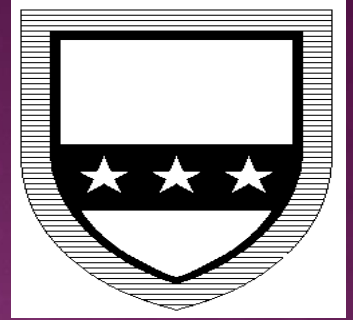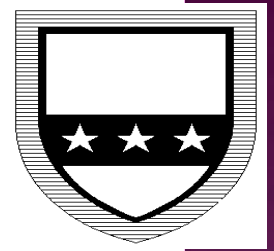# Welcome to the Year 6 workshop
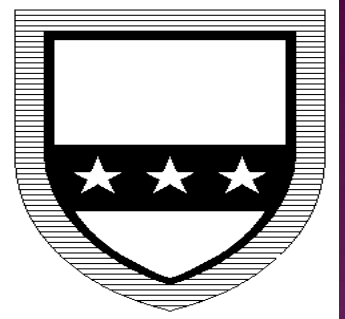
MATHEMATICS WORKSHOP

Poulton Lancelyn Primary School

NATIONAL CURRICULUM CHANGES

- New Curriculum introduced from September 2014 for all pupils.

- Children must be mathematically fluent.

- Expectations have changed. Coverage and skills have been "pushed down."

- No longer using levels. Emerging, Expected, exceeding.

SCHOOL CHANGES

- Maths calculation policy (on the website)
- 2 maths sessions per day – main (45 mins) and fluency (15 mins)
- More focus on number to develop number fluency
- Focus on developing mastery in maths
- Focus for Year 6 on retrieval of knowledge from past year groups in preparation for high school
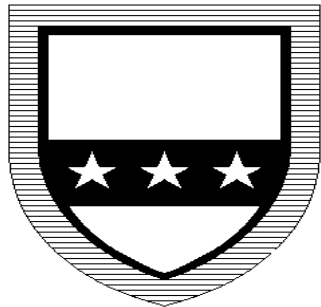
WRITTEN MATHEMATICS

- Detailed breakdown for each year group in calculation policy (on website)
- Summary document highlights key stages
- Mathematics session in each year group will outline the calculation methods used within that group

CLASSROOM ENVIRONMENT
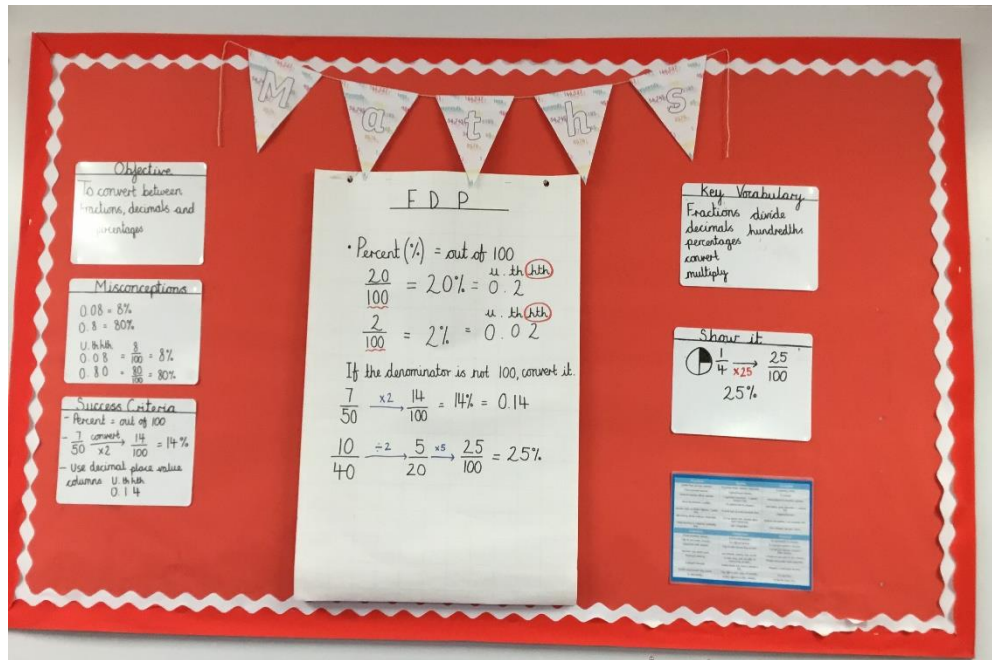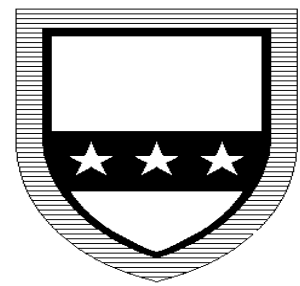
Working walls to aid retrieval and support mathematical understanding
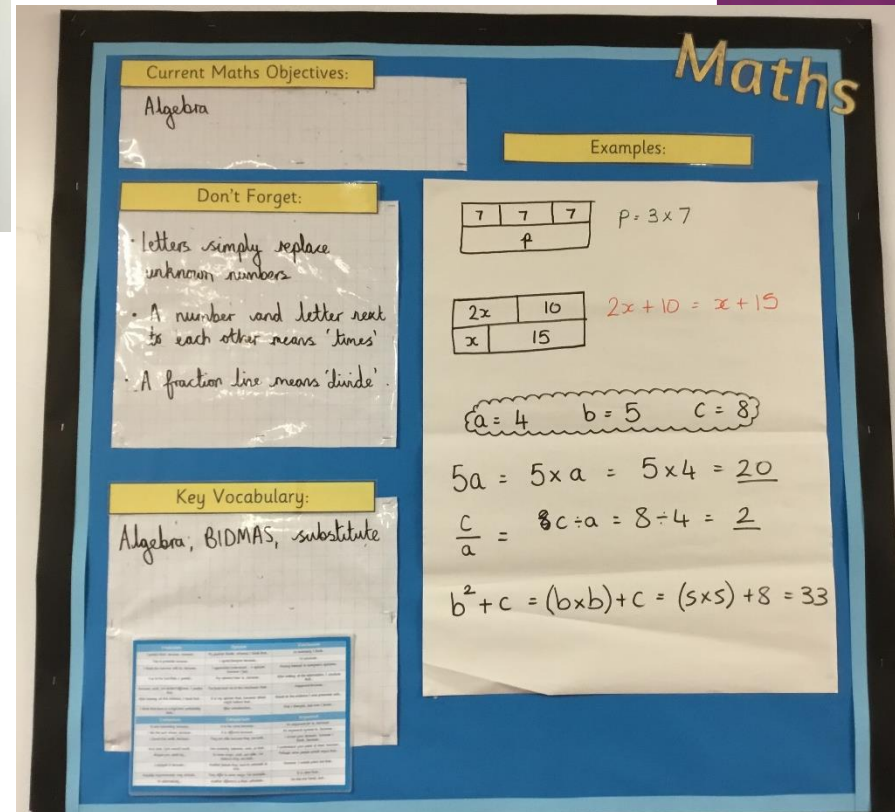
RESOURCES

YEAR 6 – LTP (ON SCHOOL WEBSITE)

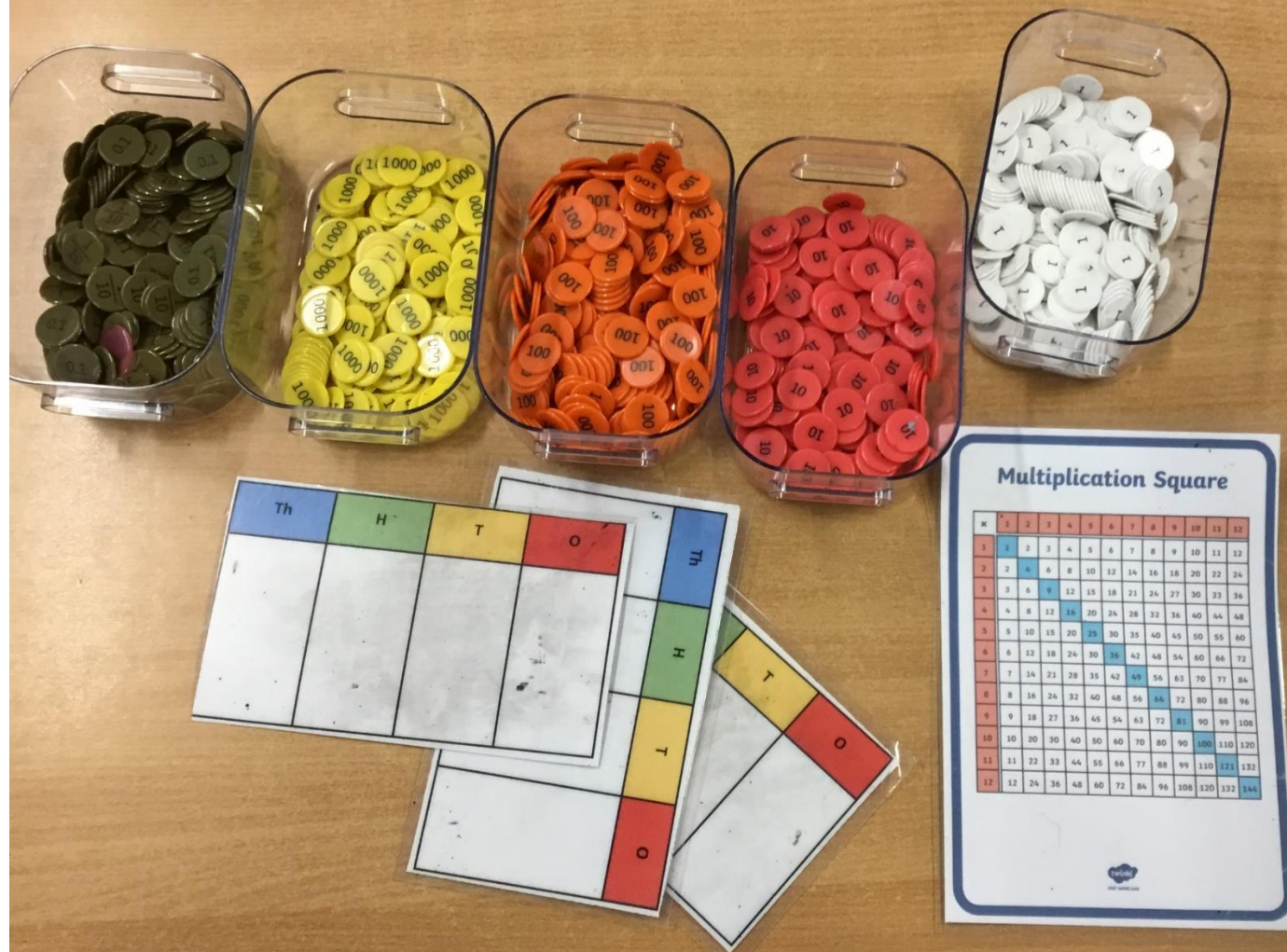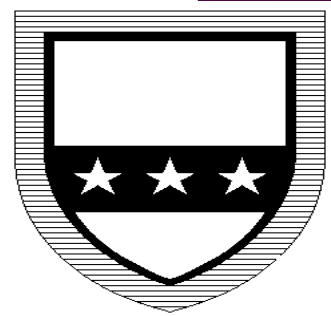|	W1	W2 - Number	W3 - Number	W4 - Operation	W5 and 6 - Operation	W7 - Operation	Week 8 - Factors and Multiples
A1	2 day week – times table assessment	Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit	Use negative numbers in context, and calculate intervals across zero	Solve problems involving addition, subtraction,	Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication Multiply one-digit numbers with up to two decimal places by whole numbers	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 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 Use written division methods in cases where the answer has up to two decimal places	Identify common factors, common multiples and prime numbers Use their knowledge of the order of operations to carry out calculations involving the four operations
	W1 - Operation	W2 - Geometry	W3 and 4 - Fractions		W5 - Fractions	W6 – Geometry	W7 - Statistics
A2	Calc Solve problems involving addition, subtraction,	Draw 2-D shapes using given dimensions and angles Recognise, describe and build simple 3-D shapes, including making nets	Use common factors to simplify fractions; use common multiples to express fractions in the same denomination Compare and order fractions, including fractions > 1 Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions		Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 3/8]	Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius	Interpret and construct pie charts and line graphs and use these to solve problems
	W1 - Geometry	W2 - Number	W3 - Geometry	W4 - Measure	W5 - Fractions	W6 - Operations	
Sp1	Describe positions on the full coordinate grid (all four quadrants)	Use negative numbers in context, and calculate intervals across zero	Draw and translate simple shapes on the coordinate plane, and reflect them in the axes	Recognise that shapes with the same areas can have different perimeters and vice versa Calculate the area of parallelograms and triangles	Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 1/4×½=1/8] Divide proper fractions by whole numbers [for example, 1/3 ÷ 2 = 6) Multiplying fractions by whole number	Problem solving	
	W1 - Geometry	W2 - Fractions	W3 - Ratio	W4 - Ratio	W5 - Measure		
Sp2a	Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.	Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.	Solve problems involving similar shapes where the scale factor is known or can be found	Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.	Recognise when it is possible to use formulae for area and volume of shapes		

HOME HELP

- Technology (Mathletics, SATs Companion)

- Times tables (TT Rockstars)

- Real-life support – money and time
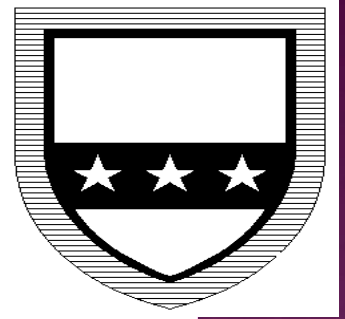
USING AND APPLYING

- We regularly use reasoning and problem solving questions within lessons to allow children to apply their understanding of the four operations. Children are encouraged to explain and prove their understanding verbally and their beginning to record their thought processes.
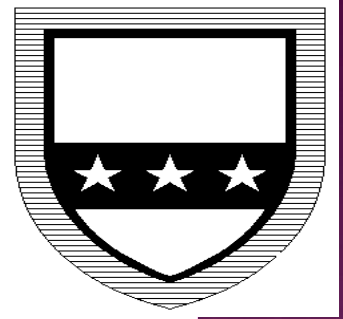
IMPORTANCE OF READING

- Real life problems involve being able to read Trend of struggling with reading = struggling with mathematical problems

The following problems can be solved by using the calculation 8 ÷ 2. True or false?

- There are 2 bags of bread rolls that have 8 rolls in each bag. How many rolls are there altogether?
- A boat holds 2 people. How many boats are needed for 8 people?
- I have 8 pencils and give 2 pencils to each person. How many people receive pencils?
- I have 8 pencils and give 2 away. How many do I have left?

ADDITION

Year 6 Addition

Steps to success

```
  2 3 · 3 6 1
      9 · 0 8
  5 9 · 7 7
+     1 · 3
  9 3 · 5 1 1
  2 1     2
```

Adding several numbers with different numbers of decimal places (including money and measures):

Tenths, hundredths and thousandths should be correctly aligned, with the decimal point lined up vertically including in the answer row.

Zeros could be added into any empty decimal places, to show there is no value to add.

```
    8 1,0 5 9
      3,6 6 8
    1 5,3 0 1
+   2 0,5 5 1
  1 2 0,5 7 9
      1 1 1 1
```

Adding several numbers with more than 4 digits

Key Skills

- Perform mental calculations, including with mixed operations and large numbers, using and practising a range of mental strategies.
- Solve multi-step problems in context, deciding which operations and methods to use and why.
- Use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Pupils understand how to add mentally with larger numbers and calculations of increasing complexity.

We will now demonstrate the addition method

4 This table shows the number of people living in various towns in England.

Town	Population
Bedford	82,448
Carlton	48,493
Dover	34,087
Formby	24,478
Telford	166,640

What is the **total** of the numbers of people living in Formby and in Telford?

1 mark

SUBTRACTION

Year 6 Subtraction — Steps to success

Year 6

Perform mental calculations, including with mixed operations and large numbers

```
   9 10 14   9
  X  8  X0 , 6  9  9
-    8  9 , 9  4  9
─────────────────────
     6  0 , 7  5  0
```

Using the compact column method to subtract more complex integers

```
   9 10  5 · 3 4 11  9  kg
  X  X0 '5 · X  1  9  kg
-        3  6 · 0  8     kg
────────────────────────────
         6  9 · 3  3  9  kg
```

Using the compact column method to subtract money and measures, including decimals with different numbers of decimal places.

Empty decimal places can be filled with **zero** to show the place value in each column.

Key Skills

- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why.
- Read, write, order and compare numbers up to 10 million and determine the value of each digit
- Round any whole number to a required degree of accuracy
- Use negative numbers in context, and calculate intervals across zero.
- Children need to utilise and consider a range of mental subtraction strategies, jottings and written methods before choosing how to calculate.

We will now demonstrate our subtraction method

4 This table shows the heights of three mountains.

Mountain	Height in metres
Mount Everest	8,848
Mount Kilimanjaro	5,895
Ben Nevis	1,344

How much higher is Mount Everest than the combined height of the other two mountains?
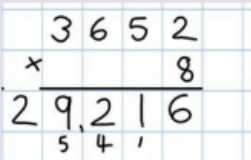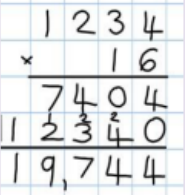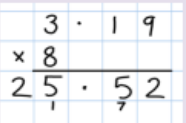
Show your method

m

2 marks

MULTIPLICATION

Year 6 Multiplication — Steps to success

Year 6	Perform mental calculations, including with mixed operations and large numbers	Mental calculation			Multiply decimals with up to 2d.p by a single digit.
Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication		**Partitioning** 5.7 × 6 5 × 6 = 30 0.7 × 7 = 4.2 30 + 4.2 = 34.2 5.3 × 19 5.3 × 10 × 2 = 106 106 − 5.3 = 100.7	3652 × 8 29,216 5 4 1	1234 × 16 7404 (1234 x 6) 12340 (1234 x 10) 19,744	3 · 1 9 × 8 2 5 · 5 2 Line up the decimal points in the question and the answer. Remind the children that the single digit belongs in the units column.

Key Skills
- Recall multiplication facts for all times tables up to 12 x 12 (as Y4 and Y5).
- Multiply multi-digit numbers, up to 4-digit x 2-digit using long multiplication.
- Perform mental calculations with mixed operations and large numbers.
- Solve multi-step problems in a range of contexts, choosing appropriate combinations of operations and methods.
- Estimate answers using round and approximation and determine levels of accuracy.
- Round any integer to a required degree of accuracy.

Video clips:
Moving from grid method to a compact method (youtube)
Reinforcing rapid times table recall: (youtube)
Demonstration of long multiplication (SLEP)

Key vocabulary:
tenths,
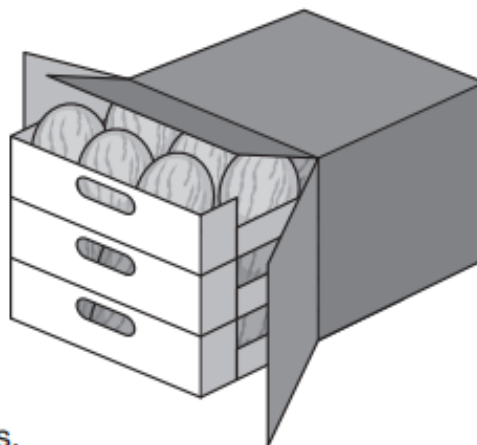hundredths,
decimal

We will now demonstrate our multiplication method

15

A box contains trays of melons.

There are 15 melons in a tray.

There are 3 trays in a box.

A supermarket sells **40** boxes of melons.

How many melons does the supermarket sell?

Show your method

| | melons |

2 marks

DIVISION

Year 6 Division — Steps to success

Year 6	Use known facts	Use tests of divisibility	Short division, for dividing by a single digit	Introduce long division by chunking for dividing by 2 digits
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 | Know 378 is a multiple of 3 because 300/60 and 18 are all multiples of 3

Know 385 is a multiple of 7 because 350 and 35 are multiples of 7 | Multiple of 3, digits in the number add to 3, 6 or 9

Multiple of 4, tens and ones in the number are a multiple of 4

Multiple of 6, the number is even and digits in the number add to 3, 6 or 9

Multiple of 9, digits in the number add to 9 | $\begin{array}{r} 0\ 8\ |\ 2 \cdot 1\ 2\ 5 \\ \hline 8\overline{)6\ ^64\ ^97\ ^70\cdot^00\ ^00} \end{array}$

Short division with remainders: Pupils should continue to use this method, but with numbers to at least 4 digits, and understand how to express remainders as fractions, deci-mals, whole number remainders, or rounded numbers. Real where life problem solving contexts need to be the starting point, pupils have to consider the most appropriate way to express the remainder.

Calculating a decimal remainder: In this example, rather than expressing the remainder as **r 1**, a decimal point is added after the units because there is still a remainder, and the one remainder is carried onto zeros after the decimal point (to show there was no decimal value in the original number). Keep dividing to an appropriate degree of accuracy for the problem being solved. | $\begin{array}{r} 27 \\ 36\overline{)\ 972} \\ -\ 720 \quad 20x \\ \hline 252 \\ -\ 252 \quad 7x \\ \hline 0 \end{array}$

Answer: 27

Find out 'How many 36s are in 972?' by subtracting 'chunks' of 36, until zero is reached (or until there is a remainder).
Teach pupils to write a '**bank**' first at the side that will help them decide what chunks to use, e.g.:
Bank 1x = 36
   10x = 360
   100x = 3600

Introduce the method in a simple way by limiting the choice of chunks to 'Can we use 10 lots? Can use 100 lots?' As children become confident with the process, encourage more efficient chunks to get to the answer more quickly (e.g. 20x, 5x), and expand on their 'bank'. |

Key Skills
- Recall and use multiplication and division facts for all numbers to 12 x 12 for more complex calculations
- 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. Use short division where appropriate.
- Perform mental calculations, including with mixed operations and large numbers.
- Identify common factors, common multiples and prime numbers.
- Use estimation to check answers to calculations and determine accuracy, in the context of a problem.
- Use written division methods in cases where the answer has up to two decimal places.
- Solve problems which require answers to be rounded to specified degrees of accuracy.

Key vocabulary:
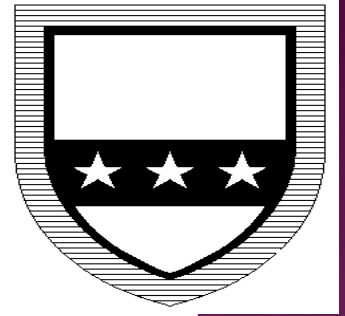**common factor**

We will now demonstrate our division method

22

Show your method

$$43 \overline{)6\,4\,5}$$

2 marks

CHALLENGES (STARBUCKS):

a. I buy three black coffees and a bottled water. How much change will I get from a £20 note?

b. The staff have made £28.80 in tips. If the money is shared equally, how much will each of the 24 staff members get?