contents and sample pages

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Foreword

Motivational Maths has been designed to enrich the mathematical experience of older students or simply enthral younger students with the seeming magical properties of mathematics. Teachers may use the ideas to introduce lessons, to finish a lesson on 'a high note', to arouse curiosity or extend the thinking of students. Alternatively, teachers may wish to copy the activities and allow students to jot down ideas or the calculations required to complete the trick. Older students should be encouraged to look a the reason behind the tricks; i.e. what makes them work? In many cases, this will provide the opportunity to discuss and develop algebraic ideas and concepts. Younger students who are not ready for algebra may simply be allowed to wonder at the magic of mathematics. Remember, the purpose of introducing a 'mathemagical' trick should not be to baffle students with the intricacies of algebra but to turn them on to mathematics and m[illegible] to try!

Contents

Magic Numbers

There are several numbers that when multiplied appear to have magical properties. For example, the number 12 345 679 may be used to good effect. Simply ask a student to choose any single-digit number and then to multiply it by nine (a good way to get students to practise their nine-times table). Next, the product is multiplied by 12 345 679. To add to the mystery of the occasion the mathemagician at this point can predict the outcome prior to the completion of the final calculation.

The following example shows the trick in operation. If a student volunteer chooses seven as the single-digit number, then sixty-three is produced as the result of multiplying seven by nine ($7 \times 9 = 63$). The result of multiplying sixty-three by the magic number 12 345 679 is 777 777 777. It should be noted that this calculation cannot be performed on an ordinary calculator with an eight-digit display so most students are suitably impressed when the teacher (or other person) predicts the answer almost instantaneously.

The product of 12 345 679 and 9 is 111 111 111. Therefore any single-digit multiple of nine will produce the following result nnn nnn nnn, where n represents the single-digit multiple of nine.

Where is the mathematics?

The mathematics to be derived from a trick of this kind comes from the children developing their own magic number puzzles. Once the students appreciate the principle underlying this trick they may like to make up some of their own, using one of the following magic numbers: 37 037, 15 873 or 8 547. To develop the trick requires recognising the relationship between these numbers and 111 111.

Calendar Magic

$a+b+c=4$

- *Choose any month from the year and draw a 3 x 3 box around any nine dates.*

January

sun	mon	tue	wed	thu	fri	sat
				4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

	Example	Working
• *Choose the smallest number in the box.*	4	
• *Add eight to it.*	4 + 8 = 12	
• *Multiply the result by nine.*	9 x 12 = 7	
• *Record your answer.*		
• *Add the nine numbers in the box.*	4 + 5 + 6 + 11 + 12 + 13 + 18 + 19 + 20 = 7	

- *How does your answer compare to the sum of the numbers in the box?*

Try

- Try other months.
- Does it work for every month in the year?

Magic Months

$a+b+c=4$

- *Work with a partner. Keep your back to him/her while you work your "magic" trick.*

January

sun	mon	tue	wed	thu	fri	sat

	Example	Working
• *Ask your partner to secretly choose a 3 x 3 block from any month on the calendar, and follow this procedure:*		
• *Add the nine numbers.*	11 + 12 + 13 + 18 + 19 + 20 + 25 + 26 + 27 = 171	
• *Write the total and show it to you.*		
• *Using your "Secret Solution", offer to "read" his/her mind to find out the 3 x 3 block in the chosen month.*		

Secret Solution

Mentally divide the total by 9, which will reveal the middle number in the block.
Subtract 8 to determine the first number in the block.
The rest may be worked out using the sequence of the calendar.