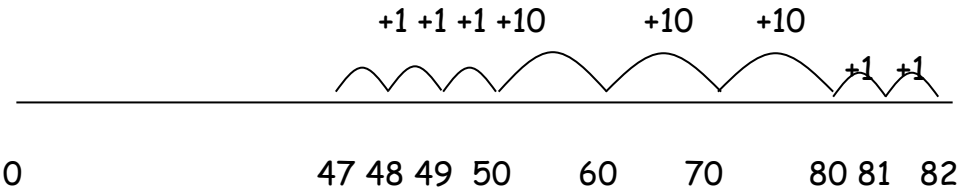
Counting on

If the numbers invoved in the calculation are close together or near to multiples of 10, 100 etc, it can be more efficient to count on.

Count up from 47 to 82 in jumps of 10 and jumps of 1.

The number line should still show 0 so children can cross out the section from 0 to the smallest number. They then associate this method with 'taking away'.

82 - 47



Help children to become more efficient with counting on by:

- ✓ Subtracting the units in one jump;
- ✓ Subtracting the tens in one jump and the units in one jump; ✓ Bridging through ten.

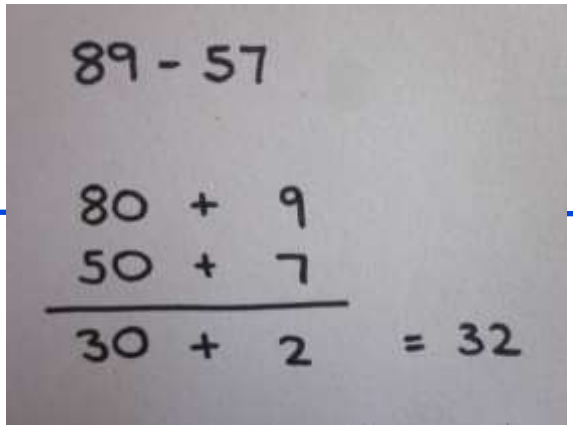
Y3

Children will continue to use empty number lines with increasingly large numbers.

Children will begin to use informal pencil and paper methods (jottings) to support, record and explain partial mental methods building on existing mental strategies.

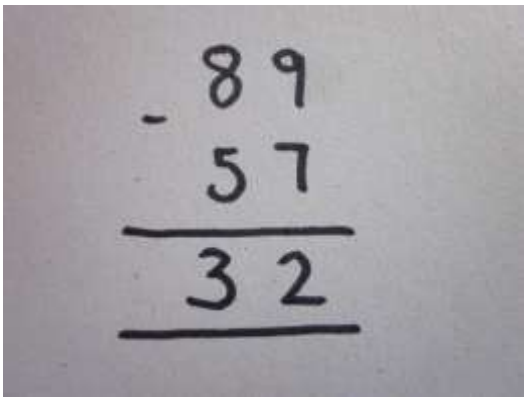
Partitioning

Initially, the children will be taught using examples that do not need the children to include decomposition (borrowing).



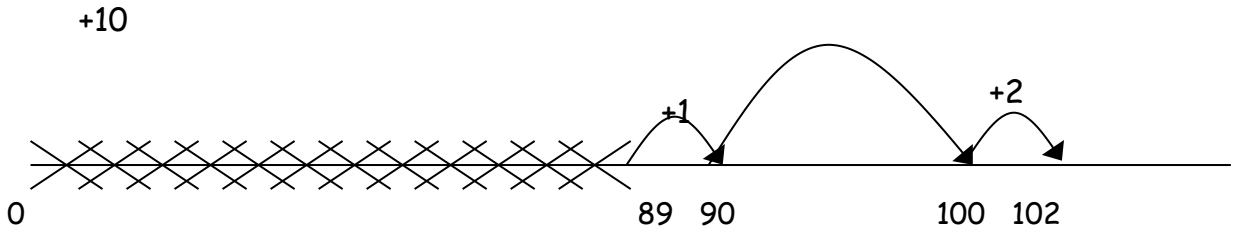
This method can be demonstrated by the teacher as a mental method:

Children would write:



Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

102 – 89 = 13



Y4

Partitioning and decomposition

In Year 4 children move on to subtracting up to 4 digit numbers and using 2 decimal places in the context of money or measures. Teachers may demonstrate the partitioning method as follows:

754 – 86

Step 1 700 + 50 + 4
\- 80 + 6

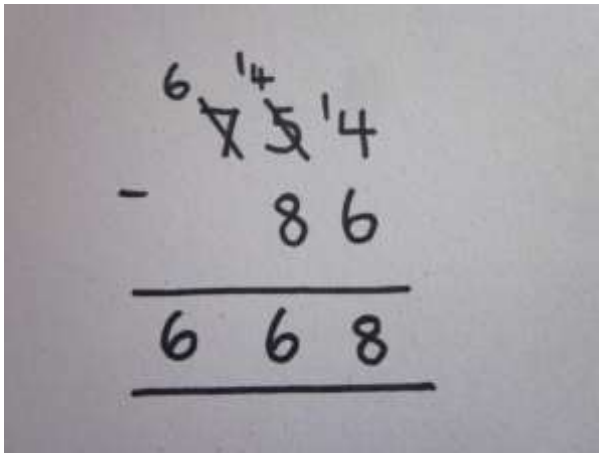
Step 2 700 + 40 + 14 *(adjust from T to U)*

- 80 + 6

Step 3 600 + 140 + 14 *(adjust from H to T)*

- 80 + 6 600 + 60 + 8 = 668

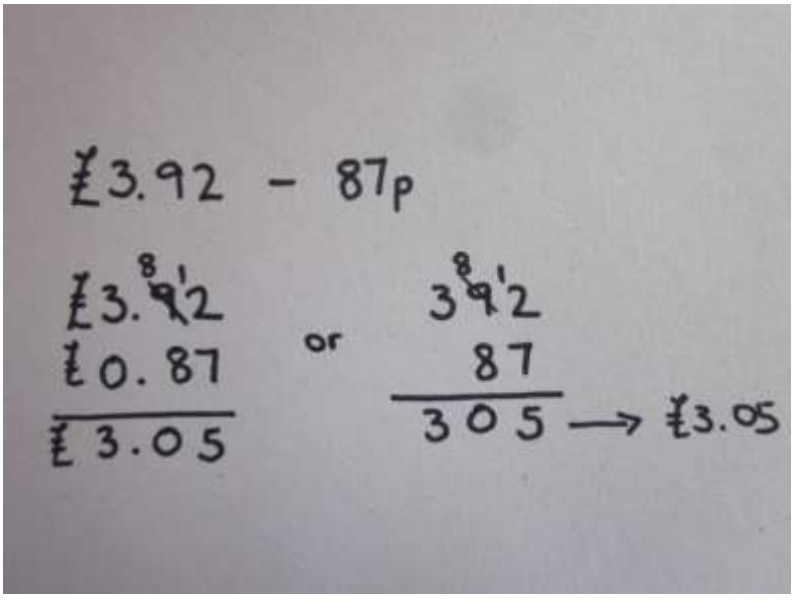
This would be recorded by the children as decomposition:



Children should:

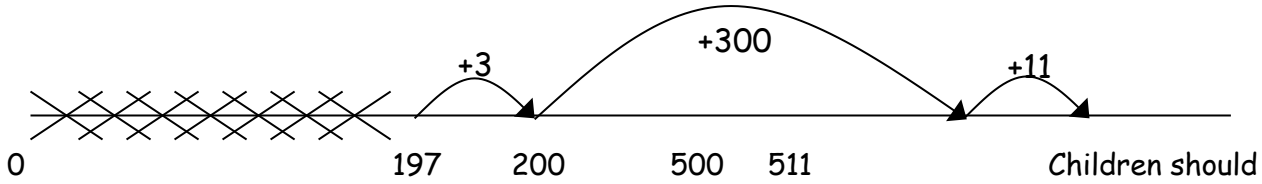
- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *using this method, children should also begin to find the difference between two sums of money, with or without 'adjustment' from the pence to the pounds;* ✓ *know that decimal points should line up under each other.*

For example:



Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used. This aids mental methods.

511 – 197 = 314

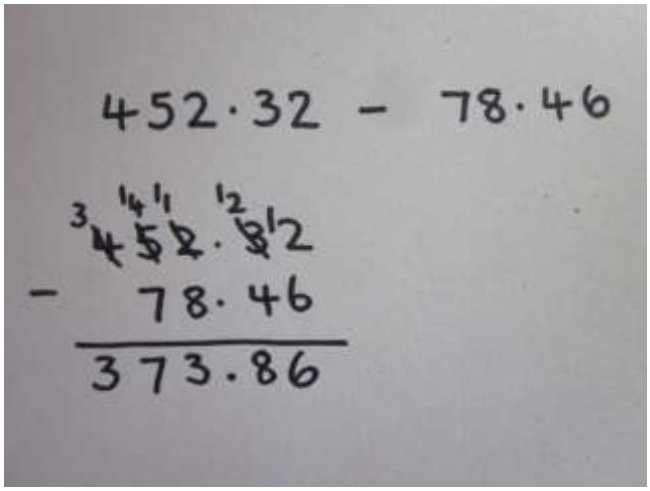


Children should subtract fractions with the same denominator, e.g. $\frac{3}{5} - \frac{1}{5} = \frac{2}{5}$

Y5

Decomposition

Children should extend the decomposition method to numbers with at least four digits and use decimals up to 3 decimal places.

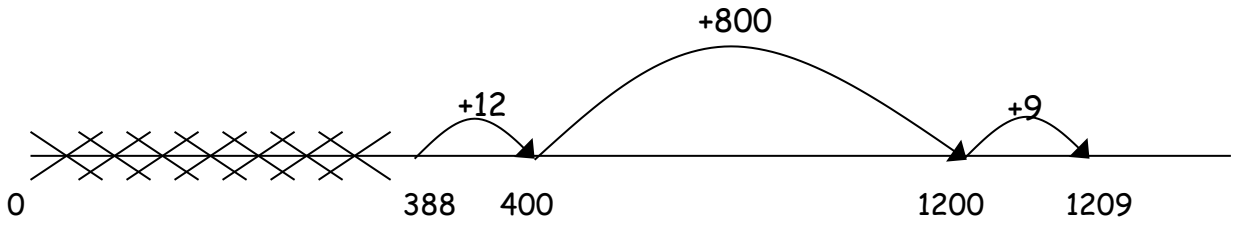


Children should:

- ✓ *be able to subtract numbers with different numbers of digits;*
- ✓ *know that decimal points should line up under each other.*

Where the numbers involved in the calculation are close together or near to multiples of 10, 100 etc counting on using a number line should be used.

1209 – 388 = 821



Children should subtract fractions with the same denominator, recognising mixed numbers, or subtract those with denominators that are multiples of the same number, e.g.

$1\ \frac{1}{5} - \frac{2}{5} = \frac{6}{5} - \frac{2}{5} = \frac{4}{5}$ and $\frac{2}{3} - \frac{2}{6} = \frac{2}{3} - \frac{1}{3} = \frac{1}{3}$

Y6

Children will solve multi-step problems that may involve subtraction. They use the formal written method of decomposition or choose a suitable mental method to solve problems involving more complex numbers.
They will explore the order of operations using brackets, e.g. 12 - 1 x 3 = 9 and (12 - 1) x 3 =33

Children will subtract fractions with different denominators, e.g.

$\frac{1}{3} - \frac{1}{4} = \frac{4}{12} - \frac{3}{12} = \frac{1}{12}$

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.
Children should not be made to go onto the next stage if:

3) **they are not ready.**
4) **they are not confident.**

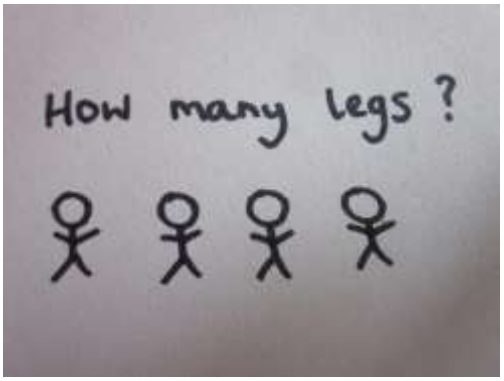
Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.

MULTIPLICATION

THE FOLLOWING ARE STANDARDS THAT WE EXPECT THE MAJORITY OF CHILDREN TO ACHIEVE.

Foundation

Children will experience equal groups of objects and will count in 2s and 10s. They will work on practical problem solving activities involving equal sets or groups.



Y1

Children count in 2s and 10s and 5s. They will work on practical problem solving activities involving equal sets or groups.

Y2

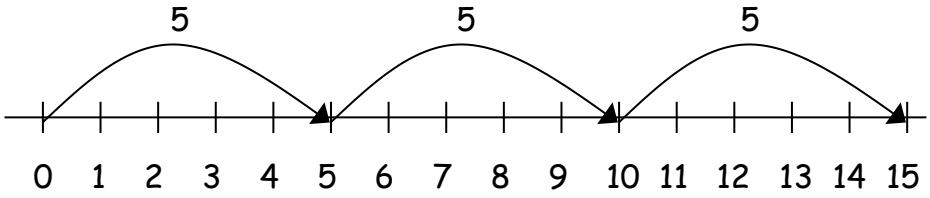
Children will develop their understanding of multiplication and use jottings to support calculation:

✓ **Repeated addition**

5 times 3 is 5 + 5 + 5 = 15 or 3 lots of 5 or 5 x 3

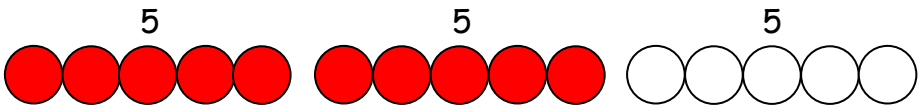
Repeated addition can be shown easily on a number line:

5 x 3 = 5 + 5 + 5

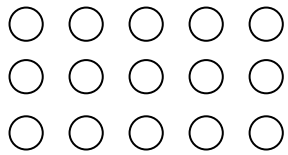


and on a bead bar:

5 x 3 = 5 + 5 + 5



Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.

3 x  5 = 15

5 x 3 = 15

Y3

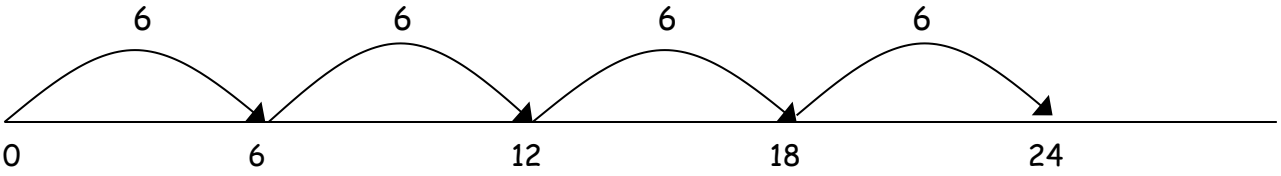
Children should recall their 2,3,4,5,8 and 10 times tables.

Children will continue to use:

✓ **Repeated addition**

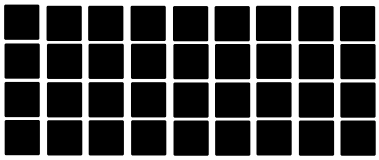
4 times 6 is 6 + 6 + 6 + 6 = 24 or 4 lots of 6 or 4 x 6

Children should use number lines or bead bars to support their understanding.



✓ **Arrays**

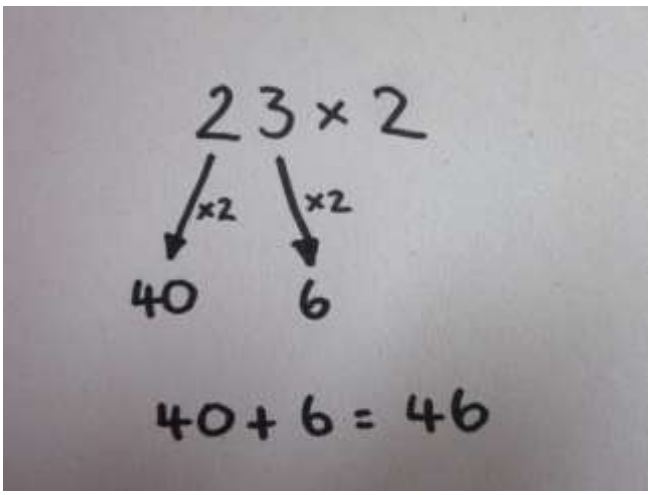
Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.



4 x 9 = 36

9 x 4 = 36

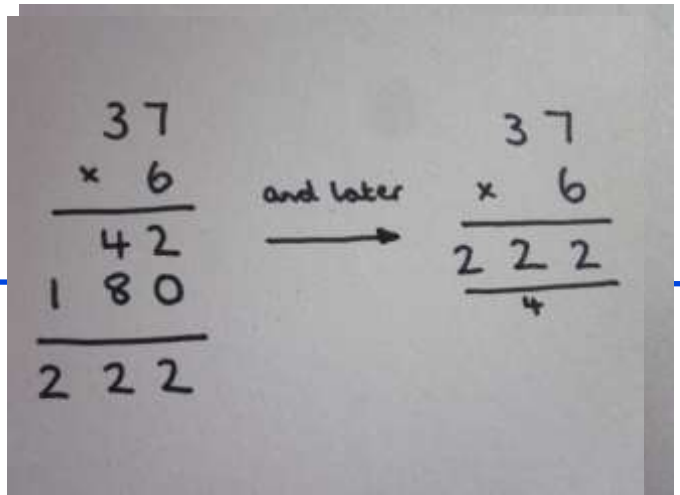
Children will begin to multiply a 2 digit number by a one digit number using informal jottings:



Y4

Children should recall all their tables up to 12x12.

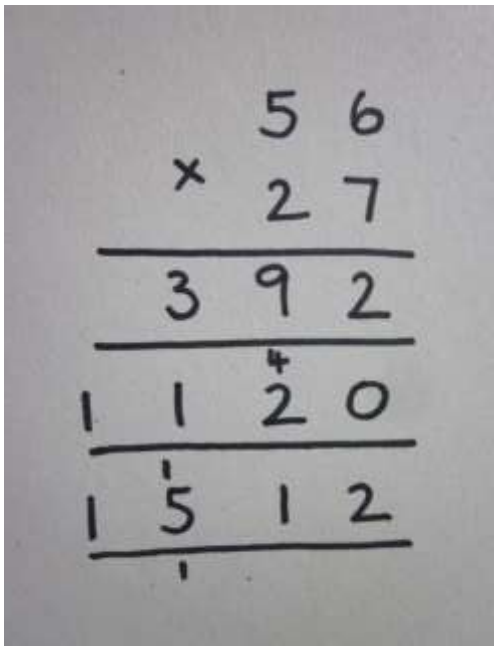
Children will continue to use informal jottings and mental methods to solve increasingly complex problems:



Children will be introduced to a more formal calculation technique, leading to a compact method:

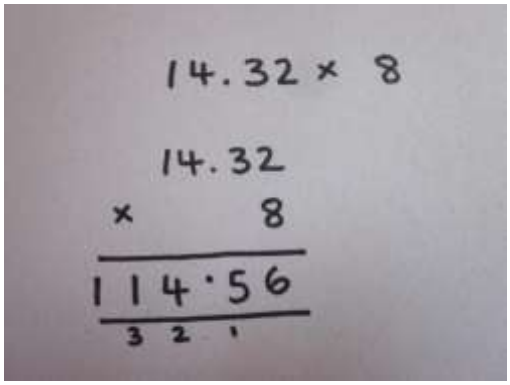
Y5

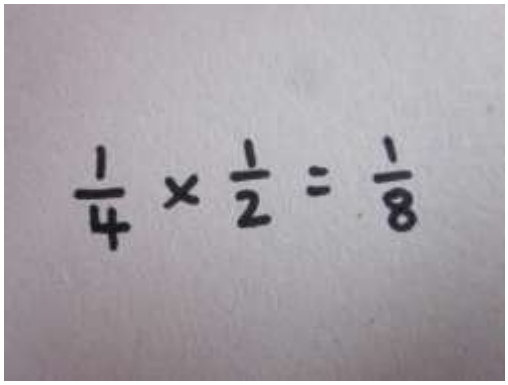
Children should multiply numbers up to 4 digits by a 2 digit number using the formal method of long multiplication:



Y6

Pupils will be able to multiply decimals and fractions:

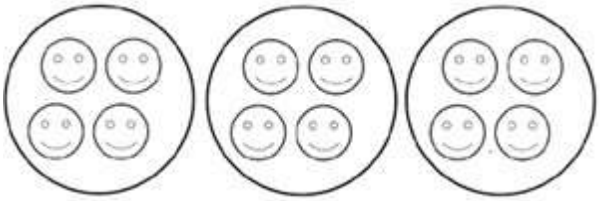




Division

YR and Y1

Children will understand equal groups and share items out in play and problem solving. They will count in 2s and 10s and later in 5s.

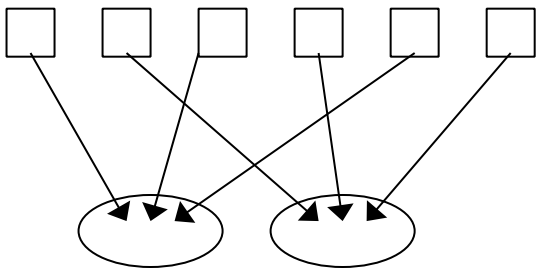


Y2

Children will develop their understanding of division and use jottings to support calculation

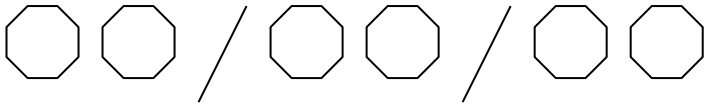
✓ **Sharing equally**

6 sweets shared between 2 people, how many do they each get?



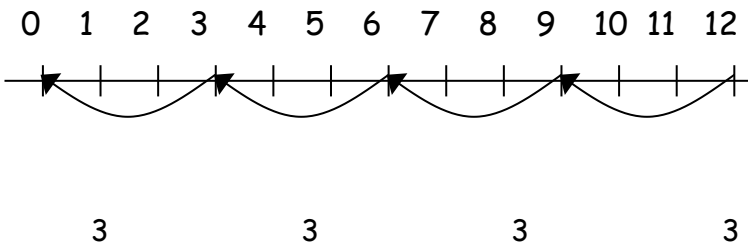
✓ **Grouping or repeated subtraction**

There are 6 sweets, how many people can have 2 sweets each?

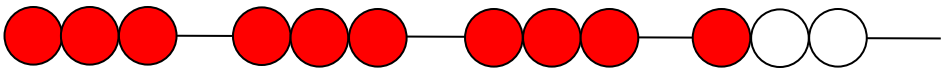


✓ **Repeated subtraction using a number line or bead bar**

12 ÷ 3 = 4



The bead bar will help children with interpreting division calculations such as 12 ÷ 3 as 'how many 3s make 12?'



✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

□ ÷ 2 = 4 20 ÷ △ = 4 □ ÷ △ = 4

Y3

Children should move onto calculations involving remainders. They use knowledge of times tables facts to solve divisions.

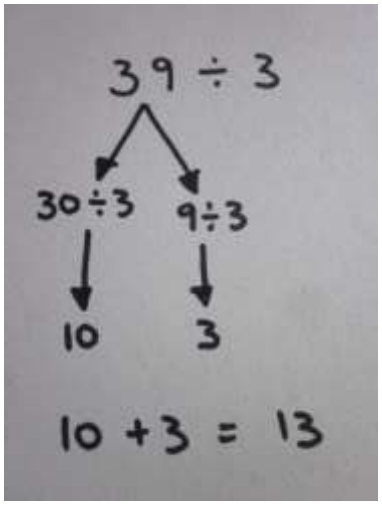
13 ÷ 4 = 3 r 1

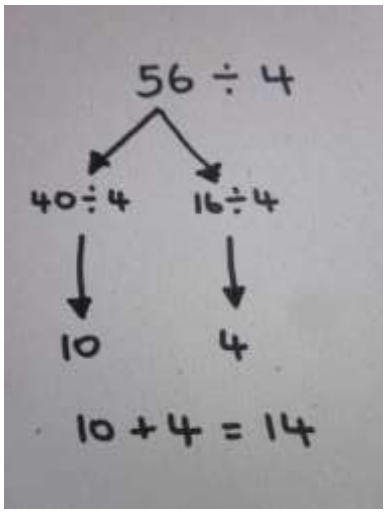
✓ **Using symbols to stand for unknown numbers to complete equations using inverse operations**

26 ÷ 2 = □ 24 ÷ △ = 12 □ ÷ 10 = 8

Y4

Children partition 2 digit numbers to make division easier and then recombine the answer. Informal jottings aid mental methods:





Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 62 ÷ 8 is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?
Answer: 7 (the remaining 6p is not enough to buy another sweet)

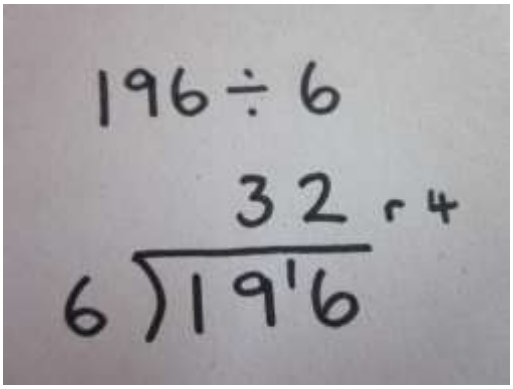
Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?

Answer: 8 (the remaining 6 apples still need to be placed into a box)

Y5

Children will continue to use mental methods and informal jottings to solve divisions TU ÷ U.

Short division HTU ÷ U



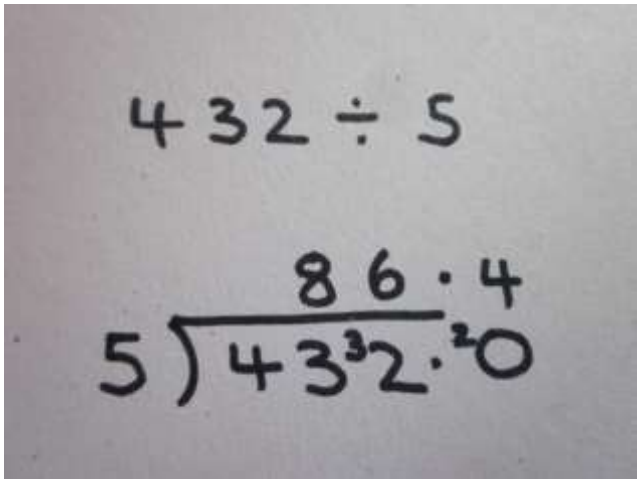
Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example 240 ÷ 52 is 4 remainder 32, but whether the answer should be rounded up to 5 or rounded down to 4 depends on the context.

Y6

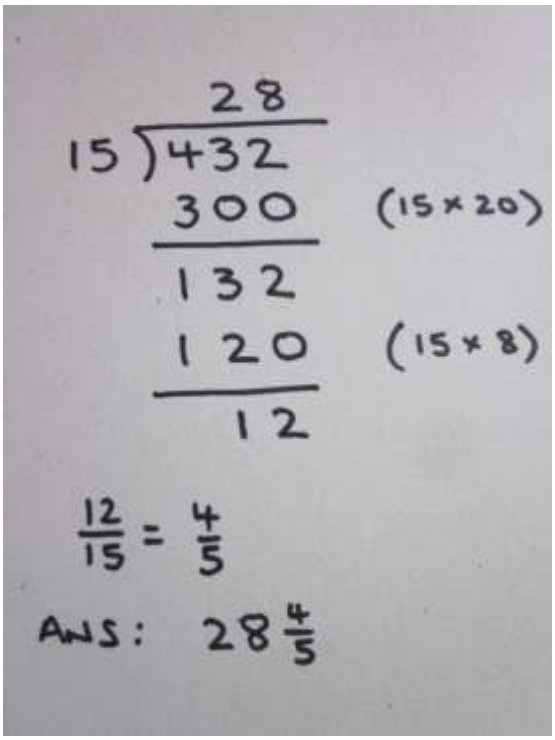
Children will continue to use written methods to solve short division TU ÷ U and HTU ÷ U.

Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3\ ^{2}/_{10}$ which could then be written as $3\ ^{1}/_{5}$ in it's lowest terms.

Children will also write remainders as a decimal:



Long division HTU ÷ TU



Pupils will be able to divide fractions:

$\frac{1}{3} \div 2 = \frac{1}{6}$

By the end of year 6, children will have a range of calculation methods, mental and written. Selection will depend upon the numbers involved.
Children should not be made to go onto the next stage if:

5) **they are not ready.**
6) **they are not confident.**

Children should be encouraged to approximate their answers before calculating.
Children should be encouraged to check their answers after calculation using an appropriate strategy.
Children should be encouraged to consider if a mental calculation would be appropriate before using written methods.