Vinculum Numbers

"Vinculum is the name given to the minus sign when it is put on the top of a number".
For example, minus 2 in Vinculum form is $\bar{2}$.this is also known as "bar 2".

What is a Vinculum Number?
A Vinculum Number is simply a number which is composed of at least one negative digit (or bar digit).

Vinculum Process

For a given number, the Vinculum number is obtained by converting all the digits in that number which a 5 or greater than 5 to digits which are 5 or less than 5, without changing the actual value of the original number.
This process also requires the use of complements of 10 or 9.

Advantages of using Vinculum Numbers

- **flexibility**.....the Vinculum can be used when and where it suits
- **ease of mathematical calculations**.....large digits like 6, 7, 8 and 9 are avoided
- **cancellation**.....figures tend to cancel each other out
- **frequency**.....0 and 1 (on the whole) occur twice as frequently as they would otherwise occur

Number Conversions

In the following methods we will be converting numbers proceeding from digit to digit, going from **RIGHT** to **LEFT**

Conversion of common number into a Vinculum Number

Step1: Moving from right to left find the first digit. If this digit is <= 5 write it down unchanged directly underneath and move left to the next digit.

Keep applying Step1 until a digit > 5 is reached then apply **Step2**

Step2: For the digit > 5 (i.e. 6, 7, 8, 9) take it's 10's complement. **Write a bar over the complement** and move left to the next digit.
(a) If the next digit is >= 5 takes its 9's complement this time. **Write a bar over the complement** and move left to the next digit. Continually repeat Step2(a) until a digit < 5 is reached then apply **Step3**

Step3: Increment the digit which is < 5 by 1.

**Repeat Steps1, 2 and 3 until the number is completely processed.

Conversion of a Vinculum Number to a common number

Step1: Moving from right to left find the first digit. If this digit is a non-bar digit write it down directly underneath and move left to the next digit.
However, if this digit is a bar digit move to **Step2**:

Step2: Take the 10's complement of the digit and write the complement down directly underneath and move left to the next digit.
If next digit is again a bar digit then take it's 9's complement and write that complement down directly underneath and move left to the next digit. Keep taking 9's complement of bar digits until a non-bar digit is encountered then apply Step3:

Step3: Decrement the non-bar digit by 1

**Repeat Steps1, 2 and 3 until the number is completely processed.

****Special conversion****
when first digit of a number is negative (bar digit) and we want to convert that number to a normal common number.

In this case we need to convert all of the digits in the number to bar digits

So, the procedure is as follows: (working from right to left as usual)

Step1: Take the 10's complement of the non bar digit and put a bar over it
Step2: Increment the digit to the immediate left by one BUT
if the result is a positive digit apply Step1 to this digit.

Repeat until all the digits in the number are bar digits.

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