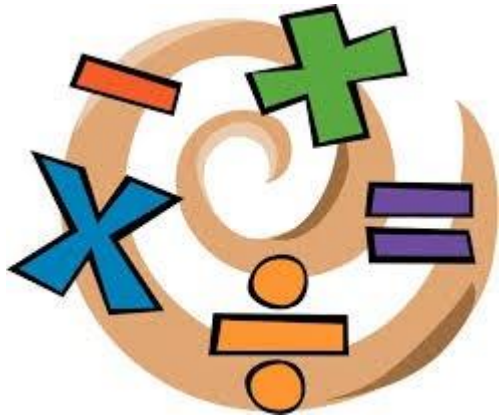
Westfields JUNIOR SCHOOL

Number Operation Maths Workshop



Warming up our brains for Maths

- What is you favourite ice cream?

Mathematical Fluency: A recap on the last parent workshop

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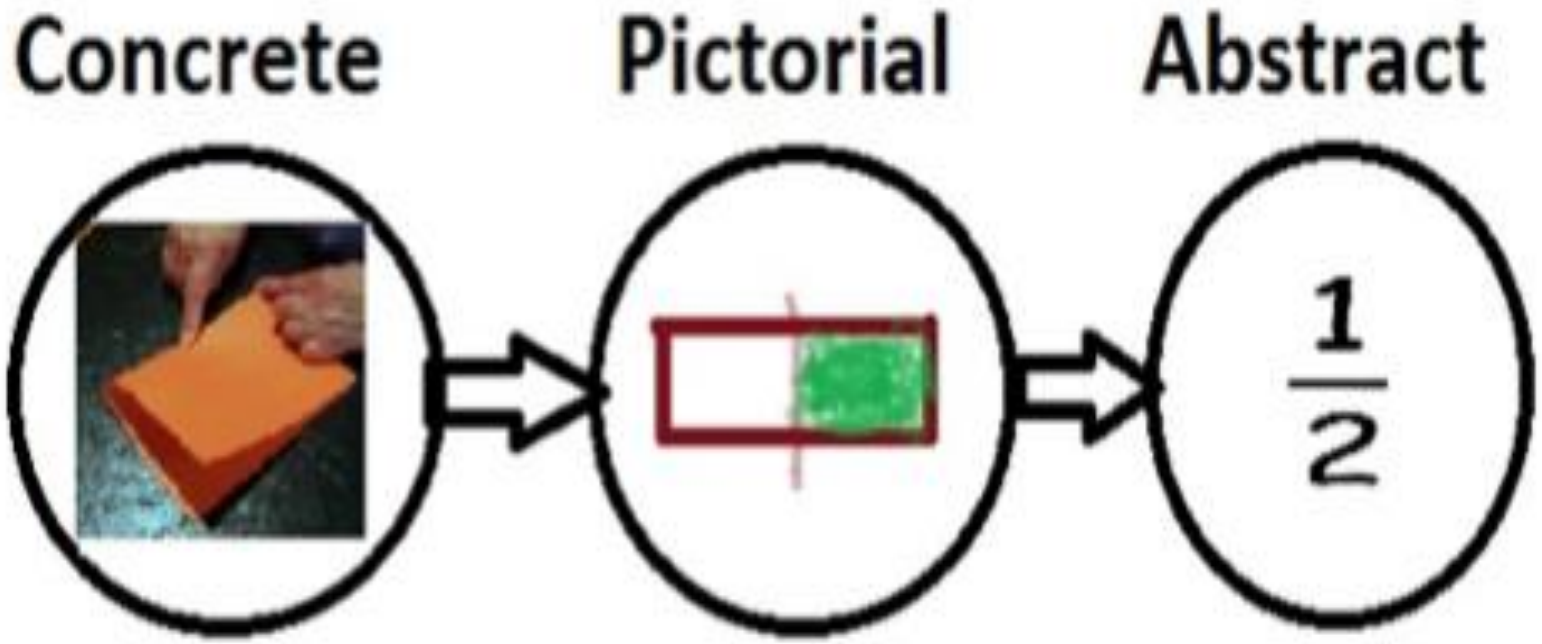
The three aspects of fluency with number

- **Efficiency** - this implies that children do not get bogged down in too many steps or lose track of the logic of the strategy. An efficient strategy is one that the student can carry out easily, keeping track of sub-problems and making use of intermediate results to solve the problem.
- **Accuracy** depends on several aspects of the problem-solving process, among them careful recording, knowledge of number facts and other important number relationships, and double-checking results.
- **Flexibility** requires the knowledge of more than one approach to solving a particular kind of problem, such as two-digit multiplication. Pupils need to be flexible in order to choose an appropriate strategy for the numbers involved, and also be able to use one method to solve a problem and another method to check the results.

- ***So fluency demands more of pupils than memorising a single procedure – they need to understand why they are doing what they are doing and know when it is appropriate to use different methods.***

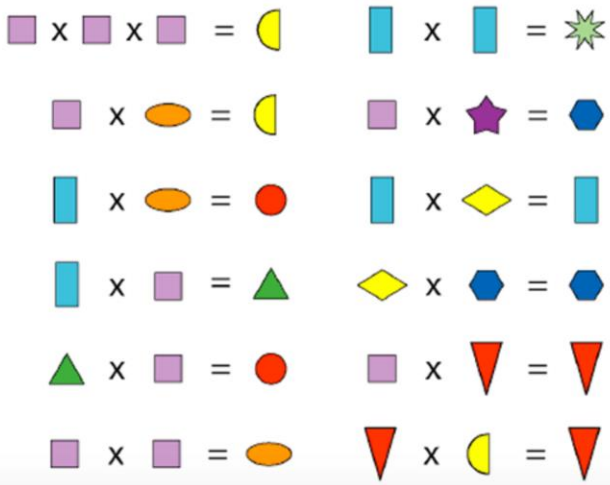

Concrete
Pictorial
Abstract
1/2

Shape Times Shape

Stage: 2 ★

The coloured shapes stand for eleven of the numbers from 0 to 12. Each shape is a different number.

Can you work out what they are from the multiplications below?



The numbers 2 -12 were used to generate it with, again, just one number used twice.

x						
	32			40		
					49	
			22			
		15				27
			24			
					42	

This challenge is a game for two players. The first player chooses two numbers in this grid and either multiplies or divides them.

100	25	5
10	2	36
12	4	3

÷

×

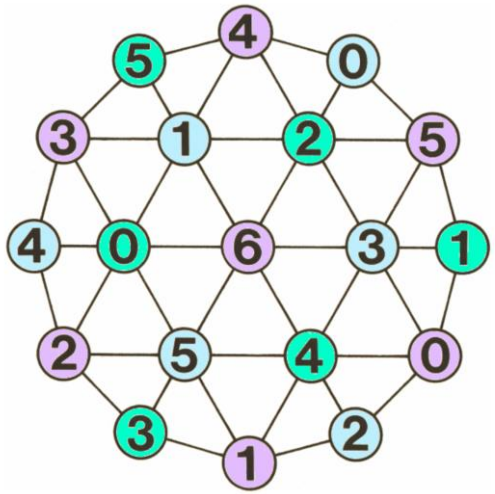
He or she then marks the answer to the calculation on the number line.The second player then chooses two numbers and either × or ÷, and marks that number in a different colour on the number line.

If the answer is too big or too small to be marked on the number line, the player misses a go.

The winner is the player to get four marks in a row with none of their opponent's marks in between.

What good ways do you have of winning the game?

Does it matter if you go first or second?



The Smith family

Why might the Smiths find it difficult to support their children with their Maths home learning?

Addition and subtraction: Do I borrow or do I carry?

What does the National Curriculum say about addition and subtraction?

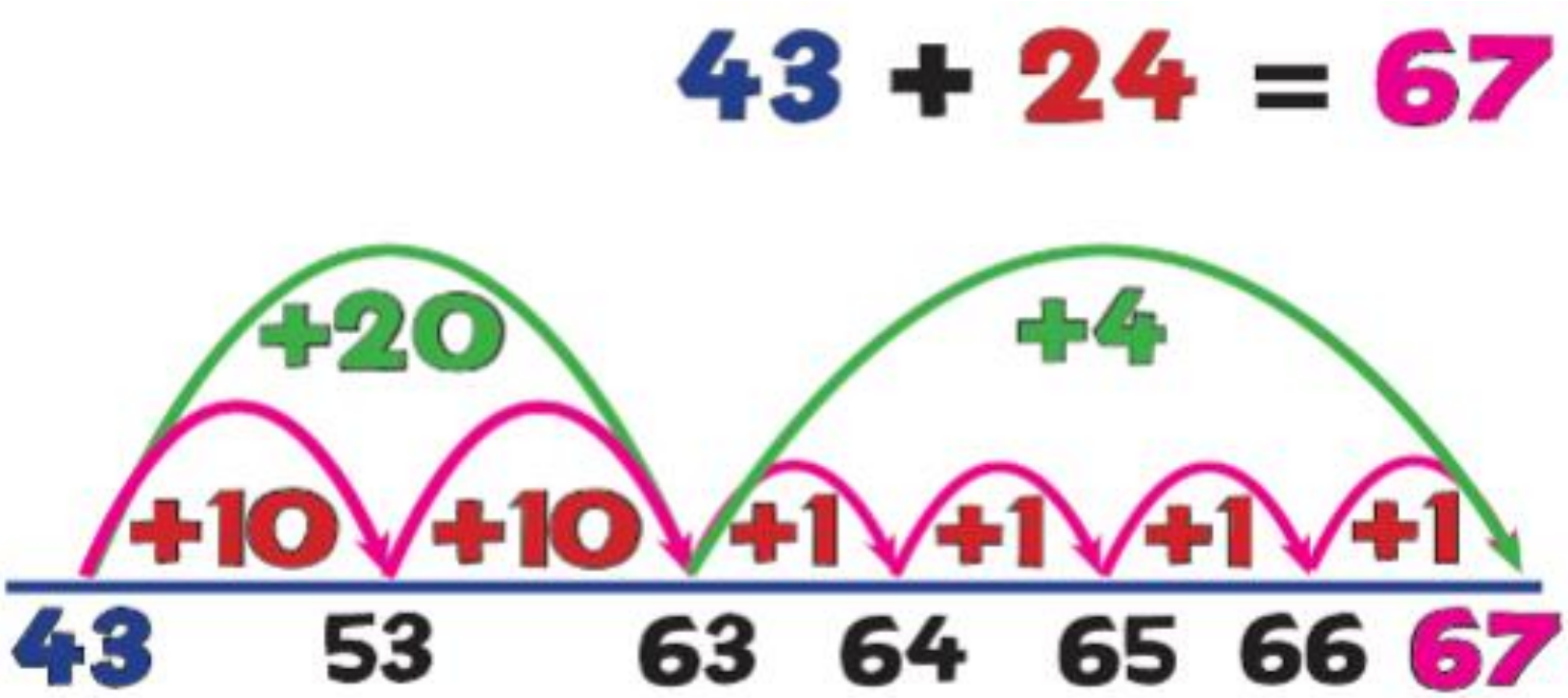
- Year 3 - Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction.
- Year 4 - Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.
- Year 5 - Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) and solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- Year 6 - Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Click on this link to watch a video

Top Tip!

BBC Bitesize have amazing videos that explain things simply and in an engaging way!

Addition – using a number line



Your turn:

27 + 56

124 + 233

Addition – partitioning and expanded column methods

$$\begin{array}{rcr} 40 & + & 3 \\ 20 & + & 4 \\ \hline 60 & + & 7 \\ \hline \end{array}$$

$$\begin{array}{rrrr} & H & T & U \\ & 6 & 8 & 7 \\ + & 2 & 4 & 8 \\ \hline & & 1 & 5 \\ & 1 & 2 & 0 \\ & 8 & 0 & 0 \\ \hline & 9 & 3 & 5 \\ \hline \end{array}$$

Your turn:

57 + 29

368 + 176

Addition – formal method

	H	T	U
	6	8	7
+	2	4	8
	9	3	5
	1	1	

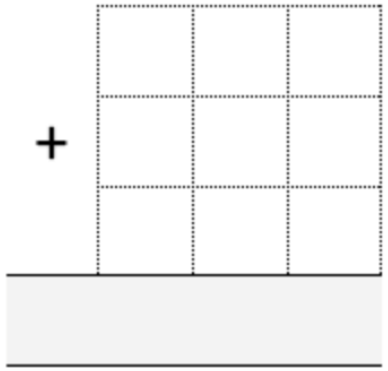
Your turn:

726 + 436

537 + 618

Mastering the four number operations: Now we know it, what do we do with it?

Each of you draw an addition grid like this:



Throw the dice nine times each until all the cells are full.

Whoever has the sum closest to 1000 wins.

There are two possible scoring systems:

- A point for a win. The first person to reach 10 wins the game.
- Each player keeps a running total of their "penalty points", the difference between their result and 1000 after each round. First to 5000 loses.

You can vary the target to make it easier or more difficult.

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Subtraction – numberline method

75 - 37 = 38

Your turn:

85 - 36

193 - 27

Subtraction – numberline method

723 - 356 = 367

	H	T	U
	600	110	1
	~~700~~	~~20~~	3
-	300	50	6
	300	60	7

Your turn:

736 - 272

638 - 389

Subtraction – formal column method

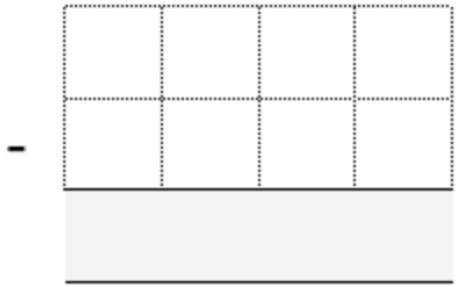
Your turn:

924 - 476

3,363 - 1,539

Mastering the four number operations: Now we know it, what do we do with it?

Each of you draw a subtraction grid like this:



Throw the dice eight times each until all the cells are full.

Whoever has the difference closest to 1000 wins.

There are two possible scoring systems:

- A point for a win. The first person to reach 10 wins the game.
- Each player keeps a running total of their "penalty points", the difference between their result and 1000 after each round. First to 5000 loses.

You can vary the target to make it easier or more difficult, perhaps including negative numbers as your target.

Multiplication and Division: Something about arrays and bus stops?

What does the National Curriculum say about multiplication and division?

Year 3

- 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

Year 4

- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout

Year 5

- 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
- 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

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 and short division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

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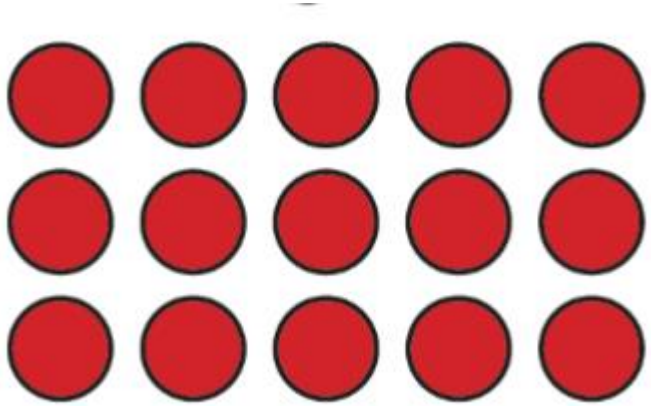
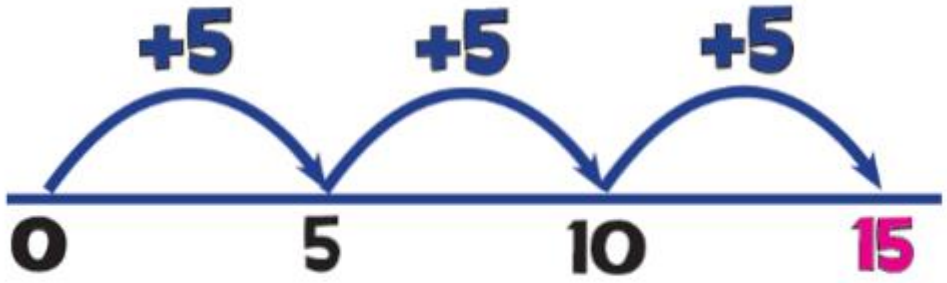
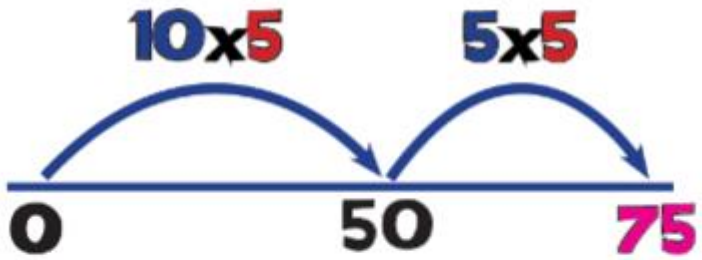
Multiplication – arrays and number lines





$5 \times 3 = 5 + 5 + 5 = 15$



$10 \times 5 = 50$

$5 \times 5 = 25$

75

$15 \times 5 = 75$

Multiplication – grid method

43 x 65 = 2795

40 x 60

3 x 60

x	40	3
60	2400	180
5	200	15

40 x 5

3 x 5

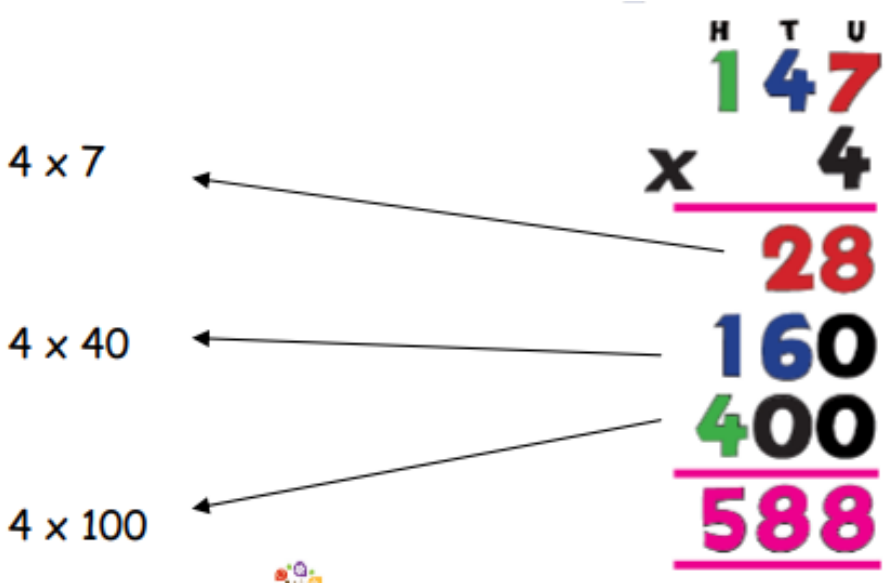
2400 + 180 + 200 + 15 = 2795

Your turn:

127 x 4

25 x 37

Multiplication – expanded and column multiplication



Your turn:

132 x 6

414 x 5

Mastering the four number operations: Now we know it, what do we do with it?

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Each of you draw a multiplication grid like this:

Throw the dice four times each until all the cells are full.

Whoever has the product closest to 1000 wins.

There are two possible scoring systems:

- A point for a win. The first person to reach 10 wins the game.
- Each player keeps a running total of their "penalty points", the difference between their result and 1000 after each round. First to 5000 loses.

You can vary the target to make it easier or more difficult.

nrich
Specialists in rich mathematics

Division – the tricky one!

Sharing

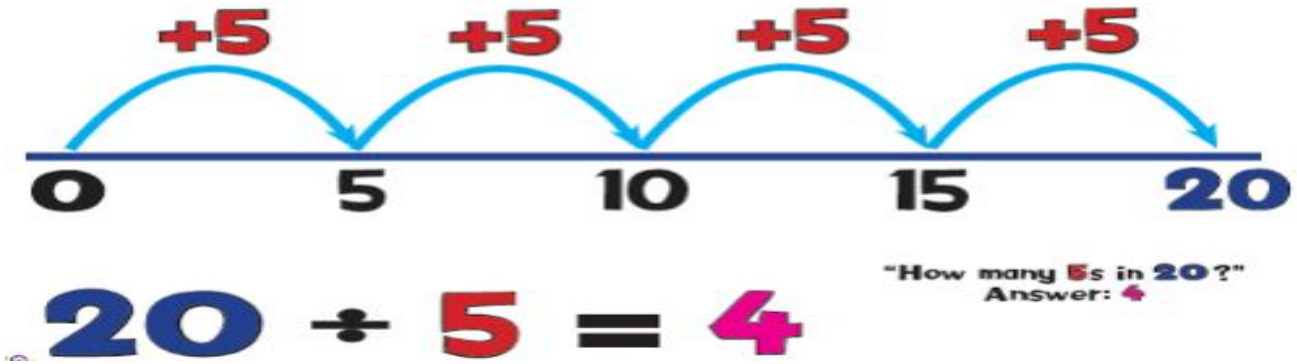
6 ÷ 2

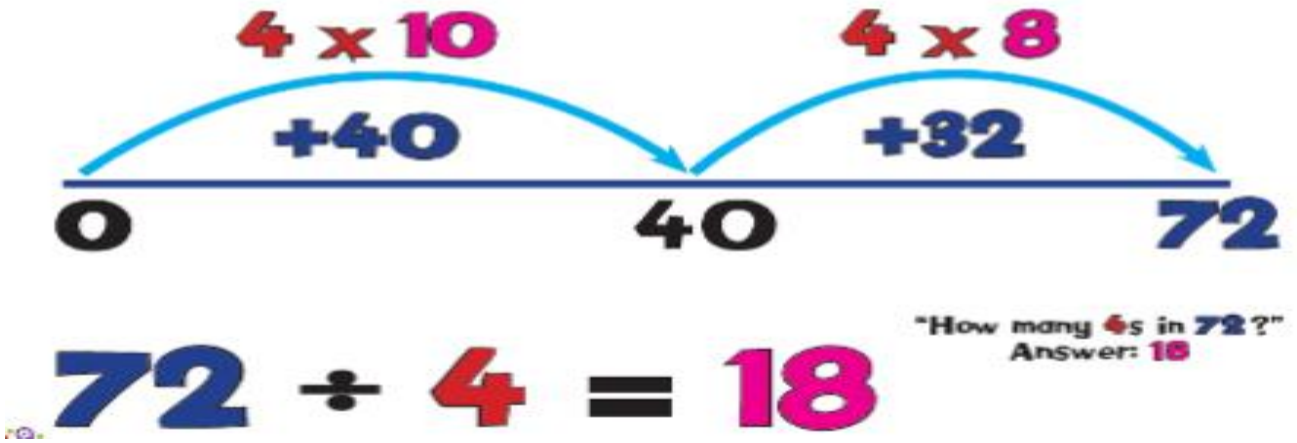
Grouping

6 ÷ 2

Your turn: Using the counters, what are the two ways you could show 10 ÷ 5?

Division – number line



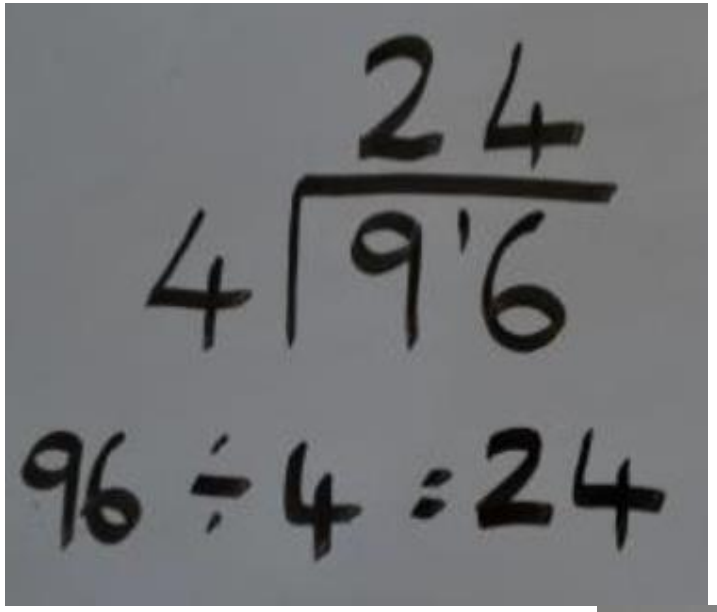


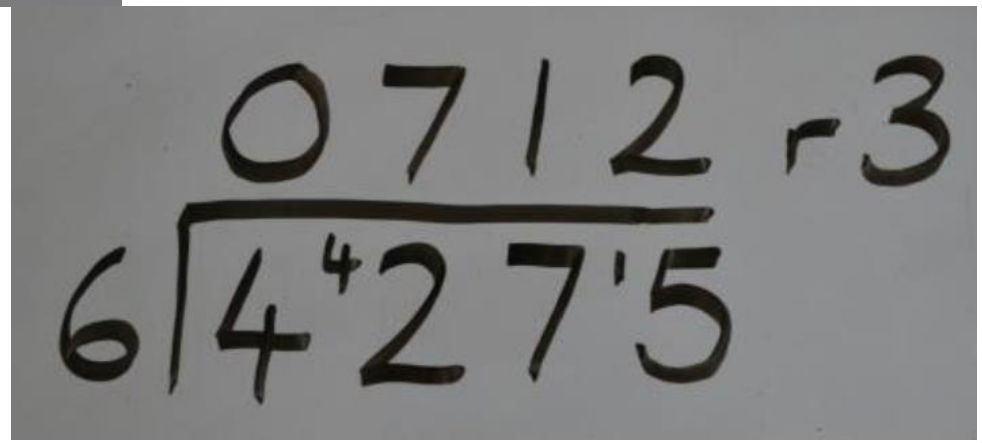
Your turn:

48 / 4

69 / 3

Division – short division



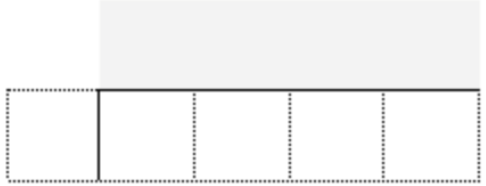


Your turn:

532 / 3

641 / 5

Mastering the four number operations: Now we know it, what do we do with it?



Each of you draw a division grid like this:

Throw the dice five times each until all the cells are full.

Whoever has the answer closest to 1000 wins.

There are two possible scoring systems:

- A point for a win. The first person to reach 10 wins the game.
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You can vary the target to make it easier or more difficult.

What’s next?

- Calculation Policy on the school website
- Try the games we have practised today with your child - they’ll love it!
- Supporting home learning through the methods we have explored today
- Visit Nrich and BBC Bitesize