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# ARITHMETICAL UNDERSTANDING FOR THE CONCEPT OF DIVISIBILITY OF NUMBER SEVEN

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*ABSTRACT*

*The authors establish presumably a new result on arithmetical understanding for the concept of divisibility of number seven.*

***2010 Mathematics Subject Classification:*** *11A05, 11A51.*

***Key Words and Phrases:*** *Integer division, divisibility rules.*

## INTRODUCTION

The divisibility rules for numbers through modular arithmetic procedure are well known and studied by several researchers. The purpose of this article to introduce presumably a new concept of arithmetical understanding for the concept of divisibility of number seven.When we compute numerical value for any number, then we find following results- One, if the value for a number is divisible by 7, then number itself also divisible by 7; Two, if the value for a number is NOT divisible by 7, then the number also NOT divisible by 7.

## METHODOLOGY FOR COMPUTATION OF NUMERICAL VALUE OF NUMBERS

For any given number we compute its value as
[1]. ($1^{st}$ digit) × 1 + ($10^{th}$ digit)×3+ ($100^{th}$ digit) ×2+ ($1000^{th}$ digit) ×6 + ($10\,000^{th}$ digit) ×4 + ($100\,000^{th}$ digit) ×5.

[II]. Further, when we proceed again same pattern is repeated for other / more digits of numbers as given in the following table:

| Place of digit | $10^0$ | $10^1$ | $10^2$ | $10^3$ | $10^4$ | $10^5$ | $10^6$ | $10^7$ | $10^8$ | $10^9$ | $10^{10}$ | $10^{11}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Multiplied by | 1 | 3 | 2 | 6 | 4 | 5 | 1 | 3 | 2 | 6 | 4 | 5 |
| Place of digit | $10^{12}$ | $10^{13}$ | $10^{14}$ | $10^{15}$ | $10^{16}$ | $10^{17}$ | For other numbers…………………… | | | | | |
| Multiplied by | 1 | 3 | 2 | 6 | 4 | 5 | Repeated same pattern………………… | | | | | |

## INTERPRETATION OF RULE BY NUMERICAL EXAMPLES

**Example 1:** Number 623.

If we divide it by 7, we get 623 / 7 = 89, i.e. divisible by 7.

Now we can compute its vale by above table as
3×1+2×3+6×2= 3+6+12 = 21, which is also divisible by 7.

**Example 2:** Number 237.

If we divide it by 7, we get 237 / 7 = NOT divisible by 7.

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Now we can compute its vale by above table as
7×1+3×3+2×2= 7+9+4 = 20, which is also NOT divisible by 7.

**Example 3:** Number 237865293.

If we divide it by 7, we get 237865293 / 7 = NOT divisible by 7.

Now we can compute its vale by above table as
3×1+9×3+2×2+5×6+6×4+8×5+7×1+3×3+2×2 = 3+27+4+30+24+40+7+9+4= 148,
which is also NOT divisible by 7.

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