

Looking for Patterns

In these two calculations each letter represents a different digit.

The same letter represents the same digit in both calculations.

What digit does each of the letters represent?

×	TS	K		
QS	ATSS	WAS	EPA S	
E	YSS	AW	YAW	
			EAWW	

NOTE:

× is not a digit, it's the multiplication sign.

We've been kind and given you the digit 8.

	8 E	
×	WY	
	TSES	(8E × WS)
	PW8	(8E × Y)
	TYS8	

Explain how you worked out what each letter represented.

The Arts Roundup



Harriet's ticket for the theatre is in the seventh row from the front, which is also the seventeenth row from the back.

If there are seventeen seats in each row, how many seats are there in the theatre?

Looking for Patterns

Without working out any values, arrange these numbers and calculations in order, smallest to largest. Then, using pencil and paper or a calculator, calculate the values.

Write another set of 10 numbers or calculations similar to this for a friend to solve. Try and make the difference between the values small so that they are trickier to order!

200×600	0.2×6000	6^{10}
10^6	20^3	$2^6 \times 6^2$
$2^6 \times 10$	2000×0.6	$60\,000 \times 200$
		$2 \times 200 \times 2000$

Name: _____

The Maths Herald

Date: _____

Volume 5

In the Past

In the 1800s, peasants in a remote part of Russia were discovered multiplying numbers using a remarkably unusual method. This method has become known as the 'Russian peasant method of multiplication'.

Look at the example on the right to see how you would calculate the answer to 13×18 using this method.

• Halve the numbers in the left column, ignoring any remainders	$\begin{array}{r} 13 \times 18 \\ \underline{6 \times 36} \\ 3 \times 72 \\ \underline{1 \times 144} \\ 234 \end{array}$	• Double the numbers in the right column
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- Cross out all the rows that have an even number in the left column.
- Add the remaining numbers in the right column.

Make up some multiplication calculations of your own. Use the Russian peasant method to work out the answers.

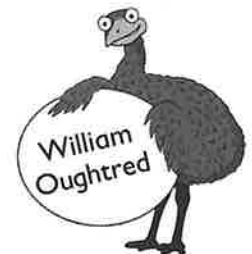
Is this a method of multiplication that you would regularly use? Why? Why not?



Let's Investigate

Write down three consecutive numbers. Multiply together the smallest and the largest numbers. Square the other number. Compare the two answers. What do you notice? Choose other sets of three consecutive numbers and repeat several times. What generalisations can you make?

9, 10, 11
 $9 \times 11 = 99$
 $10^2 = 100$



In the Past

Vedic Mathematics is the name given to the ancient system of Indian mathematics. Try this Vedic Mathematics activity.

Look at this 1 – 9 times-table square.

For each of the two-digit answers on the square add the digits of each number together. If the answer results in another two-digit number, repeat until you get a one-digit number answer. For example:

15: $1 + 5 = 6$

48: $4 + 8 = 12 / 1 + 2 = 3$ 6 and 3 are referred to as the *digital root*.

Using a blank 9×9 grid, write each digital root in the same position on the square.

Some squares have been completed.

Complete the grid.

Now, look at all the 1s on the grid. Join together the centre of each of the squares with a '1' digit in them to the centre of all the other squares with a '1' digit in them.

What do you notice?

What happens if you do the same for all the squares with a '2' digit in them?

What about a '3' or '4' digit in them?

×	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

1	2	3	4	5	6	7	8	9
2	4	6	8					
3	6	9		6				
4	8							
5		6						
6							3	
7								
8					3			
9								

The Puzzler

Write down any three-digit number. 168

Multiply this number by 7. 1176

Multiply the answer by 11. 12 936

Multiply this answer by 13.

What do you notice?

Repeat with other three-digit numbers.

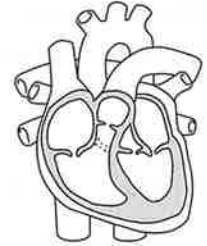
Can you explain why this happens?

Sports Update

Approximately how many times does your heart beat in a year?

Write about how you calculated your approximation.

How does this compare with the number of times an adult's heart beats in a year?



Looking for Patterns

Complete these patterns.

Then write the next three calculations in each of these patterns.

$1 \times 2 \times 3 \times 4 + 1 = 25 = 5^2$

$1^3 = 1$

$2 \times 3 \times 4 \times 5 + 1 = \square = 11^2$

$1^3 + 2^3 = 9 = 3^2$

$3 \times 4 \times 5 \times 6 + 1 = \square = \square^2$

$1^3 + 2^3 + 3^3 = \square = 6^2$

$1^3 + 2^3 + 3^3 + 4^3 = \square = \square^2$

Help!

$2^3 = 2 \times 2 \times 2$

$5^3 = 5 \times 5 \times 5$

For each pattern, write down any patterns you notice.

Can you find some similar patterns of your own?

The Puzzler

Investigate the digital roots of cubed numbers.

$1 \times 1 \times 1 = 1$	$2 \times 2 \times 2 = 8$	$3 \times 3 \times 3 = 27$	$4 \times 4 \times 4 = 64$
↓	↓	↓	↓
1	8	9	?

Is there a pattern?

Investigate for numbers up to $20 \times 20 \times 20$ to check the pattern.

The Puzzler

1 2 3 4 5 6 7 8 9 10 11 12

The product of some of these numbers is 17 280.

What are the numbers?

Write about how you worked out which numbers they were.