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The Wonders and Curiosities of the Number 9

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Abstract- Numbers are a world full of secrets and wonders that help explain many phenomena and enter the world of games to act as an engine for the human mind and a catalyst for the study of these numbers. For the numbers associated with the number 9, and help us build the number system so that it is divisible by the number 9, in addition to what is related to the result and its properties.

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The Wonders and Curiosities of the Number 9

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I. INTRODUCTION

The world in which we live is unequal, with all its developments. Numbers played a major role in that, as they contributed to organization, discovery, invention, led the framework of technology, and achieved the pillars of the economy.

The numbers 1 to 9 are very important to the semantics of words, things, and businesses,^[1] and these numbers vary in their meaning, contributions, and usage, so whether we see them in our number charts or wonder why they keep popping up in our lives,^[2] it's important to know what they mean so that we can understand some of what these numbers are all about. of wonders.

This number is a human number at its core, and it requires a lot of research and more^[3] effort from us to find out what it hides in terms of energy and strength, and it provides us with mathematical operations that we deal with as a new tributary to game theory and its multiple applications.

II. PREE THEORY

Any number^[4] whose sum of its digits is equal to a natural number. If the number representing the sum of the digits of that number is subtracted from it, the result becomes divisible by 9, this theory is expressed in the following way:

if a is natural number, and the sum of its digits equal q, then $(a - q) \sum a = q, a - q$, divisible by 9.

Number(a)	sum of number of the digit number $\sum a=q$	$a - q$	$(a - q) \div 9$
678945	39	$678945 - 39 = 678906$	$678906 \div 9 = 75434$
45870234	33	$45870234 - 33 = 45870201$	$45870231 \div 9 = 509689$
98000111	20	$98000111 - 20 = 98000091$	$98000091 \div 9 = 1088899$
76	13	$76 - 13 = 63$	$63 \div 9 = 7$
3241	10	$3241 - 10 = 3231$	$3231 \div 9 = 359$
539	17	$539 - 17 = 522$	$522 \div 9 = 58$

From this theory, the following two branches can be reached:

Lemma 1: If any number consisting of two digits is divided after subtracting the sum of its digits by the number 9, the result of the division operation is the number in the ones place of the original number.

The application of the lemma (1) is shown in the following table (2)

Number(a)	sum of number of the digit number $\sum a=q$	$a - q$	$(a - q) \div 9$
32	5	27	$27 \div 9 = 3$
67	13	54	$54 \div 9 = 6$
98	17	81	$81 \div 9 = 9$
05	5	0	$0 \div 9 = 0$
12	3	9	$9 \div 9 = 1$

Lemma 2: If any number consisting of three digits is divided so that the tens digit is 0 and after subtracting the sum of its digits to the number 9, the result of the division process is the number in the ones place repeated.

The application of the lemma 2 is shown in the following table (3)

Number(a)	sum of number of the digit number $\sum a=q$	$a - q$	$(a - q) \div 9$
302	5	297	$297 \div 9 = 33$
609	15	594	$594 \div 9 = 66$
908	17	891	$891 \div 9 = 99$
405	9	396	$396 \div 9 = 44$
102	3	99	$99 \div 9 = 11$
801	9	792	$792 \div 9 = 88$

The two lemmas presented in this article contributes extensively to

1. Determine the divisibility of a number by 9
2. The theory is used in the applications of game theory
3. Create numbers that are divisible by 9

Notes

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