KS2 Calculation

Four Operations

Outline of the session

- Lower KS2 calculations (Miss Ostler)
  - Addition and subtraction
  - Times tables
  - Multiplication and division

- Upper KS2 calculations (Mrs Mockridge)
  - Addition and subtraction
  - Multiplication and division
  - F.D.P (fractions, decimals and percentages)
  - SATs questions

- Key links

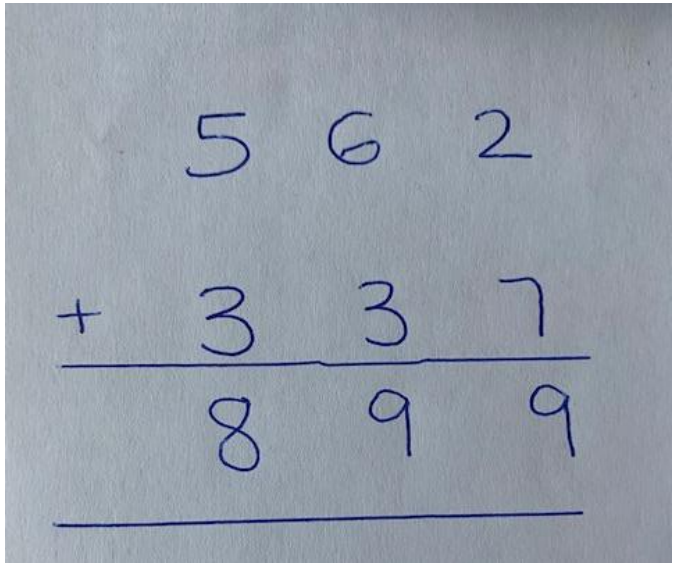
Addition – column method

- Year 3 – adding numbers up to 3 digits.
- Year 4 - adding numbers up to 4 digits.

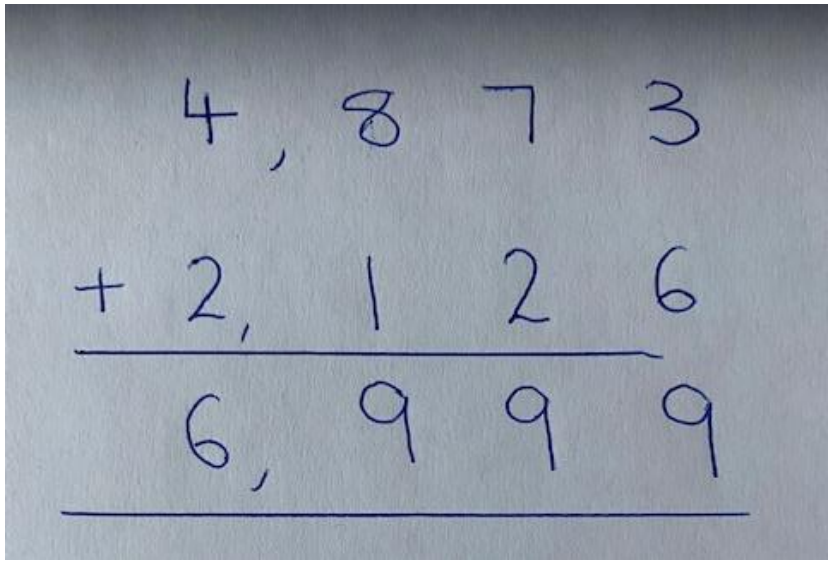
Both including adding without carrying and adding with carrying.

Adding without carrying

Year 3



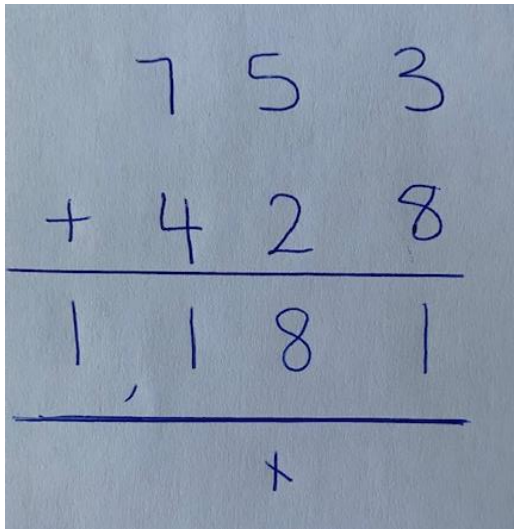
Year 4



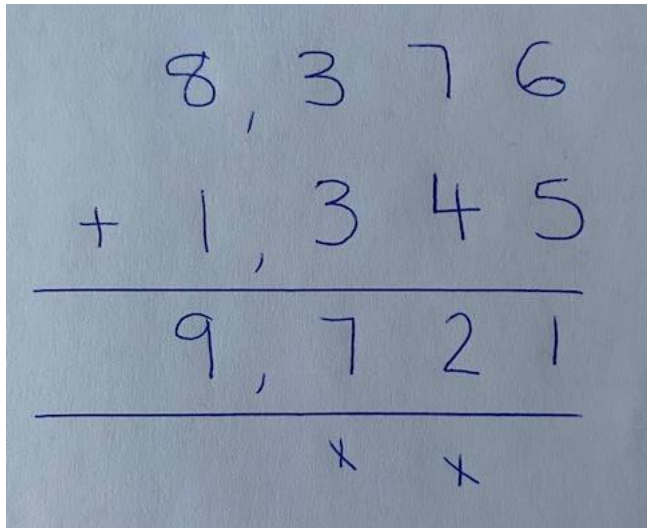
★ 375 + 524 =

Adding with carrying

Year 3



Year 4



Children are required to include a comma when the numbers are one thousand or more.

Misconceptions when adding

- Starting with hundreds or thousands column rather than the ones.
- Forgetting to add the carried numbers.
- Not lining up the digits in the correct place value.

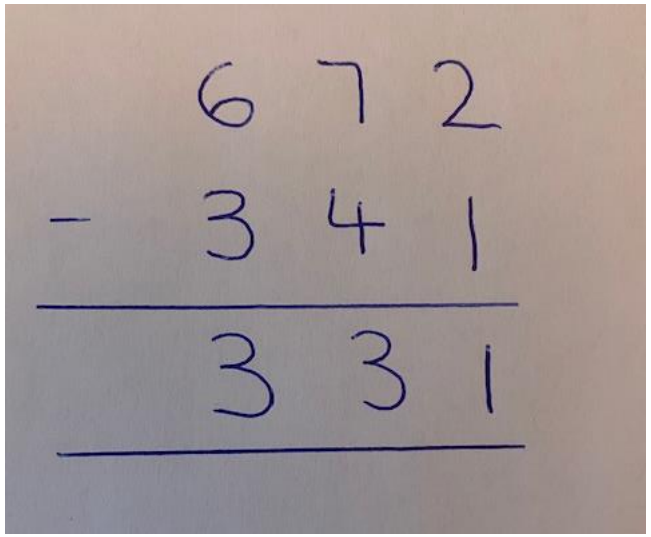
Subtraction – column method

- Year 3 – subtracting numbers up to 3 digits.
- Year 4 – subtracting numbers up to 4 digits.

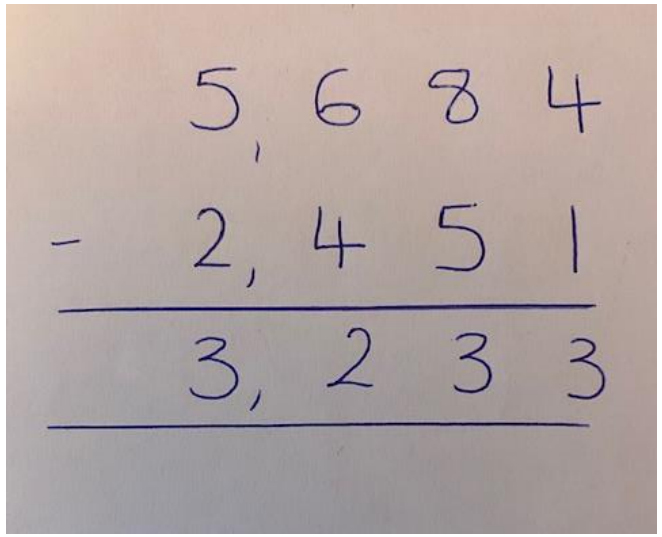
Both including subtracting without borrowing and subtracting with borrowing.

Subtracting without borrowing

Year 3

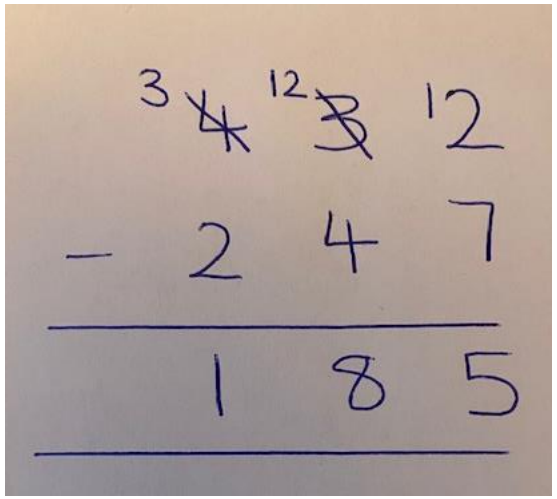


Year 4

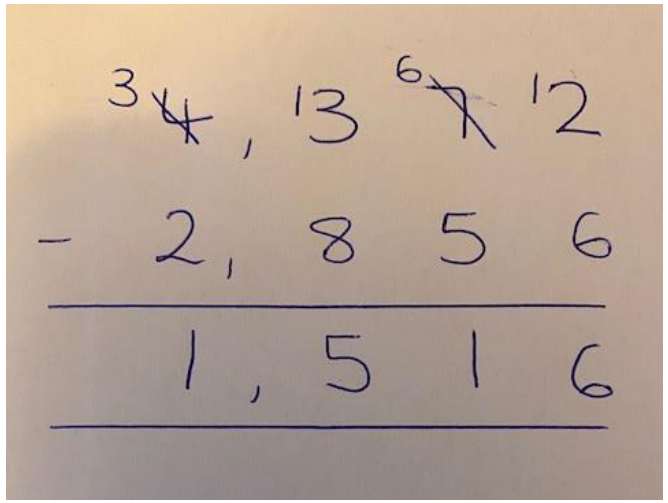


Subtracting with borrowing

Year 3



Year 4



Star Challenge

- How would you use column method to solve this subtraction question?

9,000 – 5,842 =

Misconceptions when subtracting

- Writing the calculation with the smaller number on top.
- Not lining up the digits in the correct place value.

Have a go..

1. 567 – 249 =
2. 641 – 392 =
3. 6,263 – 4,832 =
4. 7,345 – 5,592 =

Times tables

- Year 3 children are expected to know their

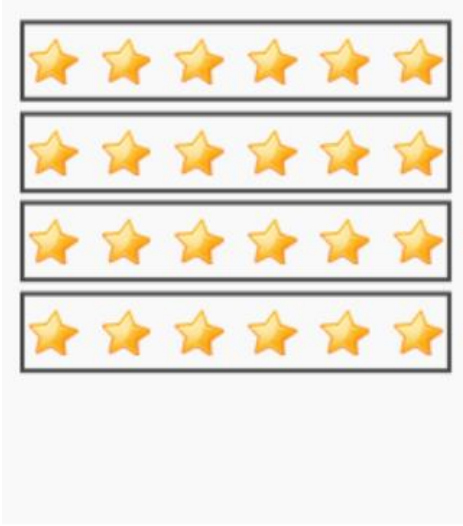
  x 2 x 3 x 4 x 5 x 8 x 10

- Year 4 children should know all their times tables (including x 11 and x 12).

- Not just knowing them as times tables but also knowing them as division facts.

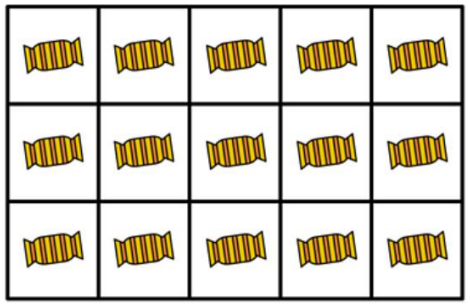
Multiplication Year 3

- In Year 2, children will learn how to use repeated addition and arrays to multiply.



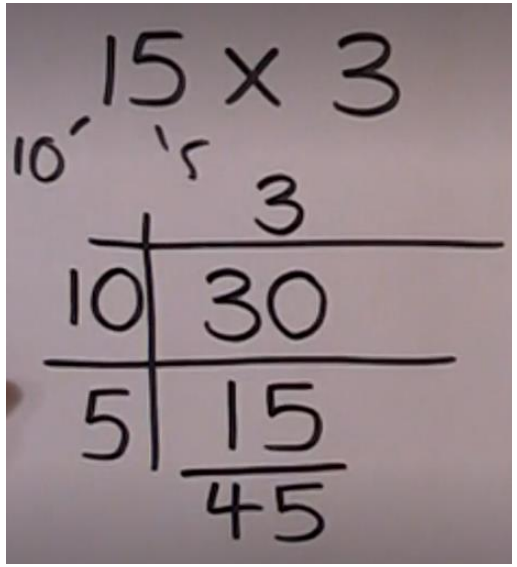
6 + 6 + 6 + 6 = 24

4 × 6 = 24



- In Year 3, children learn to use the grid method to work out multiplication questions.

15 x 3



- There are **3** rows of sweets and **5** sweets in each **row.**
- There are **5** columns of sweets and **3** sweets in each **column.**

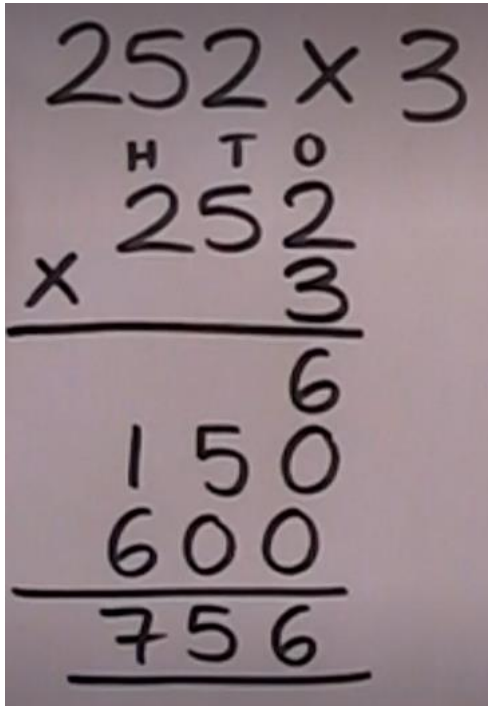
This array shows the multiplication statements **3 x 5** and **5 x 3.**

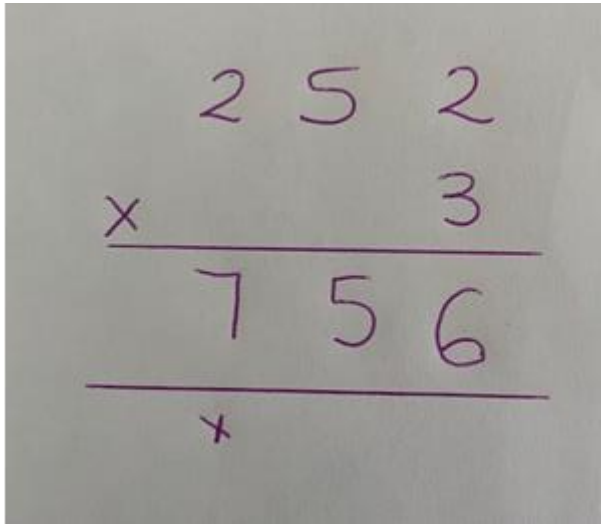
The array has **15** apples in total. This tells us that **3 x 5** and **5 x 3** are both equal to **15.**

3 x 5 = 15 and ***5 x 3 = 15***

Multiplication Year 4

- In Year 4, the children learn how to column method to work out multiplication questions.





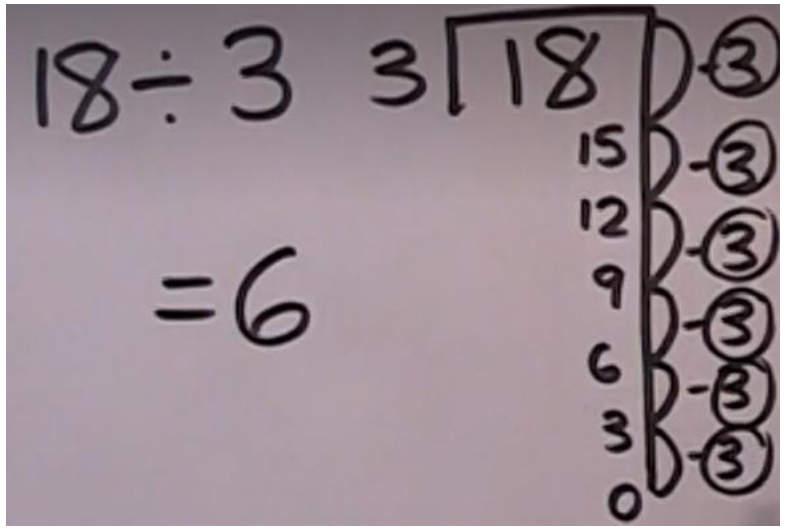
Have a go…

- 20 x 5
- 19 x 3
- 17 x 5

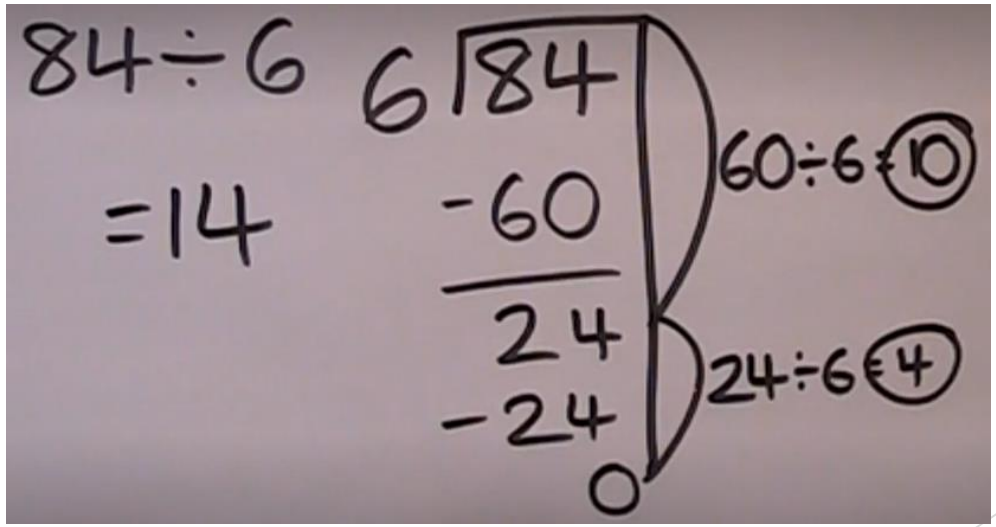
- 673 x 4
- 478 x 6
- 205 x 9

Division Year 3

- In Year 3, the main thing is children will be thinking about division as multiplication facts.
- Repeated subtraction (for children who aren't quite there with their division facts)



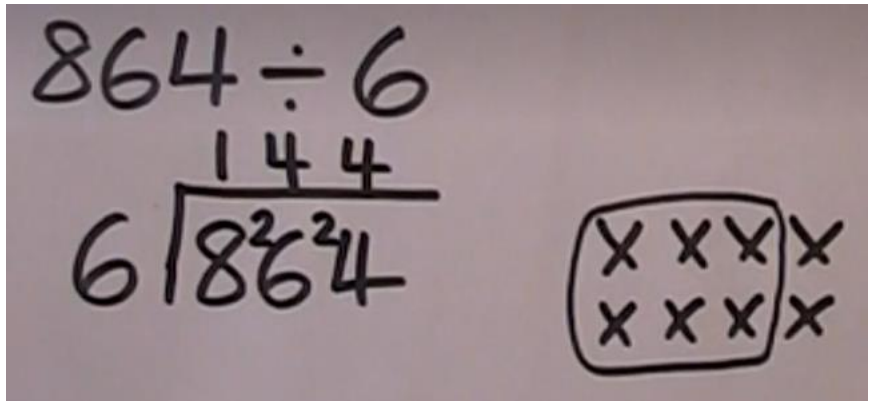
Repeated subtraction

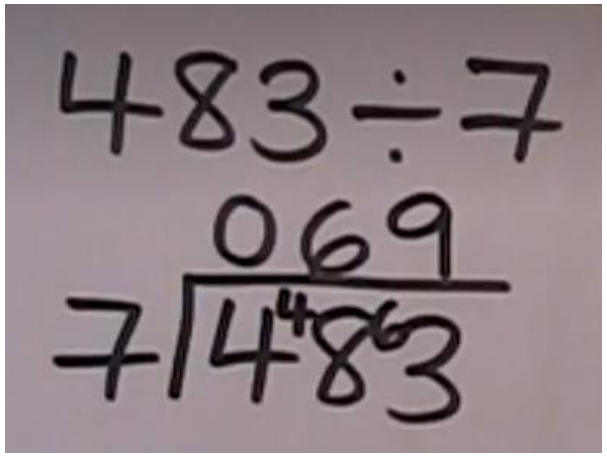


Chunking

Division Year 4

- Bus stop method



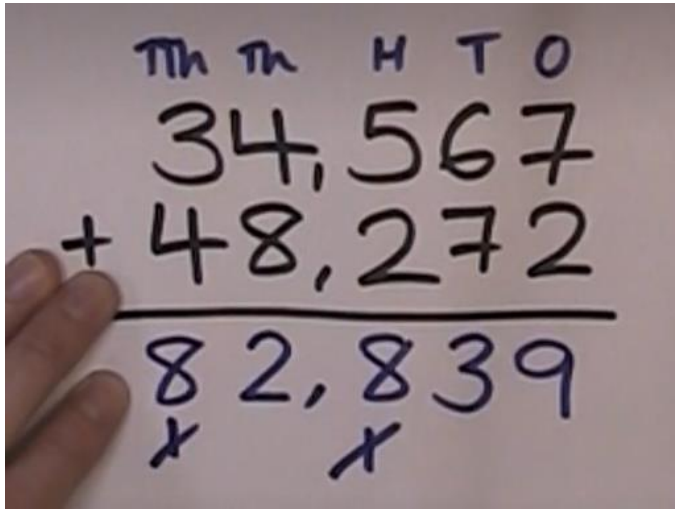


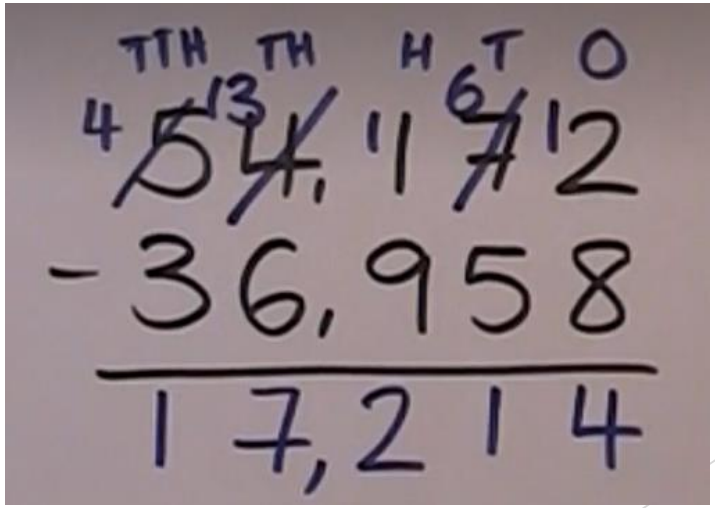
UPPER KS2
Year 5 & 6 – Overview

- Numbers to 10,000,000
- Rounding to the nearest 10, 100 and 1,000 (Y5)
- Round any number (Y6)
- Compare and order numbers within 1,000,000 (Y5)
- Compare and order any number (Y6)
- Negative numbers
- Add & subtract whole numbers with more than 4-digits (including exchange)
- Multiply and divide by 10,100 and 1,000
- Multiply up to 4-digit numbers by 2-digit numbers
- Divide up to 4-digit numbers by 1-digit numbers (including remainders) Y5
- Divide numbers by 2-digit numbers (including remainders as decimals) Y6
- Multiples, factors, prime numbers, square numbers and cubed numbers
- Inverse operations

Four Operations (addition & subtraction)

- Same method for adding and subtracting
- Children will use bigger numbers

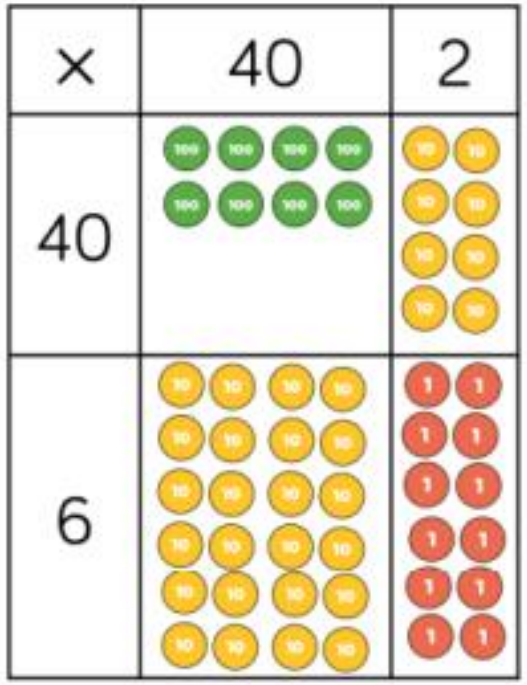


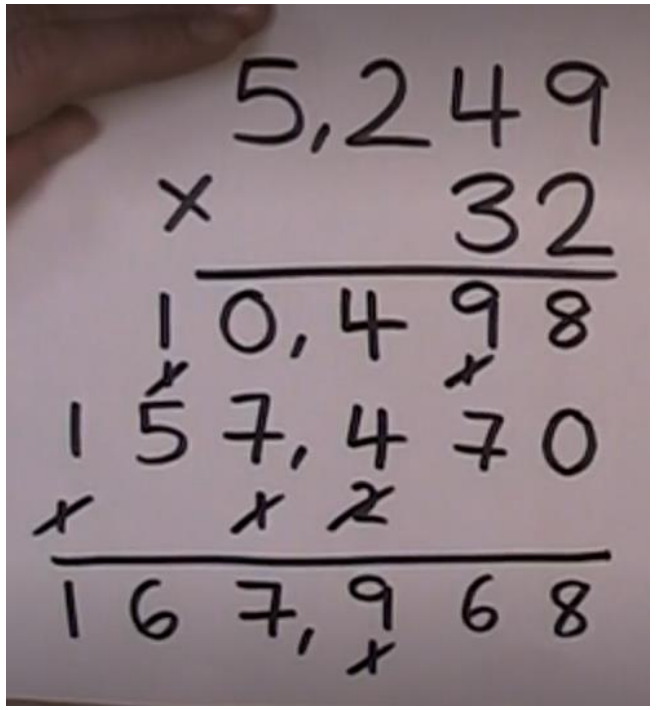


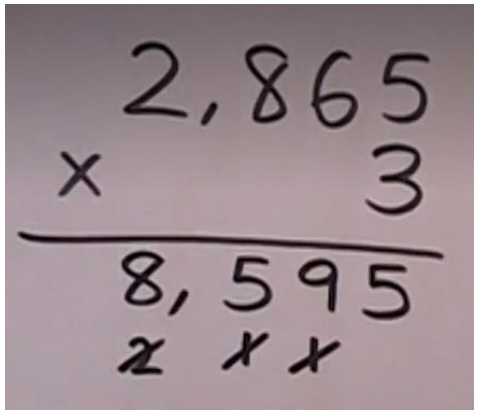
Four Operations (multiplication)

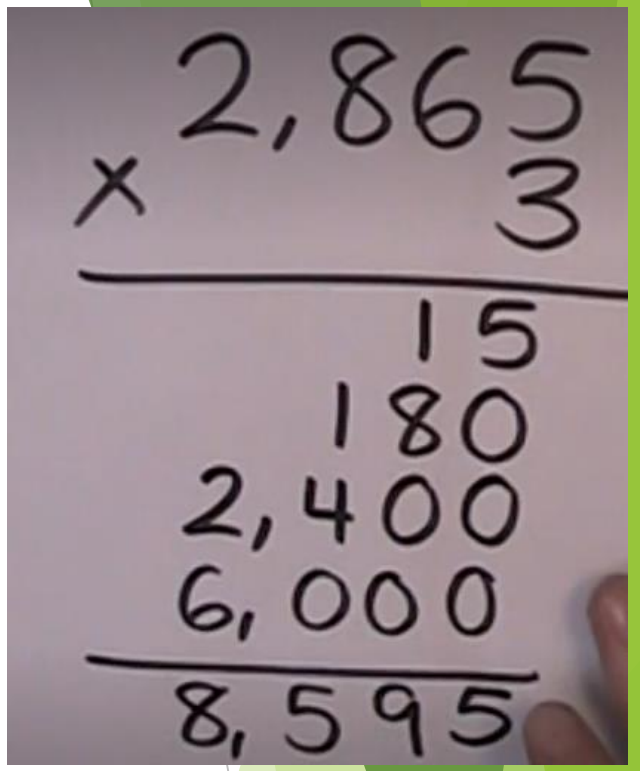
- Move from long multiplication towards short multiplication method (including x by 2-digits)

- Move from area (grid) method when multiplying by a 2 or 3-digit number



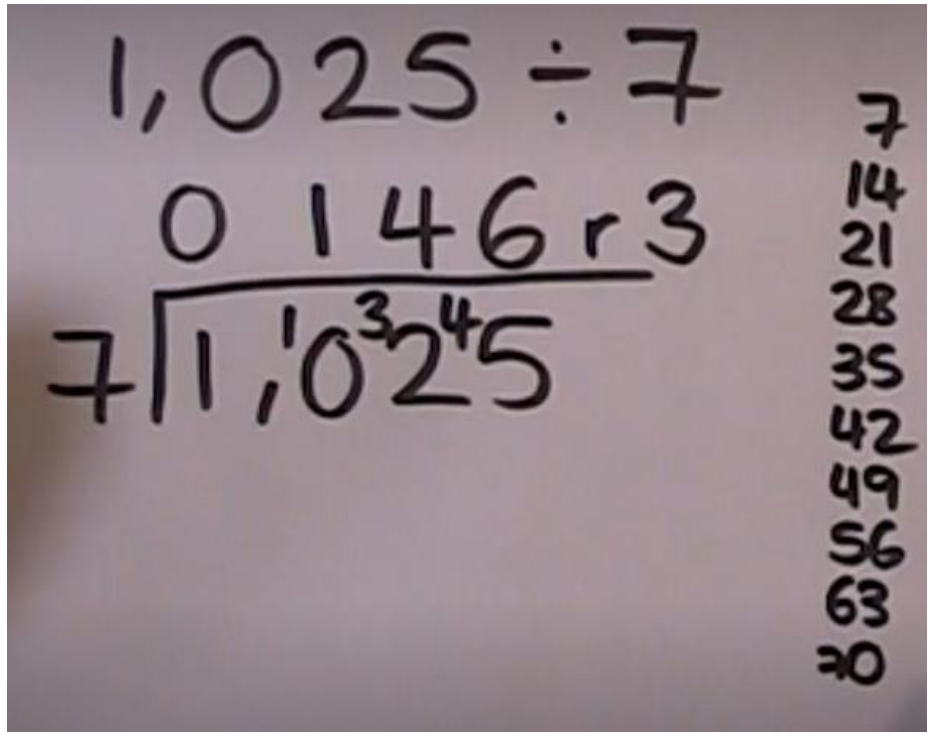






Four Operations (division)

- Continue to use 'bus stop' method to divide up to 4-digit numbers by 1-digit numbers (including where there are remainders).
- Importance of times tables to 12 (If you know 1, you know 10 method)
- Move onto long division in Y6 (Model)



			1	0	9	r	9
1	3	1	4	2	6		
	–	1	3	0	0		
			1	2	6		
	–		1	1	7		
					9		

Common misconceptions & errors

- Reversing numbers when subtracting
- Forgetting to add numbers together when multiplying by a 2-digit number
- Forgetting to add the 'sneaky' 0 when multiplying by a 2-digit number
- Times table knowledge errors

Order of operations
B.O.D.M.A.S./B.I.D.M.A.S.

Brackets
Orders (indices)
Division
Multiplication
Addition
Subtraction

34 – 12 x 9

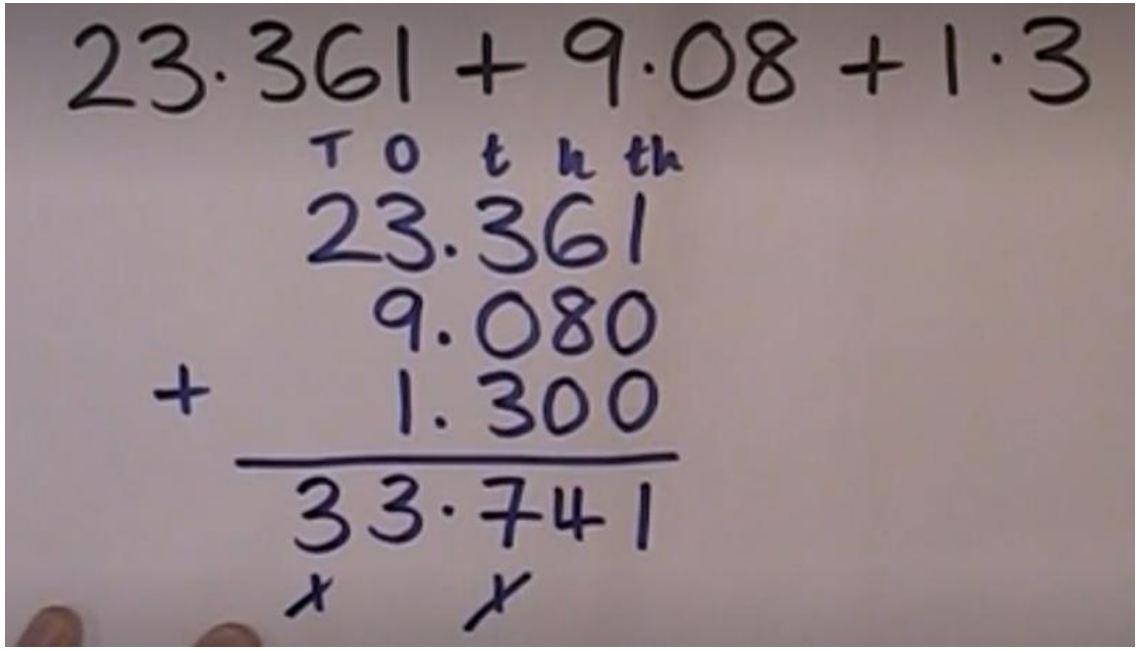
Y5 & Y6 - OVERVIEW F.D.P. (fractions, decimals & percentages)

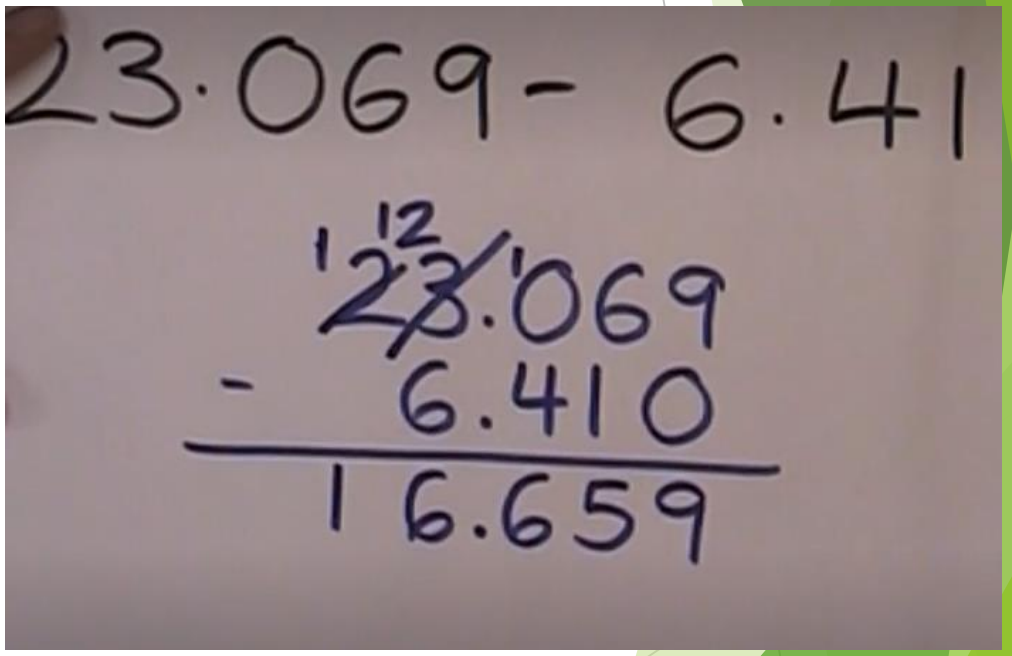
- Add & subtract fractions (including mixed/improper fractions)
- Multiply unit/non-unit fractions by integers & other fractions (including mixed/improper fractions)
- Divide unit/non-unit fractions by integers & other fractions (including mixed/improper fractions)
- Calculate fractions of a quantity and an amount
- Find equivalent fractions, simplify fractions, compare and order fractions
- Add & subtract decimals (3dp)
- Multiply and divide numbers by 10, 100 and 1,000 (including decimals)
- Multiply and divide decimals by integers
- Find percentage of an amount
- Missing values
- Increasing and decreasing percentages
- Convert between F.D.P.

SATs Practice: F.D.P.

- Example Y6 arithmetic paper
- Common misconceptions
- We're going to go through some of the F.D.P questions together (walkthrough)
- I have a completed version of this test (with all written methods) for you to take away with you.

Adding & subtracting decimals - PLACE VALUE FIRST





Multiply and divide by 10, 100 and 1,000

- Resources to support (slide to the left, slide to the right!)

Th	H	T	O .	10^{th}	100^{th}	$1{,}000^{th}$
1,	9	4	6 .			

Multiply decimals 2.34 x 5 =

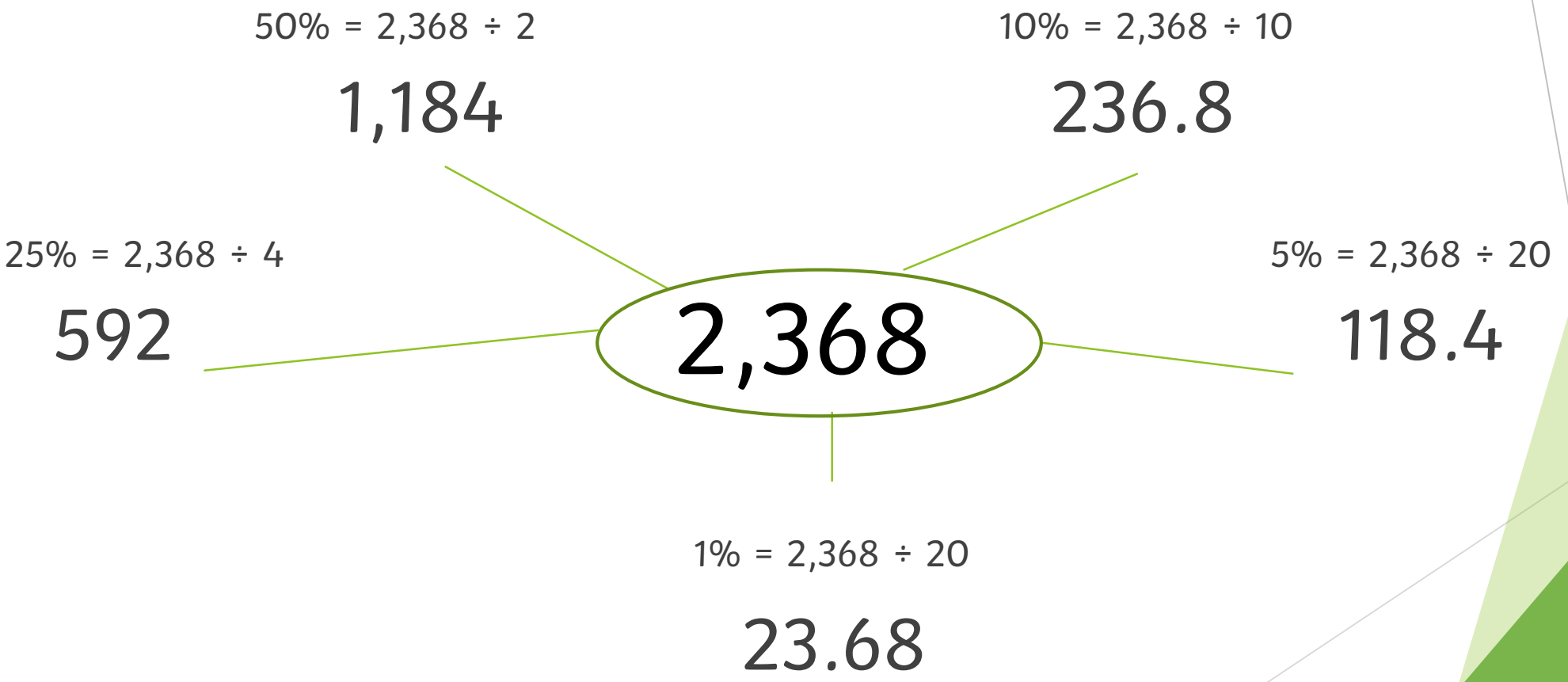
- Take out the decimal place(s)
- Multiply as normal
- Add the decimal place(s) back in

Divide decimals 51.23 ÷ 5 =

- Bus stop method (into decimals)
- Round if needed (1, 2 or 3 decimal places)

Percentages

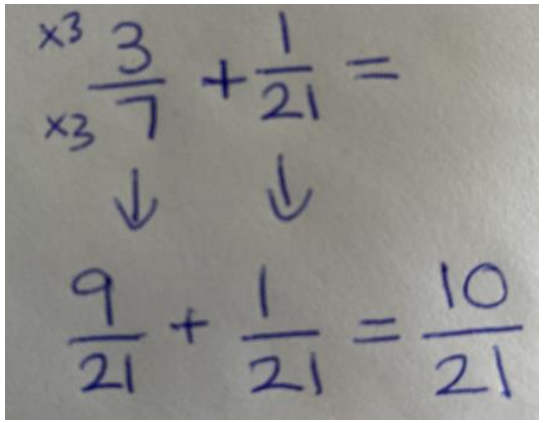
- Teach whole divided by 100 then multiply by percentage
- Teach associated facts

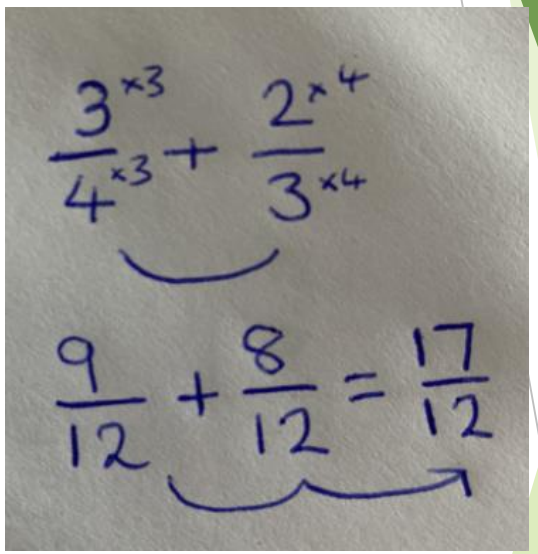


Fractions (add and subtract)

- The denominators MUST be the same to do this!
- If they are not, use multiplication to make them the same:

$$\frac{3}{7} + \frac{5}{7} = \frac{8}{7}$$





- Multiply the denominators together.
- Whatever you do to the bottom, you have to do to the top!
- Then add together.

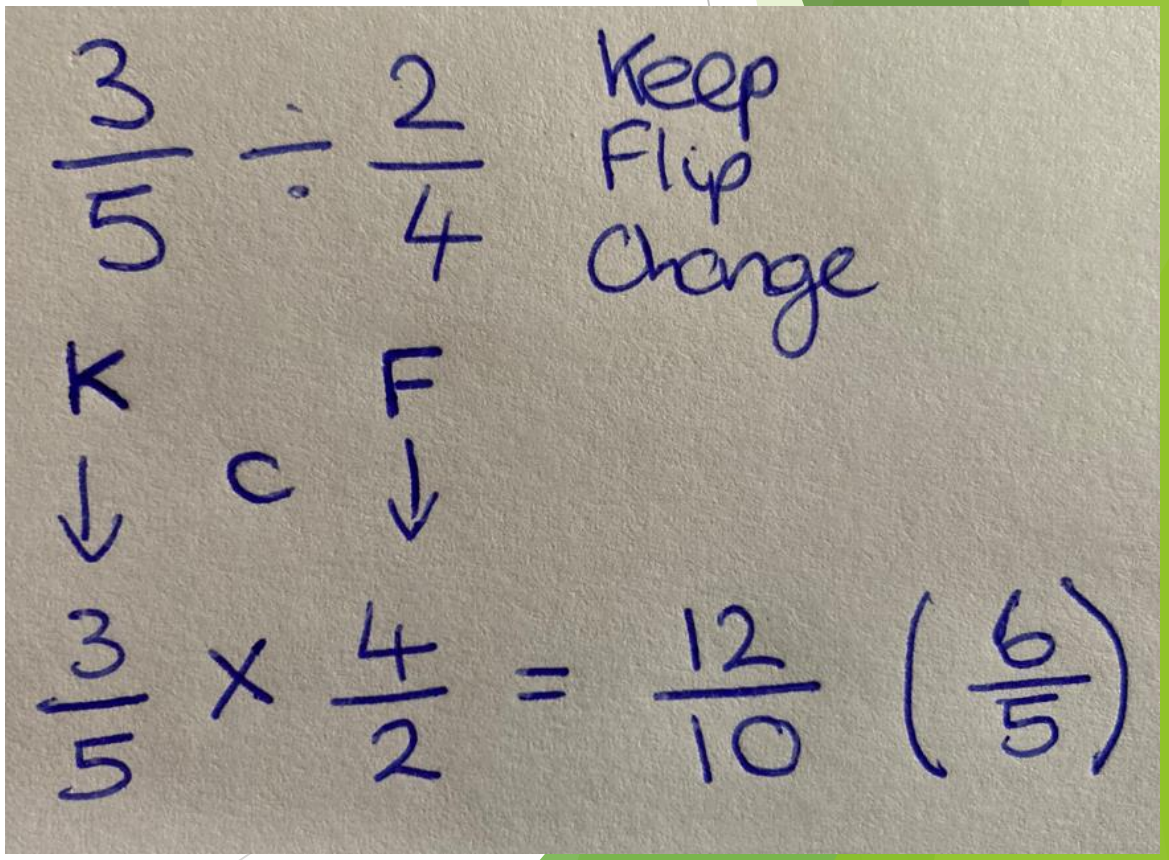
Fractions (multiply)

- Just multiply the denominators together and the numerators together.
- Simplify if possible.

$$\frac{3}{7} \times \frac{5}{7} = \frac{15}{49}$$

Fractions (divide) K.F.C.

- Keep first fraction
- Flip second fraction
- Change calculation
- Multiply as above
- Simplify if possible.



Helpful links:

- White Rose
- Oak Academy
- Calculation Policy: Addition and subtraction (EYFS - Y6)
- Calculation Policy: Multiplication and division (EYFS - Y6)
- BBC BITESIZE (KS2 Calculation)
- Times Tables Rock Stars

Any questions:

Thank you for coming!