

## Appendix 11

# Iñupiatun Kisitchiñiq

## The Iñupiaq Counting System

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The Iñupiat have traditionally used a base-20-sub-base-5 counting system, technically known as a “penta-vigesimal system.” This indicates that counting is based on groups of five “units,” which are, in turn, combined into larger groups composed of four “sets of five.” In short, this means that the overarching structure of the system is based on “scores” (or “twenties”). As Iñupiaq numbers become progressively greater, the regroupings by fives and by fours alternate. This characteristic produces a two-dimensional system with a number grid instead of a one-dimensional number line.

The decimal system is handy because the fingers can be used as counters. The Iñupiaq base-20 system clearly extends this notion to the toes as well. The Iñupiat counted on one limb at a time, so there were four groups of five, hence the sub-base-5 and the two-dimensional system. The human body may be considered the living model of the earliest abacus or counting board. Even the prototype of the Babylonian base-60 counting system used points on the body to keep track of numbers. The majority of human counting systems are body-based. Some of the Iñupiaq number words clearly reflect their corporal origins. **Tallimat**, the word for five, for example, is related to the Iñupiaq word **talik**, meaning “arm.” The word for ten, **qulit**, means something like “top,” suggesting that it refers to both of the arms on the top half of the body. The word for eleven in most Inuit-speaking communities, including some Iñupiaq-speaking communities, means “it goes down,” an indication that one is now counting on the toes. Further evidence is found in the word **akimiaq**, Iñupiaq for fifteen, which means something like “it goes across,” implying that counting will now cross over and continue on the other foot.

The connection to the human body is most apparent in the Inuit words used for twenty. Throughout the entire Inuit-speaking world, there is a clear human association. Most Inuit dialects use the same word for “person” as for “twenty.” The Iñupiaq word for twenty, **iñuiññaq**, is a word denoting a “complete person.” Inuktitut dialects spoken in Eastern Canada use the word **avatit**, signifying “all the extremities” of the body. Some have proposed that even the Iñupiaq word **atausiq** for “one” is probably also derived from a reference to the human body. **Atausiq** (or some close cognate variation, such as **atauceq**) is used almost universally where an Inuit dialect is spoken.

One special feature of the Iñupiaq counting system

is the postbase **-ğutailaq**, which anticipates any number (except **tallimat**) and regroups a preceding place value. This postbase suggests that a number is one less than the word stem to which it is attached.

Counting (and numbers) play differing roles, depending on the culture. How extensive the counting system must be is determined by what is counted as well as by how important it is to quantify certain objects. In some cultures, there may be no real need to count higher than fifty or a hundred. In other cultures, it is important to account for very large quantities of some things, so the number system will extend to higher numbers. Until relatively recently, there was rarely a need for Iñupiat to count much above 400. However, when reindeer herding was introduced, the herders sometimes needed much higher numbers to account for each reindeer in a large herd. More recently still, youth in the village of Kaktovik developed an elegant notation system to represent their numbers in written form. Almost immediately, people recognized that the numerals had several advantages over the Arabic numerals when carrying out arithmetic operations. Consequently, the Iñupiaq counting system began to be used in schools for teaching math—with dramatic results. Both reindeer herding and the school math setting introduced new cultural demands, requiring extension of the traditional counting system.

Counting has played many roles in traditional Iñupiaq culture. One of the major roles has been managing a family’s yearly requirements for food, clothing, and fuel. The Arctic is very unforgiving and is among the harshest environments on earth. Until recently, with the growth of the cash economy introduced after contact with Western culture, Native families could not survive unless they could manage their resources with foresight and prudence. Accurate counting could be a matter of life or death. It served to ensure that stores of fish, meat, and animal fat or oil were sufficient to sustain the entire family through a long winter.

The number of fish a family held in storage would often be much higher than 400, but it was not necessary to count fish individually. It was the mass, not the number, of fish that was important to a family’s survival. A fish rack could hold many more small fish than large fish. Therefore, the fish rack often served as the unit of measure for fish. Larger animals, on the other hand, were counted individually. Skins and pelts that could be used for making clothing, boats, or even shelter were bundled together; the skins of larger

animals were bundled in groups of five, and those from smaller animals were fastened together in bundles of twenty. The wife and mother in any Eskimo household knew how many bundles were required for a particular purpose, such as sewing a parka.

Counting was also essential in traditional barter and trade. Arctic peoples from as far away as Siberia regularly attended the annual trade fairs held until early in the twentieth century. There they could trade their own local goods for useful and necessary articles from other regions in order to supplement the products of their own labor, hunting, and gathering.

As mentioned above, the Iñupiaq counting system is a two-dimensional system. By contrast, the decimal system is linear, based only on powers of ten. Ten units (or ones) become 10; ten tens make 100; ten hundreds are 1,000; ten thousands give us 10,000, etc. In the Iñupiaq counting system, five ones (or \ s) are 5 (↖), four fives render 20 (\ ↖), five score (twenties) becomes 100 (↖ ↖), four hundreds yield 400 (\ ↖ ↖), five four-hundreds produce 2,000 (↖ ↖ ↖), and four two-thousands are 8,000 (\ ↖ ↖ ↖). Table 1 shows the Kaktovik Iñupiaq numerals used for notation of Iñupiaq numbers.

When naming larger numbers in Iñupiaq, as in most languages, one begins by stating the term that expresses the largest place value. Next, one states the term for the

second-largest place value, continuing until the lowest place value is reached and spoken. The speaker simply skips places that are empty of value (i.e., have a zero value). In Iñupiaq, when no places are empty, the speaker will alternate between place values that are five times the next lowest place value and those that are four times the next lowest place value. The system is a base-20 system precisely because the place values alternate between factors of five and of four times the preceding place value; five times four is twenty. This produces a two-dimensional system. Horizontally the oral system is theoretically infinite, but vertically spoken numbers are limited to two places: the basic place-value units and five times the basic place-value units.

Table 1. Kaktovik Iñupiaq numerals.

|   |   |   |   |   |
|---|---|---|---|---|
| ↖ | \ | ↖ | ↖ | ↖ |
| ↖ | ↖ | ↖ | ↖ | ↖ |
| ↖ | ↖ | ↖ | ↖ | ↖ |
| ↖ | ↖ | ↖ | ↖ | ↖ |

(Twenty is written as \ ↖ )

Table 2. Place values in Arabic and Kaktovik numerals.

|                         |                     |                 |                |                  |                       |
|-------------------------|---------------------|-----------------|----------------|------------------|-----------------------|
| 1,000,000<br>↖, ↖ ↖ ↖   | 50,000<br>↖, ↖ ↖ ↖  | 2,500<br>↖ ↖ ↖  | 125<br>↖ ↖     | 6.25<br>↖. ↖     | .3125<br>. ↖ ↖ ↖      |
| 200,000<br>↖, ↖ ↖ ↖     | 10,000<br>↖, ↖ ↖ ↖  | 500<br>↖ ↖ ↖    | 25<br>↖ ↖      | 1.25<br>↖. ↖     | .0625<br>. ↖ ↖ ↖      |
| 40,000<br>A<br>↖, ↖ ↖ ↖ | 2,000<br>C<br>↖ ↖ ↖ | 100<br>E<br>↖ ↖ | 5<br>G<br>↖ ↖  | .25<br>I<br>↖. ↖ | .0125<br>K<br>. ↖ ↖ ↖ |
| 8,000<br>B<br>↖, ↖ ↖ ↖  | 400<br>D<br>↖ ↖ ↖   | 20<br>F<br>↖ ↖  | 1<br>H<br>↖ ↖  | .05<br>J<br>↖. ↖ | .0025<br>L<br>. ↖ ↖ ↖ |
| 1,600<br>↖ ↖ ↖          | 80<br>↖ ↖           | 4<br>↖          | .2<br>. ↖      | .01<br>. ↖ ↖     | .0005<br>. ↖ ↖ ↖      |
| 320<br>↖ ↖ ↖            | 16<br>↖ ↖           | .8<br>. ↖ ↖     | .04<br>. ↖ ↖ ↖ | .002<br>. ↖ ↖ ↖  | .0001<br>. ↖ ↖ ↖ ↖    |

However, the traditional oral system can easily be expanded beyond the two spoken vertical place values. For specific purposes, some Inuit communities expand the simple base-5 system higher. One example is the special base-5 counting system used in Greenland for counting and binding birds together. When hunting from a kayak, the hunter uses the weight of the birds to maintain stability and balance the load. However, all the places in the oral system can, in theory, be extended infinitely higher and lower. The base-5 axis can be extended one or more places higher or lower in order to make calculation simpler when using the penta-vigesimal system to solve math problems. Table 2 shows the place values in both Arabic and Kaktovik numerals of the various places when the spoken system is expanded vertically. The band of value places shown in gray indicates places used in the spoken counting system. The capitalized letters, shown in the center, indicate the spoken order of the corresponding oral number words, beginning with “A.”

Note that when moving up or down in Table 2, the place values increase or decrease by a factor of five. When moving left or right, the place values increase or decrease by a factor of twenty. When moving diagonally down and left or up and right, the place values increase or decrease by a factor of four. When moving diagonally up and left or down and right, the place values increase or decrease by a factor of one hundred. Also notice the Kaktovik numeral in each horizontal row is a numeral, or a pair of them, which remains constant across the row, only changing the place value where those numerals occur, as they increase or decrease by a factor of twenty. The vertical double line separates whole numbers from vigesimal fractions.

The oral Iñupiaq counting system uses **tallimat**, with or without a postbase (e.g., **tallimat**, **tallimakipiaq**, **tallimagliaq**, etc.), to indicate value five times that of the next-lower place value. For example, the value is 5 when the next lower place value is 1; it is 100 when the lower place value is 20; and 2,000 when the lower place value is 400, etc. The oral system uses **qulit**, **qulikipiaq**, **quliagliaq**, etc. to show value *twice* five times (or ten times) the value of the next lower place value; it is, for example, 10 when the lower place value is 1; 200 when the lower place value is 20; 4,000 when the lower place value is 400, etc. In the same way, it uses **akimiaq**, with or without a postbase (e.g., **akimiaq**, **akimiakipiaq**, **akimiagliaq**, etc.) to indicate value *thrice* five times (or fifteen times) the value of the basic unit value of the next lower place. For example, it is 15 when the lower place value is 1; 300 when the lower place value is 20; 6,000 when the lower place value is 400, etc. By contrast, **malġuk**, **piņasut**, and **sisamat** are used in the lower sector, or place, with or without a postbase, to indicate respectively a value two, three, or four times the value of the basic value unit in that lower sector, or place.

In order to represent this oral system simply with symbols, every Kaktovik numeral contains information about two places: a lower place value and an upper place value (whose value is five times the value of the lower place). In both sectors, a single straight stroke is used to represent one unit of value; two strokes represent two units of value; three strokes represent three units of value. This means that mathematically both  $\backslash$  and  $\swarrow$  represent one value unit; both  $\vee$  and  $\searrow$  represent two value units; both  $\nabla$  and  $\lessgtr$  represent three value units. The difference is that the stroke pattern used in the lower sector is rotated ninety degrees to the left and elevated when written to show the value in the upper sector, or place.

The elevation shows that the stroke pattern occupies a different place and has a higher place value. The rotation and elevation together remind us that the rotated form has a value five times greater than in the place below. They also remind us that **qulit** and **akimiaq** are the appropriate oral stems, rather than **malġuk** and **piņasut**. When both sectors (or places) of one Kaktovik numeral contain strokes indicating value, the upper and lower strokes are graphically connected. If there are no strokes in one of the places (or sectors), that sector without any strokes is deemed empty (as though it contained a zero). **Suitchuq**, the equivalent of zero, is only needed when there is absence of value in both the upper and lower sectors. **Suitchuq** is a dual place holder, normally signifying that both the lower sector, or place, it occupies and the upper sector, or place, are empty.

Table 3 shows the place values for a large whole number written with Arabic numerals and occupying five places in the decimal system. It also shows the equivalent of the same number using only four Kaktovik numerals yet occupying eight places. The table also indicates (in parentheses) how that place value is determined as a multiple of the place value of the preceding place in the system. Note the linear nature of the decimal system, which has only one base in contrast to the penta-vigesimal system, which has both a base and sub-base, and places are arranged both vertically and horizontally.

When written with the Kaktovik Iñupiaq numerals, the equivalent of the number 97,531, for example, occupies eight places in the Iñupiaq place-value system, whereas it occupies only five places in the decimal system (see Table 4). Nevertheless, only four numerals are required to express 97,531 in Kaktovik numerals:  $\swarrow$ ,  $\nabla$ ,  $\searrow$ ,  $\swarrow$ . Fewer numerals are needed because each Kaktovik numeral expresses quantities for two places in the Iñupiaq place-value system, as shown in Table 4 below. Notice the column of Kaktovik numerals highlighted in gray; also notice how those Kaktovik numerals, shown in the third column, are composed of the two stroke patterns in the fourth column. (Forms in parentheses are non-rotated forms.)

Table 3. Place values for a large whole number.

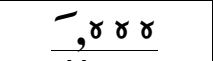
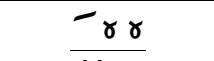
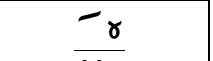
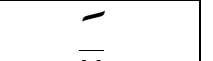
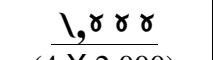
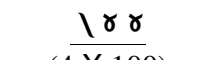
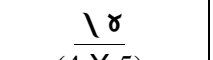
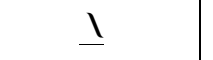
| Arabic Numeral Place Value              |                                                                                                                                                           |   |                                                                                                                                                     |                                                                                                                                            |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Decimal<br>Place Values                 | <b>1,000</b><br>thousands<br>[10 <sup>3</sup> ]                                                                                                           | , | <b>100</b><br>hundreds<br>[10 <sup>2</sup> ]                                                                                                        |                                                                                                                                            |
|                                         |                                                                                                                                                           |   | <b>10</b><br>tens<br>[10 <sup>1</sup> ]                                                                                                             | <b>1</b><br>ones<br>[10 <sup>0</sup> ]                                                                                                     |
| Kaktovik Numeral Place Value            |                                                                                                                                                           |   |                                                                                                                                                     |                                                                                                                                            |
| Iñupiaq<br>Upper-sector<br>Place Values | <br>(5 X 8,000)<br><b>forty-thousands</b><br>40,000                      |   | <br>(5 X 400)<br><b>two-thousands</b><br>2,000                     | <br>(5 X 20)<br><b>hundreds</b><br>100                   |
|                                         |                                                                                                                                                           |   |                                                                                                                                                     | <br>(5 X 1)<br><b>fives</b><br>5                        |
| Iñupiaq<br>Lower-sector<br>Place Values | <br>(4 X 2,000)<br><b>eight-thousands</b><br>8,000<br>[20 <sup>3</sup> ] | , | <br>(4 X 100)<br><b>four-hundreds</b><br>400<br>[20 <sup>2</sup> ] | <br>(4 X 5)<br><b>scores</b><br>20<br>[20 <sup>1</sup> ] |
|                                         |                                                                                                                                                           |   |                                                                                                                                                     | <br><b>ones</b><br>1<br>[20 <sup>0</sup> ]              |

Table 4. The Decimal System and the Iñupiaq System.

| 97,531 in the Decimal System |               | ᐅᐅ,ᐅᐅᐅᐅ = 97,531 in the Iñupiaq System                                              |       |   |                 |
|------------------------------|---------------|-------------------------------------------------------------------------------------|-------|---|-----------------|
|                              |               |  | > (ᐅ) | 2 | forty-thousands |
|                              |               |                                                                                     | ᐅ     | 2 | eight-thousands |
|                              |               | ᐅ                                                                                   | (ᐅ)   | 0 | two-thousands   |
| 9                            | ten-thousands |                                                                                     | ᐅ     | 3 | four-hundreds   |
| 7                            | thousands     |  | ᐅ (ᐅ) | 3 | hundreds        |
| 5                            | hundreds      |                                                                                     | ᐅ     | 1 | score           |
| 3                            | tens          |  | > (ᐅ) | 2 | fives           |
| 1                            | ones          |                                                                                     | ᐅ     | 1 | ones            |

The second and the last columns in Table 4 indicate the place values of each place in the respective systems. The first and fifth columns specify, in Arabic numerals, how many multiples of each place value there are. The fourth column gives the stroke pattern of the forms used in a Kaktovik numeral to indicate the same value that is shown in the fifth column. When the form of the basic stroke pattern has been rotated and elevated, the non-rotated form is given in parentheses so that its relationship to the Arabic numerals of the fifth column is clearer. Finally, in the third column, the

reader sees the complete Kaktovik numeral that is composed from two elements in the fourth column.

Since contact with the West began, Inuit-speaking communities have experienced strong interference and pressure from the English, French, Russian, and Danish counting systems. For the typical person who knows the decimal system better than the local Inuit penta-vigesimal system, confusion tends to set in as the numbers get higher. The confusion arises from the fact that in English the word “forty” is related to the word “four,” whereas, for example,

the Iñupiaq word equivalent to eighty is derived from the Iñupiaq word for four. As Inuit began to be educated in the decimal system, they easily equated or confused their word for eighty with the English word for forty, unless they were very familiar with their traditional system. Also, the English word “thirty” is related to the words “third” and “three,” whereas in Iñupiaq, as in other Inuit dialects, the word equivalent to sixty is derived from the Iñupiaq word for three. Therefore, educated Inuit also confused their word for sixty with the decimal number “thirty.” This has resulted in a tendency, during the post-contact period, for numbers thirty and above to fall into disuse. In some communities, the traditional Inuit sub-base-5 structure has even mutated into a sub-base-10 system, thus making the local traditional counting system more compatible with the decimal system. This tendency has been particularly marked in Eastern Canada. However, this change obscures some of the genius and simplified calculation benefits of the traditional Inuit system.

The table on the following pages is intended to help Iñupiaq learners and speakers become more familiar with the Iñupiaq counting system. In each column of the table,

the Kaktovik numeral, the Iñupiaq number name, and the decimal equivalent are given, in that order. The table is divided into groups of five to visually distinguish each group of five. The Iñupiaq for every whole number up to the equivalent of 400 is given, as well as the equivalent of zero. After 400, larger Iñupiaq number words for multiples of 400, 8,000, 160,000, and 3,200,000 are shown, from which the reader can extrapolate the remaining Iñupiaq numbers and Kaktovik numeral counterparts almost up to 2,048,000,000,000,000. Compare the Kaktovik numerals to the Iñupiaq number words. Notice how, for each Kaktovik numeral, both place values are generally read separately. Exceptions such as **itchaksrat** exist, not unlike “eleven” in the English system. Also pay attention to numbers ending in **-ġutailaq**, just above lines separating the cycles or groups of five. These numbers cause some difficulty to those unfamiliar with the Iñupiaq counting system. Although this feature may seem a nuisance at first, it is, nevertheless, an excellent linguistic aid for students learning to do complex computation quickly on a penta-vigesimal Iñupiaq abacus or counting board.

**Iñupiaq Counting System**  
**with Kaktovik Numerals (first column) and Arabic Numeral Equivalents (third column)**

|    |                      |    |     |                           |    |     |                              |    |
|----|----------------------|----|-----|---------------------------|----|-----|------------------------------|----|
| ⌚  | suitchuq (*see note) | 0  | ⌚   | iñuiññaq                  | 20 | √⌚  | malḡukipiaq                  | 40 |
| ⌚  | atausiq              | 1  | ⌚⌚  | iñuiññaq atausiq          | 21 | √⌚  | malḡukipiaq atausiq          | 41 |
| √  | malḡuk               | 2  | ⌚√  | iñuiññaq malḡuk           | 22 | √√  | malḡukipiaq malḡuk           | 42 |
| ⌚  | piḡasut              | 3  | ⌚⌚  | iñuiññaq piḡasut          | 23 | √⌚  | malḡukipiaq piḡasut          | 43 |
| W  | sisamat              | 4  | ⌚W  | iñuiññaq sisamat          | 24 | √W  | malḡukipiaq sisamat          | 44 |
| ┐  | tallimat             | 5  | ⌚┐  | iñuiññaq tallimat         | 25 | √┐  | malḡukipiaq tallimat         | 45 |
| ┐  | itchaksrat           | 6  | ⌚┐  | iñuiññaq itchaksrat       | 26 | √┐  | malḡukipiaq itchaksrat       | 46 |
| √┐ | tallimat malḡuk      | 7  | ⌚√┐ | iñuiññaq tallimat malḡuk  | 27 | √√┐ | malḡukipiaq tallimat malḡuk  | 47 |
| √⌚ | tallimat piḡasut     | 8  | ⌚√⌚ | iñuiññaq tallimat piḡasut | 28 | √√⌚ | malḡukipiaq tallimat piḡasut | 48 |
| √W | qulinḡuḡutailaq      | 9  | ⌚√W | iñuiññaq qulinḡuḡutailaq  | 29 | √√W | malḡukipiaq qulinḡuḡutailaq  | 49 |
| √  | qulit                | 10 | ⌚√  | iñuiññaq qulit            | 30 | √√  | malḡukipiaq qulit            | 50 |
| √┐ | qulit atausiq        | 11 | ⌚√┐ | iñuiññaq qulit atausiq    | 31 | √√┐ | malḡukipiaq qulit atausiq    | 51 |
| √┐ | qulit malḡuk         | 12 | ⌚√┐ | iñuiññaq qulit malḡuk     | 32 | √√┐ | malḡukipiaq qulit malḡuk     | 52 |
| √┐ | qulit piḡasut        | 13 | ⌚√┐ | iñuiññaq qulit piḡasut    | 33 | √√┐ | malḡukipiaq qulit piḡasut    | 53 |
| √W | akimiaḡutailaq       | 14 | ⌚√W | iñuiññaq akimiaḡutailaq   | 34 | √√W | malḡukipiaq akimiaḡutailaq   | 54 |
| √  | akimiao              | 15 | ⌚√  | iñuiññaq akimiao          | 35 | √√  | malḡukipiaq akimiao          | 55 |
| √┐ | akimiao atausiq      | 16 | ⌚√┐ | iñuiññaq akimiao atausiq  | 36 | √√┐ | malḡukipiaq akimiao atausiq  | 56 |
| √┐ | akimiao malḡuk       | 17 | ⌚√┐ | iñuiññaq akimiao malḡuk   | 37 | √√┐ | malḡukipiaq akimiao malḡuk   | 57 |
| √┐ | akimiao piḡasut      | 18 | ⌚√┐ | iñuiññaq akimiao piḡasut  | 38 | √√┐ | malḡukipiaq akimiao piḡasut  | 58 |
| √W | iñuiññaḡutailaq      | 19 | ⌚√W | malḡukipiaḡutailaq        | 39 | √√W | piḡasukipiaḡutailaq          | 59 |

\*“Suitchuq” is a cardinal used to express the value of nothing or zero; “kisitchisaḡvik” is used as an ordinal to show order, as when counting or to express the power of zero.

|     |                               |    |     |                               |    |
|-----|-------------------------------|----|-----|-------------------------------|----|
| ⌚⌚  | piḡasukipiaq                  | 60 | W⌚  | sisamakipiaq                  | 80 |
| ⌚⌚  | piḡasukipiaq atausiq          | 61 | W⌚  | sisamakipiaq atausiq          | 81 |
| ⌚√  | piḡasukipiaq malḡuk           | 62 | W√  | sisamakipiaq malḡuk           | 82 |
| ⌚⌚  | piḡasukipiaq piḡasut          | 63 | W⌚  | sisamakipiaq piḡasut          | 83 |
| ⌚W  | piḡasukipiaq sisamat          | 64 | WW  | sisamakipiaq sisamat          | 84 |
| ⌚┐  | piḡasukipiaq tallimat         | 65 | W┐  | sisamakipiaq tallimat         | 85 |
| ⌚┐  | piḡasukipiaq itchaksrat       | 66 | W┐  | sisamakipiaq itchaksrat       | 86 |
| ⌚√┐ | piḡasukipiaq tallimat malḡuk  | 67 | W√┐ | sisamakipiaq tallimat malḡuk  | 87 |
| ⌚√⌚ | piḡasukipiaq tallimat piḡasut | 68 | W√⌚ | sisamakipiaq tallimat piḡasut | 88 |
| ⌚√W | piḡasukipiaq qulinḡuḡutailaq  | 69 | W√W | sisamakipiaq qulinḡuḡutailaq  | 89 |
| ⌚√  | piḡasukipiaq qulit            | 70 | W√  | sisamakipiaq qulit            | 90 |
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| ᳶᳶᳺ | akimiakipiaq iñuiññaq tallimat         | 325 |
| ᳶᳶ᳻ | akimiakipiaq iñuiññaq itchaksrat       | 326 |
| ᳶᳶ᳼ | akimiakipiaq iñuiññaq tallimat malġuk  | 327 |
| ᳶᳶ᳾ | akimiakipiaq iñuiññaq tallimat piņasut | 328 |
| ᳶᳶ᳿ | akimiakipiaq iñuiññaq qulinġuġutaiġaq  | 329 |
| ᳶᳶᳺ | akimiakipiaq iñuiññaq qulit            | 330 |
| ᳶᳶ᳻ | akimiakipiaq iñuiññaq qulit atausiq    | 331 |
| ᳶᳶ᳼ | akimiakipiaq iñuiññaq qulit malġuk     | 332 |
| ᳶᳶ᳾ | akimiakipiaq iñuiññaq qulit piņasut    | 333 |
| ᳶᳶ᳿ | akimiakipiaq iñuiññaq akimiagutaiġaq   | 334 |
| ᳶᳶᳺ | akimiakipiaq iñuiññaq akimiaz          | 335 |
| ᳶᳶ᳻ | akimiakipiaq iñuiññaq akimiaz atausiq  | 336 |
| ᳶᳶ᳼ | akimiakipiaq iñuiññaq akimiaz malġuk   | 337 |
| ᳶᳶ᳾ | akimiakipiaq iñuiññaq akimiaz piņasut  | 338 |
| ᳶᳶ᳿ | akimiakipiaq malġukipiaqutaiġaq        | 339 |

|     |                                           |     |
|-----|-------------------------------------------|-----|
| ᐃᐃᐃ | akimiakipiaq malġukipiaq                  | 340 |
| ᐃᐃ\ | akimiakipiaq malġukipiaq atausiq          | 341 |
| ᐃᐃᐅ | akimiakipiaq malġukipiaq malġuk           | 342 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq piņasut          | 343 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq sisamat          | 344 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq tallimat         | 345 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq itchaksrat       | 346 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq tallimat malġuk  | 347 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq tallimat piņasut | 348 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq qulinġuġutaiġaq  | 349 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq qulit            | 350 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq qulit atausiq    | 351 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq qulit malġuk     | 352 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq qulit piņasut    | 353 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq akimiagutaiġaq   | 354 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq akimiaz          | 355 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq akimiaz atausiq  | 356 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq akimiaz malġuk   | 357 |
| ᐃᐃᐃ | akimiakipiaq malġukipiaq akimiaz piņasut  | 358 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaġutaiġaq          | 359 |

|     |                                            |     |
|-----|--------------------------------------------|-----|
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq                  | 360 |
| ᐃᐃ\ | akimiakipiaq piņasukipiaq atausiq          | 361 |
| ᐃᐃᐅ | akimiakipiaq piņasukipiaq malġuk           | 362 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq piņasut          | 363 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq sisamat          | 364 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq tallimat         | 365 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq itchaksrat       | 366 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq tallimat malġuk  | 367 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq tallimat piņasut | 368 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq qulinġuġutaiġaq  | 369 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq qulit            | 370 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq qulit atausiq    | 371 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq qulit malġuk     | 372 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq qulit piņasut    | 373 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq akimiagutaiġaq   | 374 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq akimiaz          | 375 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq akimiaz atausiq  | 376 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq akimiaz malġuk   | 377 |
| ᐃᐃᐃ | akimiakipiaq piņasukipiaq akimiaz piņasut  | 378 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaġutaiġaq           | 379 |

|     |                                            |     |
|-----|--------------------------------------------|-----|
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq                  | 380 |
| ᐃᐃ\ | akimiakipiaq sisamakipiaq atausiq          | 381 |
| ᐃᐃᐅ | akimiakipiaq sisamakipiaq malġuk           | 382 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq piņasut          | 383 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq sisamat          | 384 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq tallimat         | 385 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq itchaksrat       | 386 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq tallimat malġuk  | 387 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq tallimat piņasut | 388 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq qulinġuġutaiġaq  | 389 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq qulit            | 390 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq qulit atausiq    | 391 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq qulit malġuk     | 392 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq qulit piņasut    | 393 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq akimiagutaiġaq   | 394 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq akimiaz          | 395 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq akimiaz atausiq  | 396 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq akimiaz malġuk   | 397 |
| ᐃᐃᐃ | akimiakipiaq sisamakipiaq akimiaz piņasut  | 398 |
| ᐃᐃᐃ | iñuiññakipiaġutaiġaq or ilagiññagutaiġaq   | 399 |

|     |                                             |       |
|-----|---------------------------------------------|-------|
| ᐃᐃᐃ | iñuiññakipiaq (traditional form)            | 400   |
|     | or, in reindeer herding and math, ilagiññaq |       |
| ᐃᐃᐃ | malġuagliaq                                 | 800   |
| ᐃᐃᐃ | piņasuagliaq                                | 1,200 |
| ᐃᐃᐃ | sisamaagliaq                                | 1,600 |
| ᐃᐃᐃ | tallimaagliaq                               | 2,000 |
| ᐃᐃᐃ | tallimaagliaq ilagiññaq                     | 2,400 |
| ᐃᐃᐃ | tallimaagliaq malġuagliaq                   | 2,800 |
| ᐃᐃᐃ | tallimaagliaq piņasuagliaq                  | 3,200 |
| ᐃᐃᐃ | tallimaagliaq sisamaagliaq                  | 3,600 |
| ᐃᐃᐃ | quliagliaq                                  | 4,000 |
| ᐃᐃᐃ | quliagliaq ilagiññaq                        | 4,400 |
| ᐃᐃᐃ | quliagliaq malġuagliaq                      | 4,800 |
| ᐃᐃᐃ | quliagliaq piņasuagliaq                     | 5,200 |
| ᐃᐃᐃ | quliagliaq sisamaagliaq                     | 5,600 |
| ᐃᐃᐃ | akimiagliaq                                 | 6,000 |
| ᐃᐃᐃ | akimiagliaq ilagiññaq                       | 6,400 |
| ᐃᐃᐃ | akimiagliaq malġuagliaq                     | 6,800 |
| ᐃᐃᐃ | akimiagliaq piņasuagliaq                    | 7,200 |
| ᐃᐃᐃ | akimiagliaq sisamaagliaq                    | 7,600 |

|                                                                                                 |                        |         |                                                                                                                                                                                                                                                            |                            |                       |
|-------------------------------------------------------------------------------------------------|------------------------|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------|
| $\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                         | atausiqpautai!aq       | 7,999   | $\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                                            | iñuiññaqpautai!aq          | 159,999               |
| $\backslash.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$              | atausiqpak             | 8,000   | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                                 | iñuiññaqpak                | 160,000               |
| $\vee.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | malguqpak              | 16,000  | $\neg.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                                       | tallimakipiaqpak           | 800,000               |
| $\wedge.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                  | pijasuqpak             | 24,000  | $>.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                                          | qulikipiaqpak              | 1,600,000             |
| $\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$ | sisamaqpak             | 32,000  | $\geq.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                                       | akimiakipiaqpak            | 2,400,000             |
| $\neg.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | tallimaqpak            | 40,000  | $\overline{\overline{w}}\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                              | ilagiññaqpautai!aq         | 3,199,999             |
| $\neg.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | tallimaqpak atausiqpak | 48,000  | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                         | ilagiññaqpak               | 3,200,000             |
| $\vee.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | tallimaqpak malguqpak  | 56,000  | $\neg.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                               | tallimaagliaqpak           | 16,000,000            |
| $\wedge.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                  | tallimatqak pijasuqpak | 64,000  | $>.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                                  | quliagliaqpak              | 32,000,000            |
| $\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$ | tallimaqpak sisamaqpak | 72,000  | $\geq.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                                               | akimiagliaqpak             | 48,000,000            |
| $>.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                       | qulipak                | 80,000  | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                                 | atausiqpakaippaq           | 64,000,000            |
| $\neg.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | qulipak atausiqpak     | 88,000  | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                         | iñuiññaqpakaippaq          | 1,280,000,000         |
| $\vee.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | qulipak malguqpak      | 96,000  | $>.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                                                  | qulikipiaqpakaippaq        | 12,800,000,000        |
| $\wedge.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                  | qulipak pijasuqpak     | 104,000 | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                 | ilagiññaqpakaippaq         | 25,600,000,000        |
| $\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$ | qulipak sisamaqpak     | 112,000 | $\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                        | atausiqpakpijatchağutai!aq | 511,999,999,999       |
| $\geq.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | akimiaqpak             | 120,000 | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                                 | atausiqpakpijatchaq        | 512,000,000,000       |
| $\neg.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | akimiaqpak atausiqpak  | 128,000 | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                         | iñuiññaqpakpijatchaq       | 10,240,000,000,000    |
| $\vee.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                    | akimiaqpak malguqpak   | 136,000 | $>.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                                  | qulikipiaqpakpijatchaq     | 102,400,000,000,000   |
| $\wedge.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$                  | akimiaqpak pijasuqpak  | 144,000 | $\backslash.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$ | ilagiññaqpakpijatchaq      | 204,800,000,000,000   |
| $\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$ | akimiaqpak sisamaqpak  | 152,000 | $>.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}.\overline{\overline{w}}\overline{\overline{w}}\overline{\overline{w}}$          | quliagliaqpakpijatchaq     | 2,048,000,000,000,000 |

In this table, periods are used instead of commas in the Kaktovik numerals.