

Fifteenth International Linguistics Olympiad

Dublin (Ireland), 31 July – 4 August 2017

Individual Contest Problems

Rules for writing out the solutions

Do not copy over the problems. Write down your solution to each problem on a separate sheet or sheets. On each sheet indicate the number of the problem, the number of your seat and your surname. Otherwise your work may be mislaid or misattributed.

Your answers must be well-supported by argument. Even a perfectly correct answer will be given a low score unless accompanied by an explanation.

Problem 1 (20 points). Here are some arithmetic equalities in Birom:

1. $\text{tùḡūn}^2 + \text{tāt} + \text{nààs} = \text{bākūrū bībā ná vè rwīt}$
2. $\text{tāt} \text{nààs} = \text{bākūrū bītīmìn ná vè fāātāt}$
3. $\text{tàāmà}^2 + \text{fāātāt} + \text{gwīnìḡ} = \text{bākūrū bīnāàs ná vè fāāgwīnìḡ}$
4. $\text{fāātāt} \text{gwīnìḡ} = \text{fāātāt}$
5. $\text{rwīt}^2 + \text{bà} + \text{tùḡūn} = \text{bākūrū bītūḡūn ná vè fāāgwīnìḡ}$
6. $\text{bà} \text{tùḡūn} = \text{bākūrū bībā ná vè rwīt}$
7. $\text{fāātāt}^2 + \text{nààs} + \text{tāt} = \text{bākūrū bītāāmà ná vè nààs}$
8. $\text{nààs} \text{tāt} = \text{bākūrū bītūḡūn ná vè nààs}$
9. $\text{kūrū ná vè nààs} + \text{kūrū ná vè fāātāt} = \text{kūrū ná vè tīmìn} + \text{bà} + \text{kūrū ná vè tùḡūn}$

All numbers in this problem are greater than 0 and less than 125.

- (a) Write the equalities (1–9) in numerals.
- (b) Write the numbers **bākūrū bītāt**, **fāāgwīnìḡ**, **kūrū** and the equalities (A) and (B) in numerals.

A. $\text{bākūrū fāābītāt} - \text{tāt} - \text{kūrū ná gwē gwīnìḡ} = \text{bākūrū bītāāmà ná vè rwīt}$

B. $\text{bākūrū bīnāàs ná gwē gwīnìḡ} - \text{kūrū ná vè bà} - \text{kūrū ná vè tāt} = \text{kūrū ná vè rwīt}$

- (c) Write out in Birom: 6, 22, 97, 120.

⚠ Birom belongs to the Plateau group of the Benue-Congo branch of the Atlantic-Congo family. It is spoken by approx. 1,000,000 people in Nigeria.

ε is a vowel. ḡ and ƶ are consonants. The doubling of a vowel denotes length. The marks ´, ¯ and ` indicate high, middle, and low tone, respectively.

$$a^k = \underbrace{a \times a \times \cdots \times a}_{k \text{ times}}; a^1 = a.$$

—Milena Veneva