

# Sums. The're Math Magic

## 15 – Problems Solved

**Please go through each slide stopping until you have understood the concept described**

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## 15 - Problems Solved

### Marbles and Pots

I have some marbles and pots

If I put four marbles in each pot I will have one pot with nothing in it.

If I put three marbles in each pot I will have one marble over

**How many marbles and pots do I have?**



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## Marbles and Pots

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Using M = No of Marbles and P = Number of Pots

Equation 1

$$P-1=M/4$$

This is the same as  $(P-1) \times 4 = M$ , or  $4P-4 = M$

Equation 2

$$M-1=P \times 3$$

This is the same as  $M=(3P) + 1$

Substituting for M from Equation 2 into Equation 1

$$4P-4 = 3P + 1$$

Subtract  $3P$  from each side (remember  $\therefore$  means “Therefore”)

$$\therefore P-4= 1$$

$$\therefore P = 5$$

$$\therefore M = 4P-4 = 20 - 4 = 16$$

**I have sixteen marbles and five pots**

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### Letters Mean Numbers

Please solve the sum:

$$\begin{array}{r} ABCD \\ \times 4 \\ \hline DCBA \end{array}$$

Where A,B,C and D are different numbers in the range 0 to 9

Are monsters good at maths?

Not unless you Count Dracula.



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## 15 - Problems Solved

### Letters Mean Numbers

#### Proof

First segregate the thousands, etc.

Thousands	Hundreds	Tens	Units	
A	B	C	D	Because D cannot be more than 9 (thousands column) and $4 \times D = A$ so A is an even number and must be 2
			$\times 4$	
D	C	B	A	

Thousands	Hundreds	Tens	Units	
2	B	C	D	Now $4D = 2$ or $10+2$ or $30+2$ as these divide by 4. So D is either 6 or 8. So D must be 8 because $4 \times 2 = 8$ .
			$\times 4$	
D	C	B	2	

Thousands	Hundreds	Tens	Units	
2	B	C	D	Now $4D = 2$ or $10+2$ or $30+2$ as these divide by 4. So D is either 6 or 8. So D must be 8 because $4 \times 2 = 8$ . And we have 30 carried forward to the tens column.
			$\times 4$	

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### Letters Mean Numbers

Thousands	Hundreds	Tens	Units	
2	B	C	8	Now $4 \times B$ is less than 10 because we cannot have any carried forward to the thousands column. So $4C+3=B$ So if $C=1$ , $B=7$ and $4B=28$ not allowed If $C=3$ , $B=5$ and $4B=20$ not allowed If $C=4$ , $B=9$ , also not allowed If $C=5$ , $B=3$ If $C=6$ , $B=7$ , not allowed If $C=7$ , $B=1$ If $C=9$ , $B=9$ but two numbers cannot be the same.
			$\times 4$	
8	C	B	2	

Thousands	Hundreds	Tens	Units	
2	B	C	8	So B is 1 or 3 If B is 3 then $C=5$ and we have 20 to carry forward which is not allowed. So B is 1 and C is 7 is the only option remaining
			$\times 4$	
D	C	B	2	

Thousands	Hundreds	Tens	Units
2	1	7	8
			$\times 4$
8	7	1	2

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**So the result is:**

$$\begin{array}{r} \text{ABCD} \quad 2178 \\ \times 4 \quad \times 4 \\ \hline \text{DCBA} \quad 8712 \end{array}$$

**Why did the boy always wear glasses during maths class?**

**They improve di-vision!!**



**Sums. The're Math Magic**

**15 – Problems Solved**

**Please go to the next lesson.**

**Sum Logic**