

# Shilbottle Primary



## Division policy

- Year group examples
  - Vocabulary
  - Micro steps
- Year group expectations

# Division Year 1

CPA Approach  
(Concrete, pictorial, Abstract)

## Number Patterns

Children must have secure counting skills- being able to confidently count in 2s, 5s and 10s.

Children should be given opportunities to reason about what they notice in number patterns.

## Group AND share small quantities to 10- understanding the difference between the two concepts.

### Sharing

Importance of one-to-one correspondence.

Children should be taught to share using concrete apparatus.

## Grouping and Use of Bar Model

Children should apply their counting skills to develop some understanding of grouping.

How many groups of 2 in 6?

Arrays as a pictorial representation can be used for division.  $15 \div 3 = 5$  There are 5 groups of 3.

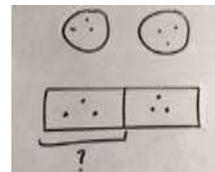
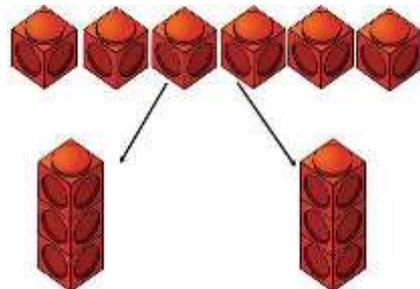
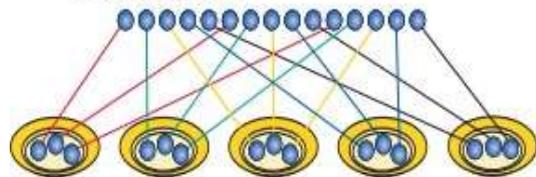
$15 \div 5 = 3$  There are 3 groups of 5.

Children should be able to find  $\frac{1}{2}$  of shapes, objects, numbers and quantities.

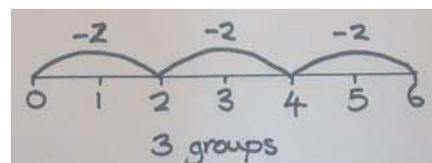
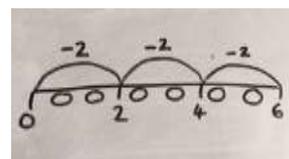


$$15 \div 5 = 3$$

15 shared between 5



|   |   |
|---|---|
| 3 | 3 |
|---|---|



## Vocabulary

# Division Year 2

CPA Approach  
(Concrete, Pictorial, Abstract)

## Sharing and Grouping

Know and understand sharing and grouping-  
introducing children to the  $\div$  sign.  
Recall and use division facts for the 2, 5 and 10  
multiplication tables

Children should continue to use grouping and  
sharing for division (dividends below 20) using  
practical apparatus, arrays and pictorial  
representations.

## Progress to Grouping using a number line

Group from zero in jumps of the divisor to find  
out 'how many groups of 3 are there in 15?'.  
 $15 \div 3 = 5$

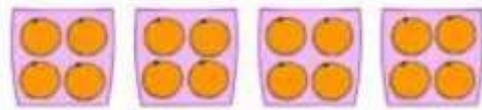
## Bar Model

Using bar model to represent a number divided  
into  $\frac{1}{2}$   $\frac{1}{4}$  etc. With not remainders at the start  
point.

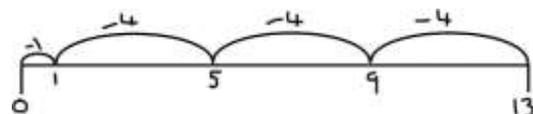
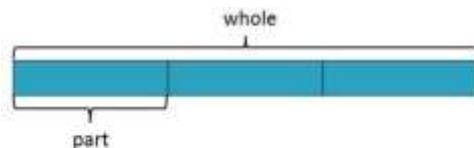
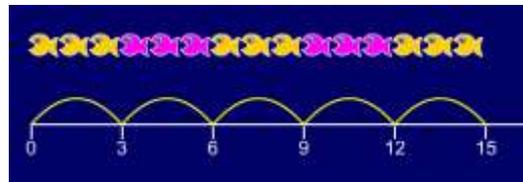
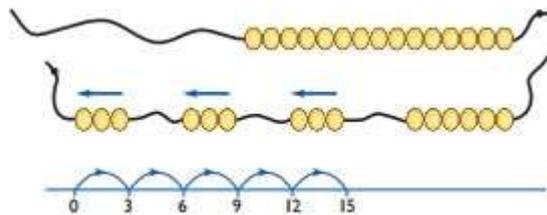
## Remainders using resources

Continue work on arrays. Support children to  
understand how multiplication and division are  
inverse. Look at an array – what do you see?  
Remainders can be introduced by use of number  
lines; sorting activities; cube and counter use and  
bar model.

## Vocabulary



1. Divide the apples into 5 bowls.



# Division Year 3

CPA Approach  
(Concrete, pictorial, Abstract)

## Recall of Known facts

Recall and use division facts for the 3, 4 and 8 multiplication tables using times grids. Children should continue to use grouping and sharing for division using practical apparatus, arrays and pictorial representations.

Place value counters, arrays and number lines can be used to support children apply their knowledge of grouping.

## Partitioning

Children need to be able to partition the dividend in different ways.

$$48 \div 4 = 12$$

## Bar Model and Short Division

Use of bar model as a representation to link alongside basic 2 digit short division. Starting with 2 digit dividends with no remainders moving onto remainders and showing remainder as a fraction

## Repeated Subtraction

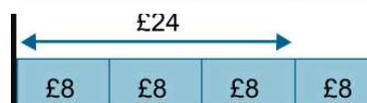
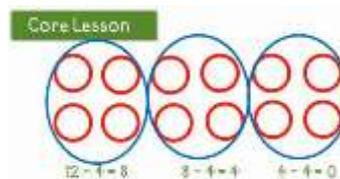
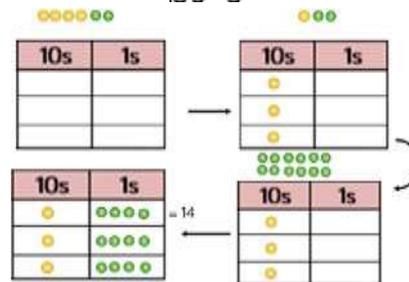
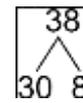
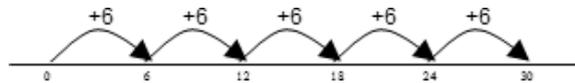
### $\div$ = signs and missing numbers

Continue using a range of equations as in year 2 but with appropriate numbers.

|    |    |    |    |    |    |    |    |     |     |     |     |
|----|----|----|----|----|----|----|----|-----|-----|-----|-----|
| 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9   | 10  | 11  | 12  |
| 2  | 4  | 6  | 8  | 10 | 12 | 14 | 16 | 18  | 20  | 22  | 24  |
| 3  | 6  | 9  | 12 | 15 | 18 | 21 | 24 | 27  | 30  | 33  | 36  |
| 4  | 8  | 12 | 16 | 20 | 24 | 28 | 32 | 36  | 40  | 44  | 48  |
| 5  | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45  | 50  | 55  | 60  |
| 6  | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54  | 60  | 66  | 72  |
| 7  | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63  | 70  | 77  | 84  |
| 8  | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72  | 80  | 88  | 96  |
| 9  | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81  | 90  | 99  | 108 |
| 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90  | 100 | 110 | 120 |
| 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99  | 110 | 121 | 132 |
| 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |



$$12 \div 4 = 3$$



$$3 \overline{)6393}$$

## Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

# Division Year 4

CPA Approach  
(Concrete, pictorial, Abstract)

Recall division facts for the multiplication tables up to  $12 \times 12$

## Sharing, Grouping, Repeated Subtraction and Inverse

Children will continue to explore division as sharing, grouping, repeated subtraction and inverse until they have a secure understanding. Continue to use pictorial representations and Bar Method to solve word problems in context.

## Chunking method

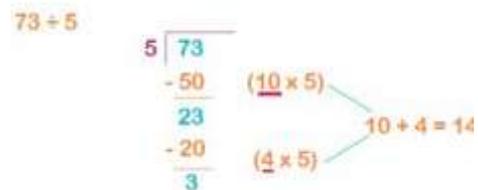
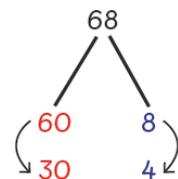
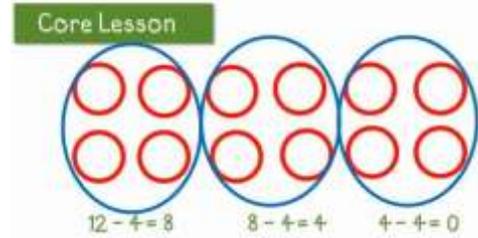
Calculations with remainders as well as without should be used

Remainders should be interpreted according to the context.

## Place value and Short Division

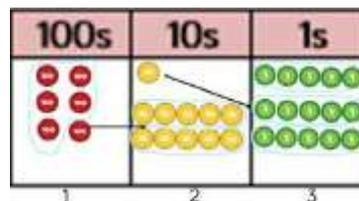
Use of partitioning and place value to show the process of regrouping across to the next column. Remainders to be represented as a remainder so:

$$946 \div 7 = 137 \text{ r}5$$



How many 5s have been subtracted?  
14 sets of 5, with 3 left over.

Answer:  $73 \div 5 = 14 \text{ r}3$



$$\begin{array}{r} 137 \text{ r}5 \\ 7 \overline{)964} \end{array}$$

## Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

# Division Year 5

CPA Approach  
(Concrete, pictorial, Abstract)

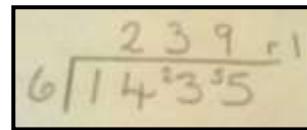
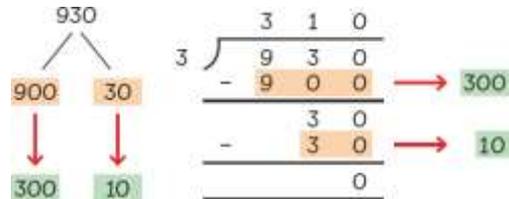
## Sharing, Grouping, Repeated Subtraction and Inverse

Children should progress in their use of written division calculations:

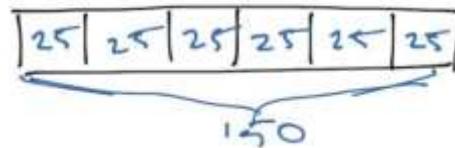
- Using tables facts with which they are fluent
- Experiencing a logical progression in the numbers they use, for example:
  1. Dividend just over 10x the divisor, e.g.  $84 \div 7$
  2. Dividend just over 10x the divisor when the divisor is a teen number, e.g.  $173 \div 15$  (learning sensible strategies for calculations such as  $102 \div 17$ )
  3. Dividend over 100x the divisor, e.g.  $840 \div 7$
  4. Dividend over 20x the divisor, e.g.  $168 \div 7$

All of the above stages should include calculations with remainders as well as without.

Children begin to practically develop their understanding of how to express the remainder as a decimal or a fraction. Ensure practical understanding allows children to work through this (e.g. What could I do with this remaining 1? How could I share this between 6 as well?)



$$150 \div 6 = 25$$



$432 \div 15$  becomes

$$\begin{array}{r}
 28 \text{ r } 12 \\
 15 \overline{)432} \\
 \underline{30} \phantom{0} \\
 132 \\
 \underline{120} \\
 12
 \end{array}$$

## Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

# Division Year 6

CPA Approach  
(Concrete, pictorial, Abstract)

## Sharing, Grouping, Repeated Subtraction and Inverse

Children will continue to explore division as sharing, grouping, repeated subtraction and inverse and to represent problems using the Bar Method (See Appendix 1) if appropriate. Quotients (results of division) should be interpreted appropriately for the context as a whole number, remainders, decimal or fraction.

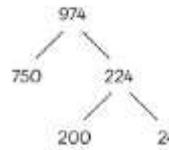
## Formal Written Methods – long and short division

Continue to use partitioning, number bonds and place value counters to support the efficient use of long and short division methods including expressing remainder as a fraction or decimal  
Dividing fractions by fractions

## Problem Solving

Teachers should ensure that pupils have the opportunity to apply their knowledge in a variety of contexts and problems (exploring cross curricular links) to deepen their understanding

$$974 \div 25 = \square$$



$$\begin{array}{r} 25 \overline{) 974} \\ \underline{- 750} \phantom{0} \\ 224 \\ \underline{- 200} \\ 24 \end{array}$$

→ 30  
→ 8

$$974 \div 25 = 38 \frac{24}{25} = 38 \frac{96}{100} = 38.96$$

$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 15 \overline{) 432} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 12 \end{array}$$

$15 \times 20$   
 $15 \times 8$

$$\frac{12}{15} = \frac{4}{5}$$

$$\text{Answer: } 28 \frac{4}{5}$$

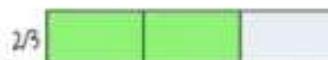
$$432 \div 15 \text{ becomes}$$

$$\begin{array}{r} 28 \cdot 8 \\ 15 \overline{) 432.0} \\ \underline{30} \phantom{0} \\ 132 \\ \underline{120} \\ 120 \\ \underline{120} \\ 0 \end{array}$$

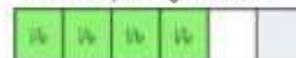
$$\text{Answer: } 28.8$$

dividing fractions by fractions

$$2/3 \div 1/6$$



"how many 1/6 s go into 2/3?"



$$= 4$$

## Vocabulary

Divisor, dividend, quotient, sharing, groups of, lots of, vinculum

## **Year Group Objectives for Division**

### **Year 1**

Pupils should be taught to:

- ☐ Solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

### **Year 2**

Pupils should be taught to:

- ☐ Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ( $\times$ ), division ( $\div$ ) and equals (=) signs
- ☐ How that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- ☐ Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

### **Year 3**

Pupils should be taught to:

- ☐ Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- ☐ Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
- ☐ Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which  $n$  objects are connected to  $m$  objects

### **Year 4**

Pupils should be taught to:

- Recall multiplication and division facts for multiplication tables up to  $12 \times 12$

- ☒ Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- ☒ Recognise and use factor pairs and commutativity in mental calculations
- ☒ Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- ☒ Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as  $n$  objects are connected to  $m$  objects

## Year 5

Pupils should be taught to:

- ☒ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- ☒ Know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers
  - Establish whether a number up to 100 is prime and recall prime numbers up to 19 ♣ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers
- ☒ Multiply and divide numbers mentally drawing upon known facts
- ☒ Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
  - Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 Mathematics – key stages 1 and 2 33 Statutory requirements
- ☒ Recognise and use square numbers and cube numbers, and the notation for squared ( 2 ) and cubed ( 3 )
- ☒ Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes
- ☒ Solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign
- ☒ Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.

## Year 6

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- 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
- Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
- Perform mental calculations, including with mixed operations and large numbers
- Identify common factors, common multiples and prime numbers

- Use their knowledge of the order of operations to carry out calculations involving the four operations
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why Mathematics – key stages 1 and 2 40 Statutory requirements
- Solve problems involving addition, subtraction, multiplication and division
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

## Micro Steps

*\*Starting in KS2 or Summer 2 KS1*

|  |  |
|--|--|
| <p>1. 2 digit ÷ 1 digit (No remainders)(quotient is 10 or lower). Write out times tables as method<br/>E.g. <math>45 \div 5 = 9</math></p>   | <p><math>36 \div 4 = 9</math><br/><math>54 \div 6 = 9</math></p>   |
| <p>2. 2 digit ÷ 1 digit with no remainders or carrying<br/>E.g. <math>68 \div 4 = 17</math></p>  | <p><math>33 \div 3 = 11</math></p>   |
| <p>3. 2 digit ÷ 1 digit with no remainders (with carrying)<br/>E.g. <math>68 \div 4 = 17</math></p>  | <p><math>91 \div 7 = 13</math>    <math>42 \div 5 = 14</math><br/><math>45 \div 3 = 15</math>    <math>78 \div 6 = 13</math></p> |
| <p>4. 3 digit ÷ 1 digit. Quotient will be three digit with no zeros (value in hundreds column will be greater than divisor). No remainders<br/><br/>HTU<br/>E.g. <math>645 \div 5 = 129</math></p> | <p><math>459 \div 3 = 153</math><br/><math>945 \div 5 = 189</math></p>   |

|   |   |  |
|---|---|--|
| <p>6. 3 digit ÷ 1 digit with remainders Quotient will be 3 digit with no zeros (value in hundreds column will be greater than divisor)</p> <p>E.g. <math>723 \div 6 = 120.5</math></p>  | <p><math>327 \div 2 = 163.5</math> or <math>163 \text{ r } \frac{1}{2}</math></p> <p><math>463 \div 2 = 231.5</math> or <math>231 \text{ r } \frac{1}{2}</math></p> |  |
| <p>7. 4 digit ÷ 1 digit with remainders. As above (Quotient will be the same length of digits as number question).</p> <p>E.g. <math>8457 \div 4 = 2114.25</math></p>                   | <p><math>8723 \div 6 = 1453 \frac{5}{6}</math><br/>1453.83</p>  |  |
| <p>8. As steps 2-7 for numbers with varying amounts of decimal place – no remainders</p> <p>Eg. <math>57.75 \div 5 = 11.5</math></p>  |   | <p><math>3.3 \div 3 = 1.1</math><br/><math>9.1 \div 7 = 1.3</math><br/><math>4.59 \div 1.53</math></p> |
| <p>9. 3 digit ÷ 1 digit when divisor is greater than place value in hundreds column (quotient will be 2 digit with no zero). No remainders</p> <p>E.g. <math>345 \div 5 = 69</math></p> | <p>H<br/><math>134 \div 2 = 67</math><br/><math>210 \div 5 = 42</math></p>  |  |
| <p>10. 3 digit ÷ 1 digit when divisor is greater than place value in hundreds column (quotient will be 2 digits with no zero) with remainders</p>                                       | <p><math>128 \div 3 = 42.6</math><br/><math>441 \div 5 = 88.2</math></p>  |  |

|  |   |
|--|---|
| <p>11. 4 digit ÷ 1 digit when divisor is greater than the place value in thousand column (quotient will be three digit with no zero)</p> <p>E.g. <math>2452 \div 4 = 313</math></p>                          | <p><math>2055 \div 5 = 411</math><br/> <math>1243 \div 2 = 621.5</math></p> |
| <p>12. 3 digit ÷ 1 digit when divisor is equal to place value in hundreds column and quotient has a zero in the tens column. With and without remainders</p> <p>E.g. <math>213 \div 2 = 106.5</math></p>     | <p><math>215 \div 2 = 107.5</math></p>                                      |
| <p>13. 4 Digit ÷ 1 digit when divisor is equal to place value in hundreds column and quotient has a zero in the hundreds column. With and without remainders</p> <p>E.g. <math>3261 \div 3 = 1087</math></p> | <p><math>3252 \div 3 = 1084</math></p>                                      |
| <p>14. 4 digit ÷ 1 digit when quotient is 4 digit and has a zero in the tens column. With and without remainders</p> <p>E.g. <math>5623 \div 4 = 1405.75</math></p>  | <p><math>5627 \div 4 = 1406.75</math></p>                                   |

|   |  |
|---|--|
| <p>15. 3 digit ÷ 1 digit when quotient is 3 digit and has zero in units place with reminders.</p> <p>E.g. <math>624 \div 4 = 156</math></p>             | <p><math>602 \div 4 = 150.5</math></p> |
| <p>16. 4 digit ÷ 1 digit when divisor is greater than value in thousands column and quotient has zeros</p> <p>E.g. <math>2432 \div 6 = 405.3</math></p> | <p><math>1836 \div 9 = 204</math></p>  |

|   |                               |
|---|-------------------------------|
| <p>17. Division of any money amounts without remainders (applying steps from above)</p> <p>E.g. <math>\pounds 32.67 \div 9 = 3.63</math></p>  | $\pounds 45.81 \div 9 = 5.09$ |
| <p>18. 2 digit <math>\div</math> 1 digit extending with zero place holders to give an exact decimal answer, no zeros in quotient. Divisors must be 2,4,5 or 8 (extend to 7)</p> <p>E.g. <math>83 \div 2 = 41.5</math></p>   | $95 \div 4 = 23.75$           |
| <p>19. 3 digit <math>\div</math> 1 digit extending with zero place holders to give an exact decimal answer, zeros in quotient or divisors greater than place value in hundreds column. Divisors must be 2,4,5 or 8 (extended to 7)</p> <p>E.g. <math>436 \div 5 = 87.2</math></p> | $835 \div 4 = 69.25$          |
| <p>20. 3 digit <math>\div</math> 1 digit extended with zero place holders to give an exact decimal answer. Divisors must be 3, 6 or 9 (record as recurring).</p> <p>E.g. <math>344 \div 3 = 114.6</math></p>  | $123 \div 6 = 20.5$           |
| <p>21. 3 digit <math>\div</math> 2 digit No remainder</p> <p>E.g. <math>836 \div 22 = 38</math></p>   | $350 \div 25$                 |
| <p>22. 4 digit <math>\div</math> 2 digit no remainders</p> <p>E.g. <math>4183 \div 47 = 89</math></p>   | $1620 \div 36 = 45$           |

|   |                         |
|---|-------------------------|
| 23. 3 digit ÷ 2 digit with remainder<br>E.g. $843 \div 34 = 24.794$ | $952 \div 42 = 22.6666$ |
|---|-------------------------|

|  |                         |
|--|-------------------------|
| 24. 4 digit ÷ 2 digit with remainder<br>E.g. $2494 \div 21 = 118.76$ | $3683 \div 24 = 153.45$ |
|--|-------------------------|