International Journal of Mathematics Research.
ISSN 0976-5840 Volume 11, Number 1 (2019), pp. 15-18

http://www.irphouse.com

Relating the English Language to Negative Numbers within the Hindu-Arabic Numeral System

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Abstract

This current research effort represents a significant extension to an earlier research paper titled "A Mathematical Relationship between the Hindu-Arabic Numeral System and the English Language", which was published in 2018 in the *International Journal of Mathematics Research*. Essentially, the current research effort will take the research from the earlier project and explore it in an opposite direction. The earlier research paper studied one perceived mathematical relationship between the English language used in the United States and the Hindu-Arabic Numeral System. The earlier examination looked at two identified factors to determine if they are in correspondence and the nature of the relationship. The two factors were the number of syllables necessary to enunciate each cardinal number in American English and the Hindu-Arabic number itself. The analysis examined in detail the denoted relationship in lower-valued sets of numbers from one through 100 and randomly selected higher valued sets of ten-digit numbers in the thousands and millions. The outcome identified the algorithm that tied the two factors together. The purpose of the research was to examine one aspect of the mathematical architecture upon which the American English system is structured.

The current research effort analyzes such a relationship looking in the opposite direction from the earlier research paper. In this case, the analysis considers negative numbers from zero and below. In other words, it considers numbers such as zero, minus one, minus two, etc.

Keywords: English language, Hindu-Arabic Numerals, Arabic numerals,

numerals, European digits, Mathematics-English relationship, mathematical architecture

INTRODUCTION

As indicated in the first research paper on this topic, it was shown that there was an unusual but consistent relationship between the English language used in the United States and the Hindu- Arabic Numeral System, also known as Arabic numerals, or European digits (in Unicode). [1] The Arabic numeral system is a decimal system using the following cardinal digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9. [2]

Proposition

1. Start with any number that follows a number with a nine as the last digit.
2. Count the number of cumulative syllables used to describe the numeral words in the following set of ten numbers.
3. The cumulative total number of syllables necessary to enunciate each number in sequence used in any set of ten digits that ends with a nine as the last digit will be evenly divisible by ten.

For example, when counting the numbers zero through minus nine (***N.B.*** The number preceding the syllable name refers to the number of cumulative syllables necessary to reach that number. The second entry is the syllable name when reaching that cumulative count.)

1. Ze- 2. ro 3. Mi- 4. nus 5. One 6. Mi- 7. nus 8. Two 9. Mi- 10. nus 11. Three 12. Mi- 13. nus !4. Four 15. Mi- 16. nus 17. Five 18. Mi- 19. nus 20. Six 21. Mi- 22. nus 23. Se- 24. ven 25. Mi- 26. nus 27. Eight 28. Mi- 29. nus 30. Nine

As shown, there are thirty syllables used in counting from zero down to minus nine (which is evenly divisible by ten).

Continue with this pattern in counting from the number minus ten (the next number following our last number containing a minus nine as the last digit) to minus nineteen.

31. Mi- 32. nus 33. Ten 34. Mi- 35. nus 36. E- 37. le- 38. ven 39. Mi- 40. nus 41. Twelve 42. Mi- 43. nus 44. Thir- 45. teen 46. Mi- 47. nus 48. Four- 49. teen 50. Mi- 51. nus 52. Fif- 53. teen 54. Mi- 55. nus 56. Six- 57. teen 58. Mi- 59. nus 60. Se- 61. ven- 62. teen 63. Mi- 64. nus 65. Eigh- 66. teen 67. Mi- 68. nus 69. Nine- 70. teen

It takes a cumulative total of seventy syllables to state the numbers from zero to minus nineteen (thirty syllables to reach the number minus nine and an additional forty syllables to reach the number minus nineteen). Each grouping of cumulative syllables is evenly divisible by ten.

The following set of ten numbers further validates the proposition:

Minus 20s

71. Mi- 72. nus 73. Twen- 74. ty 75. Mi- 76. nus 77. Twen- 78. ty- 79. one 80. Mi- 81. nus 82. Twen- 83. ty- 84. two 85. Mi- 86. nus 87. Twen- 88. ty- 89. three 90. Mi- 91. nus 92. Twen- 93. ty- 94. four 95. Mi- 96. nus 97. Twen- 98. ty- 99. five 100. Mi- 101. nus 102. Twen- 103. ty- 104. six 105. Mi- 106. Nus 107. Twen- 108.ty 109. Se- 110. ven 111. Mi- 112. nus 113. Twen- 114. ty- 115. eight 116. Mi- 117. nus 118. Twen- 119. ty- 120. nine

As with the other examples, the total number of syllables in counting from zero through twenty-nine is evenly divisible by ten.

Continuing the calculation forward to further sets of ten negative numbers brings the same result. For example, there are a total number of 30 cumulative syllables required to enunciate the numbers in the ten-number sequence ending in minus nine, 40 syllables to articulate the ten cardinal numbers in the sequence from minus 10 to minus 19, and 50 syllables in the sequence from minus 20 to minus 29. As with all previous examples above, the total number of cumulative syllables necessary to enunciate each number in sequence in a set of ten numbers, which end with a nine as the last digit, is evenly divisible by ten. It is interesting to note that the number of syllables necessary to say the numbers increases by ten for each increment of larger ten consecutive negative numbers

The results are the same if much larger sets of negative cardinal numbers are used.

As consistently demonstrated in the above examples, whether or not using smaller-valued or larger-valued sequences, the total number of cumulative syllables necessary to complete any sequence of ten numbers in which the final number has a last digit of 9 is evenly divisible by ten.

The proposition proffered above has now been shown by multiple examples to be correct. To repeat this proposition:

1. Start with any negative number that follows a number with a nine as the last digit.
2. Count the number of cumulative syllables used to describe the numeral words in the following set of ten negative numbers.
3. The cumulative total number of syllables necessary to enunciate each number in sequence used in any set of ten digits that ends with a nine as the last digit will be evenly divisible by ten.

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