Southway Junior School Progression in Calculation

Progression from
Year 3 to Year 6

The following Progression in Calculation policy has been written to meet the requirements of the National Curriculum 2014 for the teaching and learning of Mathematics.

The Progression in Calculation policy is designed to give consistent progression of learning in calculation from year 3 through to year 6.
This policy is organised according to age appropriate expectations as set out in the National Curriculum 2014.

The methods shown are only written ways of calculating. Children will also be calculating using mental strategies too.

During their time at Southway, children learn how to use models and images, such as empty number lines, to support their mental and informal written methods of calculation. As children's mental methods are strengthened and refined, so too are their informal written methods. These methods become more efficient and succinct and lead to efficient written methods that can be used more generally. By the end of Year 6 children are equipped with mental and written methods that they understand and can use correctly.

When faced with a calculation, children are able to decide which method is most appropriate and have strategies to check its accuracy. They will do this by asking themselves:

- Can I do this in my head?
- Can I do this in my head using drawing or jottings?
- Do I need to use a pencil and paper procedure?

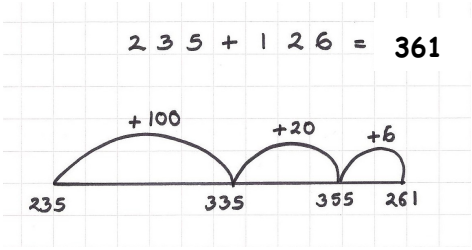
The overall aim is that when children leave Southway in Year 6 they:

- have a secure knowledge of **number facts** and a good understanding of the **four operations**.
- are able to use this knowledge and understanding to **carry out calculations mentally** and to apply general strategies when using one-digit and two-digit numbers and particular strategies to special cases involving bigger numbers.
- make use of diagrams and informal notes to help record steps and part answers when using mental methods that generate more information than can be kept in their heads;
- **have an efficient and reliable written method of calculation** for each operation that children can apply with confidence when undertaking calculations that they cannot carry out mentally.

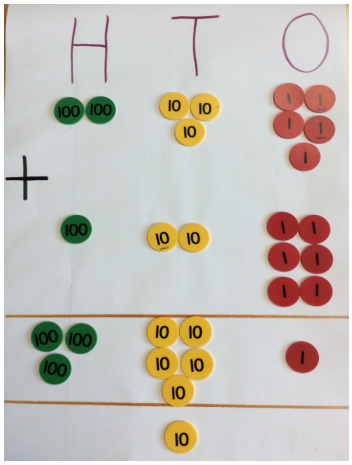
ADDITION

Year 3: Add numbers with up to 3 digits

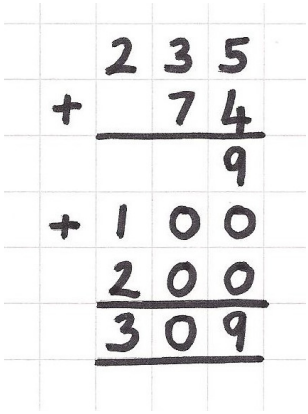
Number line



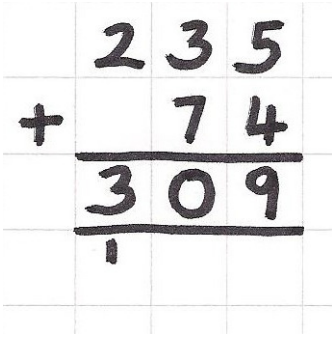
Place value counters



Expanded column addition

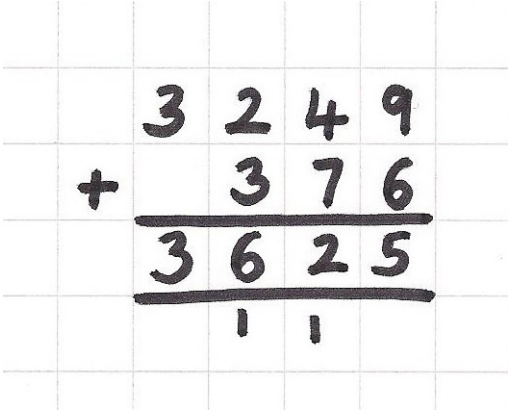


Compact column addition

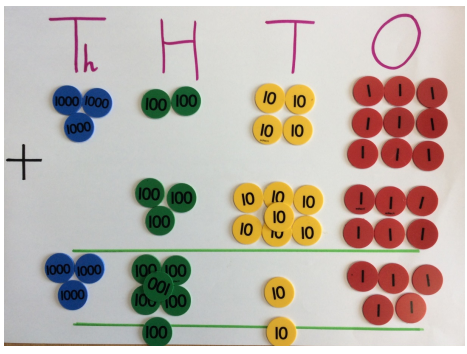


Year 4: Add numbers with up to 4 digits

Compact column addition



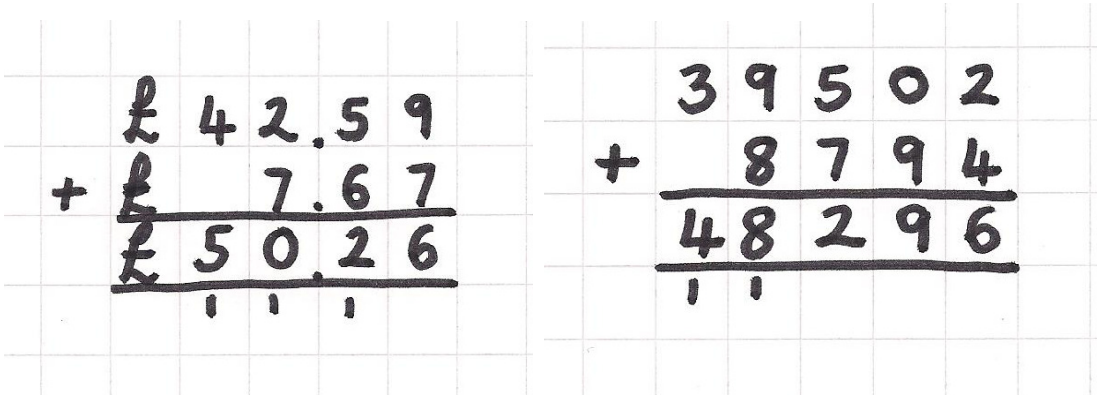
Place value counters



ADDITION

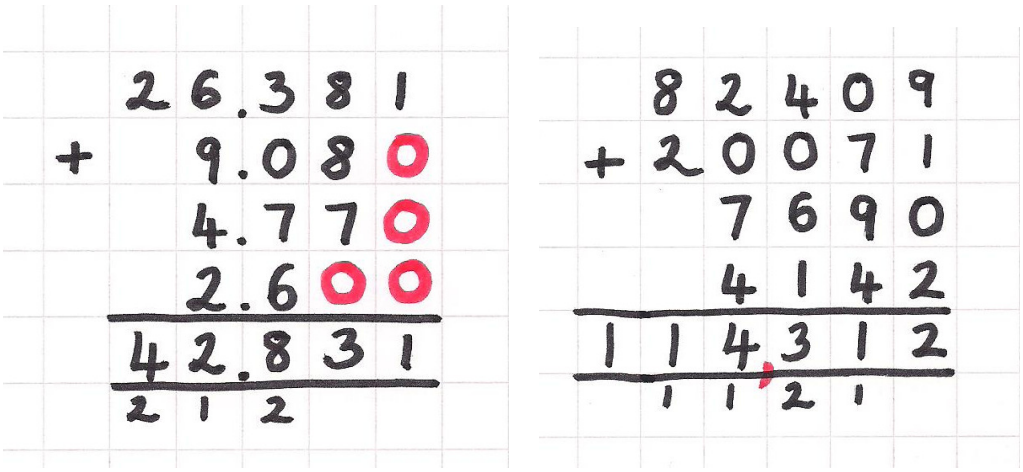
Year 5: Add numbers with more than 4 digits

Compact column addition



Year 6: Add several numbers of increasing complexity

Compact column addition

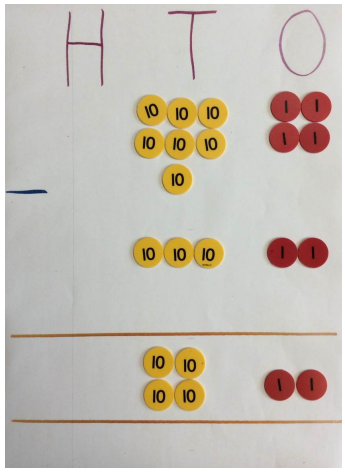


SUBTRACTION

Year 3: Subtract with 2 and 3-digit numbers

Place value counters

74– 32 = 42



Partitioned column subtraction

$$74 - 32 = 70 + 4 - 30 - 2 = 40 + 2 = 42$$

Compact column subtraction

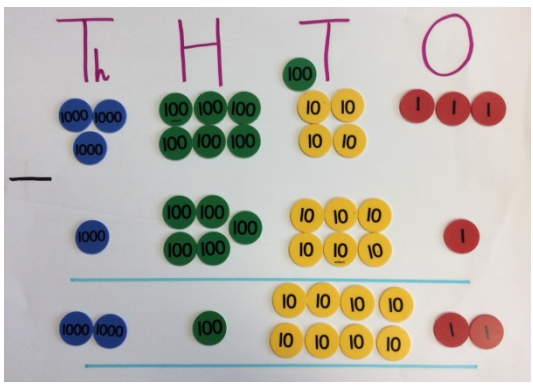
$$\begin{array}{r} 1\,{}^{4}\!\not{5}\,{}^{1}3 \\ -\quad 3\,8 \\ \hline 1\,1\,5 \end{array}$$

Year 4: Subtract with up to 4-digit numbers

Compact column subtraction

$$\begin{array}{r} 3\,{}^{6}\!\not{7}\,{}^{1}4\,3 \\ -\,1\,5\,6\,1 \\ \hline 2\,1\,8\,2 \end{array}$$

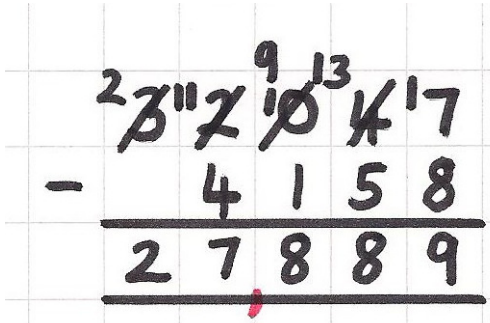
Place value counters



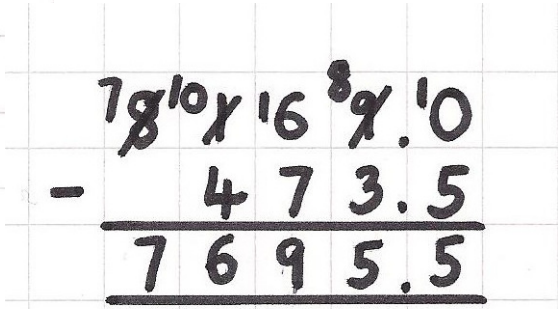
SUBTRACTION

Year 5: Subtract with at least 4-digit numbers

Compact column subtraction



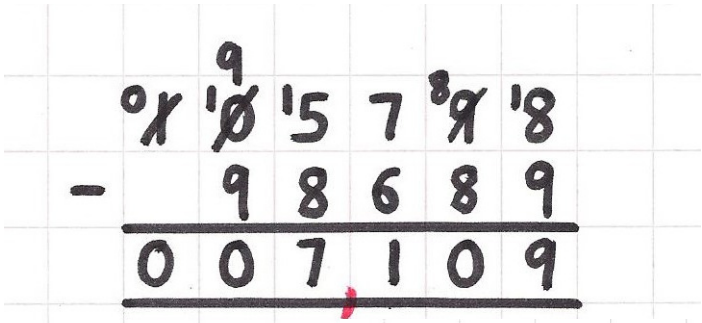
$$\begin{array}{r} {}^{2}\not{3}\,{}^{11}\not{2}\,{}^{9}\not{1}\not{0}\,{}^{13}\not{4}\,{}^{1}7 \\ -\quad 4\,1\,5\,8 \\ \hline 2\,7\,8\,8\,9 \end{array}$$



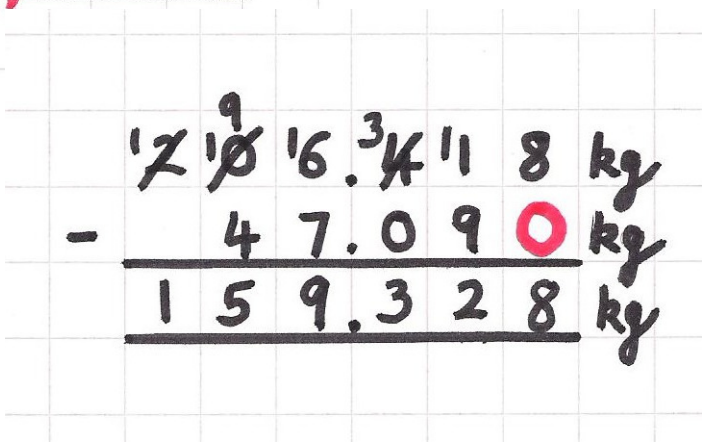
$$\begin{array}{r} {}^{7}\not{8}\,{}^{10}\not{1}\,{}^{1}6\,{}^{8}\not{4}.{}^{1}0 \\ -\quad 4\,7\,3.5 \\ \hline 7\,6\,9\,5.5 \end{array}$$

Year 6: Subtract with increasing large and more complex numbers and decimal values

Compact column subtraction



$$\begin{array}{r} {}^{0}\not{1}\,{}^{9}\not{1}\not{0}\,{}^{1}5\,7\,{}^{8}\not{9}\,{}^{1}8 \\ -\quad 9\,8\,6\,8\,9 \\ \hline 0\,0\,7\,1\,0\,9 \end{array}$$



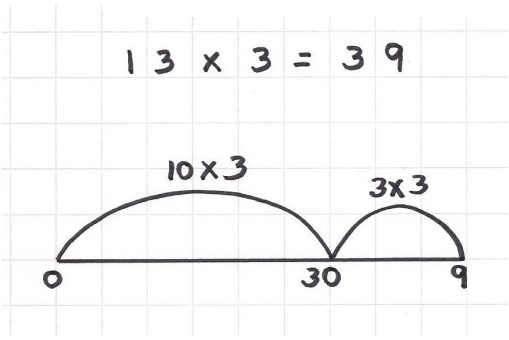
$$\begin{array}{r} {}^{1}\not{1}\,{}^{9}\not{1}\not{0}\,{}^{1}6.{}^{3}\not{4}\,{}^{1}1\,8\ \text{kg} \\ -\quad 4\,7.0\,9\,0\ \text{kg} \\ \hline 1\,5\,9.3\,2\,8\ \text{kg} \end{array}$$

MULTIPLICATION

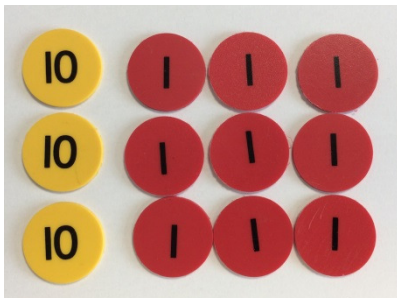
Year 3: Multiply 2-digit numbers by a 1-digit number

Number line

13 x 3 = 39



Place value counters

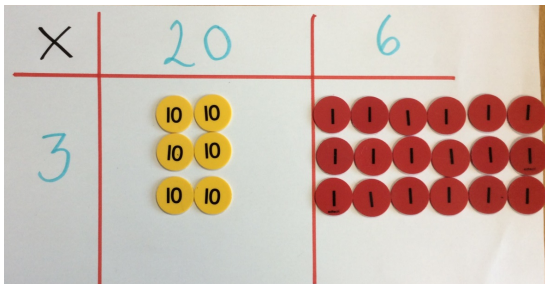


Grid multiplication

26 x 3 = 78

x	20	6
3	60	18

60 + 18 = 78



Year 4: Multiply 2 and 3-digit numbers by a 1-digit number

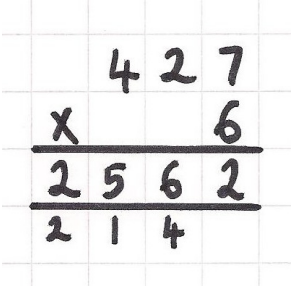
Grid multiplication

427 x 6 = 2562

x	400	20	7
6	2400	120	42

2400 + 120 + 42 = 2562

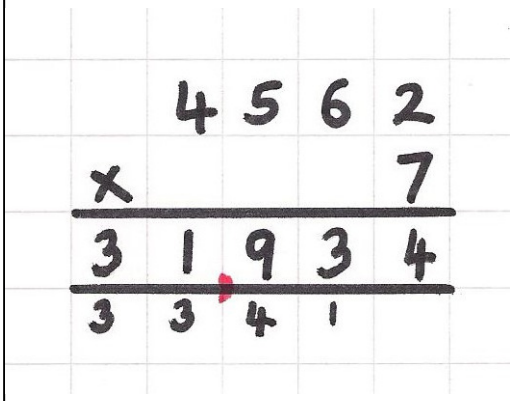
Short multiplication



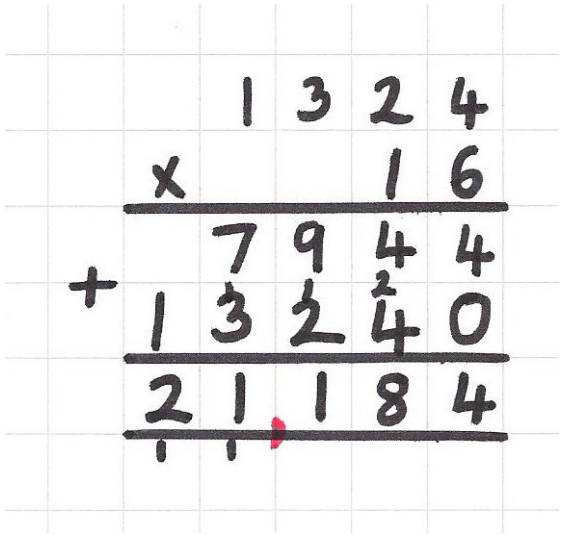
MULTIPLICATION

Year 5: Multiply up to 4-digit numbers by 1 or 2 digit numbers

Short multiplication

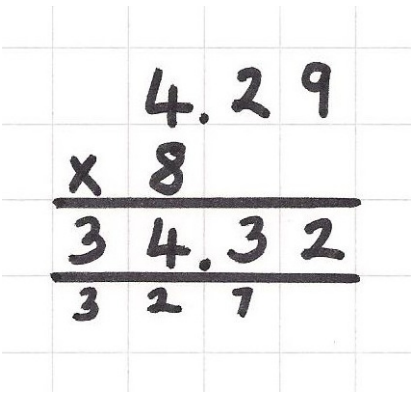


Long multiplication

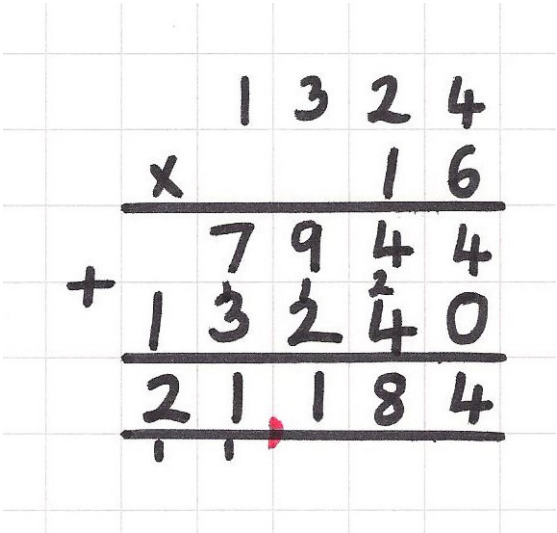


Year 6: Multiply up to 4-digit numbers by 1 or 2 digit numbers (see Year 5) and multiply decimals with 2 decimal places by a 1-digit number.

Short multiplication



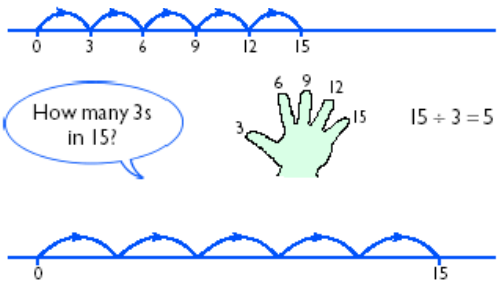
Long multiplication



DIVISION

Year 3: Divide 2-digit numbers by a 1-digit number (where there is no remainder in the final answer)

Grouping



5 hops in 15. How big is each hop?

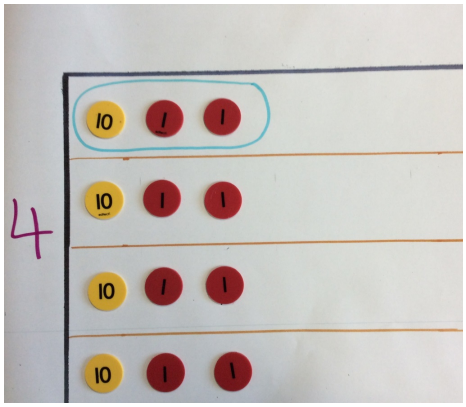
15 ÷ 5 = 3

15 shared between 5

Division using arrays

Place value counters

48÷ 4 = 12

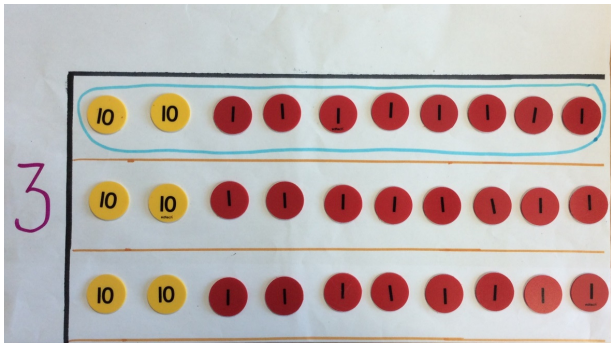


Year 4: Divide up to 3-digit numbers by a 1-digit number (without remainders initially)

Division using arrays

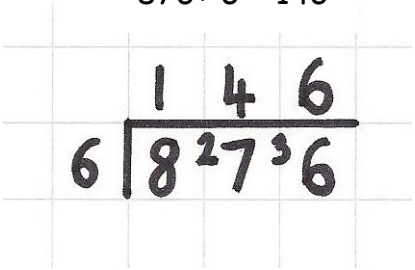
Place value counters

84÷ 3 = 28

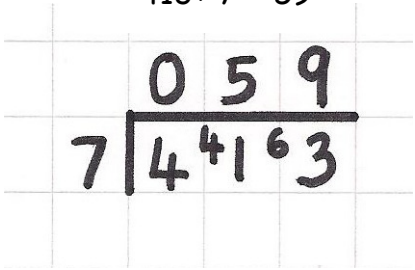


Short division

876÷ 6 = 146



413÷ 7 = 59



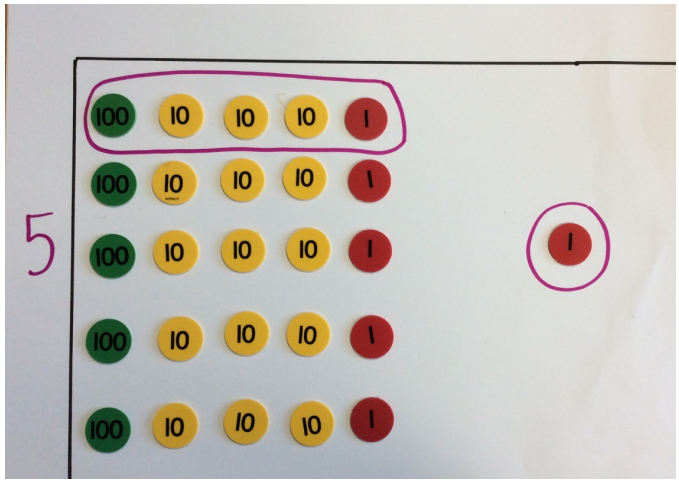
DIVISION

Year 5: Divide up to 4 digits by a 1-digit number, including those with remainders.

Division using arrays

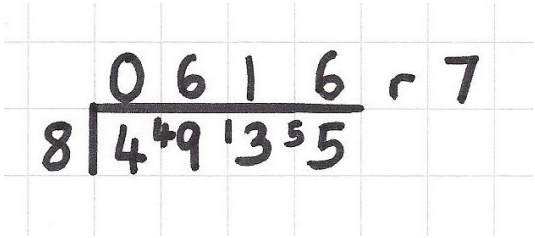
Place value counters

656÷ 5 = 131 r1



Short division

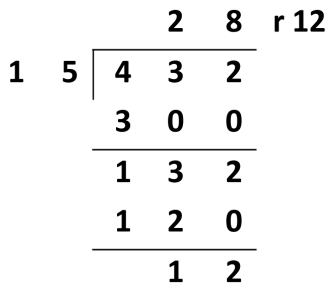
4935÷ 8 = 616 r7

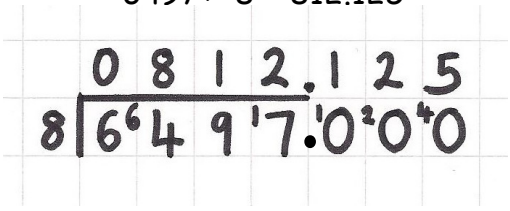


Year 6: Divide at least 4 digits by both 1-digit and 2-digit numbers (including decimal numbers and quantities)

Long division

432÷ 15 = 28 r12



Short division

6497÷ 8 = 812.125