

## Fun in Mathematics

1. Do you know that  $111, 111, 111 \times 111, 111, 111 = 12,345,678,987,654,321$  ?

2. Do you know there are just four numbers (after 1) which are the sums of the cubes of their digits :

$153 = 1^3 + 5^3 + 3^3$ ,  $370 = 3^3 + 7^3 + 0^3$ ,  $371 = 3^3 + 7^3 + 1^3$ , and  $407 = 4^3 + 0^3 + 7^3$  ?

3. Do you know  $1,741, 725 = 1^7 + 7^7 + 4^7 + 1^7 + 7^7 + 2^7 + 5^7$  ?

4. Five most important numbers in Mathematics in one equation

$$\exp(i\pi) + 1 = 0$$

5. Strange properties of 666, "The Number of the Beast":

The last book of the Bible, Revelations, brings up the number 666 as being the number of the beast connected with the end of this age and the coming of the Messiah. The direct reference is found in chapter 13, verse 18 of Revelations. Besides that cataclysmic reference, the number 666 has quite a few very interesting properties.

$$666 = 3^6 - 2^6 + 1^6$$

$$666 = 6^3 + 6^3 + 6^3 + 6 + 6 + 6$$

There are only five other positive integers that exhibit this property. Can you find them ?

$$666 = 2^2 + 3^2 + 5^2 + 7^2 + 11^2 + 13^2 + 17^2$$

$$666 = 1 + 2 + 3 + 4 + 567 + 89 = 123 + 456 + 78 + 9 = 9 + 87 + 6 + 543 + 21$$

Moreover, 666 is equal to the sum of the cubes of the digits in its square ( $666^2 = 443556$ , and the sum of the cubes of these digits is  $4^3 + 4^3 + 3^3 + 5^3 + 5^3 + 6^3 = 621$ ) plus the sum of the digits in its cube ( $666^3 =$

$295408296$ , and  $2+9+5+4+0+8+2+9+6 = 45$ , and  $621 + 45 + 666$ ).

Incredibly, the number 666 is equal to the sum of the digits of its 47th power, and is also equal to the sum of the digits of its 51st power. That is,  $666^{47} = 5049969684420796753173148798405564772941516295265408188117632668936540446616033068653028889892718859670297563286219594665904733945856$

$666^{51} = 993540757591385940334263511341295980723858637469431008997120691313460713282967582530234558214918480960748972838900637634215694097683599029436416$

and the sum of the digits on the right hand side is, in both cases, 666. In fact, 666 is *the only integer greater than one with this property*. (Also, note that from the two powers, 47 and 51, we get  $(4+7)(5+1) = 66$ .)

Again if we assign numerical values for the letters of the alphabet starting with A = 36, b = 37, and so on, we find that the letters in the word

**SUPERSTITIOUS = 666 !!!**

### 6. Amicable Numbers

There are a few pair of numbers that have a very peculiar affinity for each other and are so-called "amicable numbers." Take for instance the pair of numbers 220 and 284. It turns out that all the factors of 220 that is those less than itself add up to 284. And, surprisingly, the factors of 284 add upto 220. Three other pairs like these : 1, 184 and 1,210 (discovered by a 16-year-old Italian named Nicolo Paganini), 17,296 and 18,416, and the large pair 9,363,584 and 9,437,056. Can you find others ?

## 7. Interesting patterns in arithmetic :

$$1 \times 9 + 2 = 11$$

$$9 \times 9 + 7 = 88$$

$$12 \times 9 + 3 = 111$$

$$98 \times 9 + 6 = 888$$

$$123 \times 9 + 4 = 1111$$

$$987 \times 9 + 5 = 8888$$

$$1234 \times 9 + 3 = 11111$$

$$9876 \times 9 + 4 = 88888$$

$$9 \times 9 = 81$$

$$6 \times 7 = 42$$

$$99 \times 99 = 9801$$

$$66 \times 67 = 4422$$

$$999 \times 999 = 998001$$

$$666 \times 667 = 444222$$

$$9999 \times 9999 = 99980001$$

$$6666 \times 6667 = 44442222$$

## 8. What day of the week were you born ?

Even though you were there at the moment of your birth, you may not remember exactly what day of the week it was! Here is a little trick to help you figure what day that was. In fact, not only will it help you find that out, you can find out the day of the week for any date you want in the 20th century.

Step 1. Write the last two digits of the year you were born, Call it A.

Step 2. Divide the number, that is divide A by four. Drop the remainder if there is one. Call this answer, without the remainder, B.

Step 3. Find the month number corresponding to the month you were born in from the table below. Call it C.

Step 4. Oh, the date you were born on, call it D. (if you were born on the 12 th, call D = 12.)

Step 5. Now add A+B+C+D. Divide this sum by 7. The remainder you get is the key to the day of the week.

Step 6. In the table of days below, match the remainder with the day of the week you were born on.

### TABLE OF MONTHS

January = 1    July = 0  
(0 in leap yr.) August = 3  
February = 4  
(3 in leap yr.)  
March = 4    Sept. = 6  
April = 0    Oct. = 1  
May = 2    Nov. = 4  
June = 5    Dec. = 6

### TABLE OF DAYS

Sunday = 1  
Monday = 2  
Tuesday = 3  
Wednesday = 4  
Thursday = 5  
Friday = 6  
Saturday = 0

## Solution of Cross Word Puzzle

♥	♥	C	I	M	O	T	24 A	♥	♥
R	N	♥	E	U	A	23 L	♥	D	22 C
C	R	A	21 B	E	M	O	N	E	20 G
19 V	18 E	E	S	R	E	17 V	I	N	16 U
♥	15 C	I	S	E	D	O	E	14 G	♥
♥	N	O	H	13 P	12 E	H	T	11 E	♥
L	10 A	M	U	I	D	O	S	9 G	D
O	N	I	R	T	U	E	8 N	C	7 C
6 S	5 D	Z	T	4 I	N	B	I	3 E	2 L
♥	♥	L	E	F	F	I	1 E	♥	♥