

Problem 1 (20 points). The following are the fourth powers of natural numbers in ascending order:

1, 16, 81, 256, 625, 1296, 2401, 4096, 6561, 10000, . . .

The first ten entries of this sequence are spelt out in Ik, in arbitrary order:

- a. **ɲamɪrá leʃetse ńda tomínékwa túde ńda jírɪnɪ túde ńda kíɖɪ kɔn**
- b. **álifika ts'agúsé ńda tomínékwa túde ńda kíɖɪ ts'agúsé ńda jírɪnɪ túde ńda kíɖɪ kɔn**
- c. **álifika túde ńda kíɖɪ kɔn ńda ɲamɪrá túde ńda tomínékwa túde ńda kíɖɪ kɔn ńda nébɛɛ kɔn**
- d. **álifika tomín**
- e. **álifa kɔn ńda ɲamɪrá leʃetse ńda tomínékwa túde ńda kíɖɪ ts'agúsé ńda jírɪnɪ túde ńda kíɖɪ kɔn**
- f. **tomínékwa túde ńda kíɖɪ aɖe ńda nébɛɛ kɔn**
- g. **tomíní ńda jírɪnɪ túde ńda kíɖɪ kɔn**
- h. **kɔn**
- i. **álifika leʃetse ńda ɲamɪrá ts'agúsé ńda kɔn**
- j. **ɲamɪrá túde ńda kíɖɪ kɔn ńda tomínékwa leʃetse ńda jírɪnɪ túd**

(a) Determine the correct correspondence.

(b) Write in numerals:

- k. **álifika tomíní ńda jírɪnɪ leʃets**
- l. **tomínékwa túde ńda kíɖɪ kɔn**
- m. **tomínékwa túde ńda nébɛɛ kɔn**
- n. **álifika ɲamɪrá kɔn**

(c) Write out in Ik: 3108.

(d) Write out the eleventh entry of the sequence in Ik.

△ Ik belongs to the Nilo-Saharan family. It is spoken by approx. 7,500 people in Uganda.

ʃ, **ɖ**, **j**, **ɲ** and **ts'** are consonants. **ɔ**, **ɛ** and **ɪ** are pronounced like **o**, **e** and **i**, respectively, but with the slightly lowered tongue. The mark **´** denotes a high tone.

The fourth power of a number n is the result of multiplying four instances of n together.
($n^4 = n \times n \times n \times n$)

—Minkyu Kim