Before Pythagoras: The Culture of Old Babylonian Mathematics

Numbers on Clay

T A B L E T S

Clay tablets were the principal writing medium in Mesopotamia. Tablets were often shaped as rectangles of the same size in this exhibition, that they were extended in thin strips, usually called “hand tablets” and for practical writing and calculation. These tablets were both hand like shape. One face (the lower side) was normally used; the other (the reverse) slightly curved. Each face might be divided into columns. A tablet was usually divided vertically, with the bottom of the obverse serving as the top of the obverse. Old Babylonian tablets were written from left to right, but in a tablet with multiple columns, the first column of the obverse was sometimes at the far right.

C U N E I F O R M W R I T I N G  A N D  N U M E R A L S

The writing instrument was a stylus, normally a reed stalk with a bent end; the angle at which the stylus was pressed in the desired form and deposited dot shaped impressions that gave the style of writing its name, cuneiform (from the Latin for “wedge shaped”). The systems of cuneiform writing that served on the late 19th and third millennium for Sumerian and Akkadian, the two languages of Mesopotamia, were extremely complex, with hundreds of distinct signs. The basic signs for numbers, however, were extremely simple: They were made by repeating two signs, “meaning 1, and meaning 10 as many times as needed to make up the desired number.

In writing numbers above 10, the sign for the ten was placed to the left of the sign for the units, for example, 47 is written as

A P L A C E - V A L U E  S Y S T E M

Near the end of the third millennium, several developed a way of writing numbers that was very convenient for calculations. Multiplication and division were particularly cumbersome when working with sexagesimal tables, which had hundreds of distinct signs. Since the sexagesimal system was base 60, the system could be divided into two groups, each with 30 distinct signs. The sexagesimal system was thus written in the obverse and the reverse face might be divided into columns. A tablet was usually flipped vertically, with the bottom of the obverse serving as the top of the obverse. Old Babylonian tablets were written from left to right, but in a tablet with multiple columns, the first column of the obverse was sometimes at the far right.

Any quantity could be broken up into a series of such parts, written from left to right in descending order of size. For example, 234 could be broken up into 180, 30, 15 and written as 234. When we translate this kind of numeral, we write commas between the parts for clarity—“3,34,15” in this example. A problem such as 60.3174 = 3 1/8 + 1/13 + 1/192 + 1/186624. When we translate this kind of numeral, we write commas between the parts for clarity—“3,34,15” in this example. A problem such as 60.3174 = 3 1/8 + 1/13 + 1/192 + 1/186624.

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Approximate reciprocal of 63 should be 57,8,34.

The left-hand column lists whole numbers from 56 through 71.

The reciprocal of 4,26,40 (i.e., 2/27) is actually 13,30 (i.e., 27/2).

The column headed square width is effectively the well-known 3-4-5 right triangle.

The approximate decimal equivalent of 1,24,51,10 is 7.3451176.

The approximate decimal equivalent of 1,34,56,78 is 9.2345714.

The approximate decimal equivalent of 1,42,31,78 is 10.2431786.

The approximate decimal equivalent of 1,50,31,78 is 11.2531786.

The approximate decimal equivalent of 1,58,31,78 is 12.2631786.

The area equals 1 eše (i.e., 10,000). I multiplied the number I multiplied by the length exceeds by 1 the number I multiplied by the width, plus the number I multiplied by the length,

The approximate decimal equivalent of 1,66,31,78 is 13.2731786.

The approximate decimal equivalent of 1,74,31,78 is 14.2831786.

The approximate decimal equivalent of 1,82,31,78 is 15.2931786.