

Senior Open Round of the Tenth International Linguistics Olympiad, China

April 10, 2021

Problems

Problem 1 (20 points). Here are some arithmetic equalities written using Cistercian numerals:

$$1. \quad \text{Cistercian numeral for 1} + \text{Cistercian numeral for 9} = \text{Cistercian numeral for 10}$$

$$2. \quad \text{Cistercian numeral for 5} + \text{Cistercian numeral for 5} = \text{Cistercian numeral for 10}$$

$$3. \quad \text{Cistercian numeral for 1} \times \text{Cistercian numeral for 10} = \text{Cistercian numeral for 10}$$

$$4. \quad \text{Cistercian numeral for 1} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} = \text{Cistercian numeral for 100}$$

$$5. \quad \text{Cistercian numeral for 1} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} = \text{Cistercian numeral for 1000}$$

$$6. \quad \text{Cistercian numeral for 1} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} \times \text{Cistercian numeral for 10} = \text{Cistercian numeral for 10000}$$

All numbers in these equalities are less than 10,000.

(a) Write these equalities using Arabic numerals.

(b) Write using Arabic numerals:

$$7. \quad \text{Cistercian numeral for 1000}$$

$$8. \quad \text{Cistercian numeral for 10000}$$

$$9. \quad \text{Cistercian numeral for 100000}$$

(c) Write using Cistercian numerals: 2348; 5479; 7680.

—Ye Liu

Problem 2 (20 points). Here are some words and word combinations in Fijian and their English translations in arbitrary order:

- | | |
|-------------------------|--|
| 1. bari moli vau | A. <i>big cup</i> |
| 2. batabata | B. <i>fat mussel</i> |
| 3. bati | C. <i>cold (adj.)</i> |
| 4. bilo levu | D. <i>holey wood</i> |
| 5. butu sui | E. <i>new fan (non-electric instrument)</i> |
| 6. iri vau | F. <i>to gnaw at the immature citrus fruit</i> |
| 7. kai levulevu | G. <i>to hear</i> |
| 8. kau cicila | H. <i>to tread on the bone</i> |
| 9. rogo | I. <i>tooth</i> |

(a) Determine the correct correspondences between them.

(b) Determine the correct correspondences:

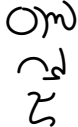

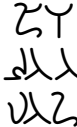
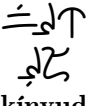

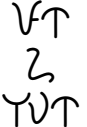



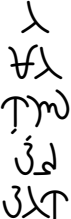
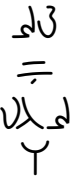
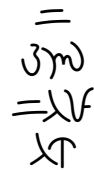
- | | |
|-------------------------|---|
| 10. bari sui | J. <i>air conditioner</i> |
| 11. bati sui | K. <i>carpet</i> |
| 12. bati vau | L. <i>false tooth</i> |
| 13. bilo cicila | M. <i>fame</i> |
| 14. butu kai | N. <i>old man who likes young women</i> |
| 15. ibutubutu | O. <i>skinny (of people)</i> |
| 16. iri batabata | P. <i>strong, tough</i> |
| 17. irogorogo | Q. <i>to be dependent on others</i> |
| 18. kaukaua | R. <i>to be famous</i> |
| 19. rogo levu | S. <i>to dance</i> |
| 20. suisuia | T. <i>unreliable person</i> |

⚠ Fijian belongs to the Central-Eastern Malayo-Polynesian group of the Malayo-Polynesian branch of the Austronesian family. It is spoken by approx. 630,000 people in Fiji.


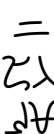
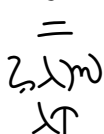
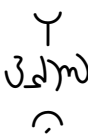
False teeth were mainly made of animal bones in ancient times. Mussel is a kind of animal.

—Ziji Wang

Problem 3 (20 points). Here are some words and word combinations in Pampanga written in the Kulitan script and in the Latin script and their English translations:

| | | | | | | |
|---|---|---|--|---|---|---|
|  |  |  |  |  |  |  |
| banggéra <i>kitchen</i> | dangalan <i>to honor</i> | dalyáwat <i>pimple</i> | kinyud <i>motion of waist</i> | mantílyu <i>hammer</i> | pantalón <i>pants</i> | tindáhan <i>shop</i> |
|  |  |  |  |  | | |
| alimbáwa <i>example</i> | ganíng aldó <i>dawn</i> | amánung sísuan <i>mother tongue</i> | iskuwéla <i>school</i> | kasangkápan <i>tool</i> | | |

(a) Write in the Latin script:

| | | | |
|---|---|---|---|
| 1.  | 2.  | 3.  | 4.  |
| <i>invitation</i> | <i>needle</i> | <i>parent-in-law</i> | <i>drunkard</i> |

(1–4) are words.

(b) Write in the Kulitan script:

5. **batwín** *star*
6. **bendisyón** *benediction*
7. **búgtung** *riddle*
8. **palkinyuran** *buttocks*

⚠ Pampanga belongs to the Central Luzon group of the Malayo-Polynesian branch of the Austronesian family. It is spoken by approx. 2,040,000 people in the Philippines.

ng and **y** are consonants. The mark ´ indicates stress; if there is no such mark, the word has no stress.

—Yiming Luo, Ziji Wang

Problem 4 (20 points). Here are some sentences in Tangale and their English translations:

| | |
|----------------------------|---------------------------------------|
| <i>ka lɔbɪnɔ</i> | <i>You (m. sg.) like me.</i> |
| <i>ma dobi sɛɛrɔni</i> | <i>You (pl.) call his friend.</i> |
| <i>ma weemgum</i> | <i>You (pl.) did not see us.</i> |
| <i>mbaastam lɔmgu</i> | <i>She liked us.</i> |
| <i>mbaastam saa amaknɔ</i> | <i>She eats my egg.</i> |
| <i>mbeɛndam saagom</i> | <i>He did not eat.</i> |
| <i>mbeɛndam lɔbɪkɔm</i> | <i>He does not like you (m. sg.).</i> |
| <i>mɪn lɔskɔ</i> | <i>We liked you (f. sg.).</i> |
| <i>mɪn nanɛ mbeɛndam</i> | <i>We beat (prs.) him.</i> |
| <i>n dokko</i> | <i>I called you (m. sg.).</i> |
| <i>n saago kɛbnɛwɔ</i> | <i>I ate their buffalo.</i> |
| <i>sɪ lɔbɪ ikno</i> | <i>You (f. sg.) like my body.</i> |

(a) Translate into English:

1. *ka dongo*
2. *ma nanɛmɔ*
3. *mbeɛndam lɔbɪm kɛbnɛni*
4. *n weegom sɛɛrɔnɔ*

(b) Translate into Tangale:

5. *I beat (prs.) you (m. sg.).*
6. *She saw me.*
7. *We did not eat their egg.*
8. *You (f. sg.) do not see his body.*

⚠ Tangale belongs to the Chadic branch of the Afro-Asiatic family. It is spoken by approx. 260,000 people in Nigeria.

ɛ, **ɪ**, **o**, and **u** are the lax counterpart of **e**, **i**, **o**, and **u**, respectively. The doubling of a vowel denotes length.

f. = female. *m.* = male. *prs.* = present.

—Ye Liu

Problem 5 (20 points). Here are some words in Yaminahua and their most natural English translations:

| | |
|-------------------------|---------------------------------------|
| fianāfai | <i>marry all day</i> |
| fixōtoshinaka | <i>will already get it for him</i> |
| kafasāmafaiyamea | <i>made him walk yesterday</i> |
| mātsokoītai | <i>always really sweep</i> |
| nashixoni | <i>bathe for him</i> |
| nifaīfaiyamea | <i>lived all day yesterday</i> |
| noipakei | <i>keep loving it</i> |
| opai | <i>come down</i> |
| oiakoīmashini | <i>make him really cry all night</i> |
| piātaifai | <i>always eat it to his detriment</i> |
| pimafaini | <i>feed it to him all day</i> |
| tapī | <i>know it</i> |
| tsaopakenaka | <i>will sit down</i> |
| yoinātitaayamea | <i>always chatted</i> |
| yometsotitaifai | <i>always steal it</i> |

(a) Translate into English in the most natural way:

1. **oiapayamea**
2. **omai**
3. **pianāshī**
4. **tapikoītaifanaka**
5. **tsaomani**
6. **yoī**
7. **yometsoxōpakei**

(b) Translate into Yaminahua:

8. *always said it*
9. *keep sweeping to his detriment*
10. *really bathe*
11. *steal each other all night*
12. *walked down for him yesterday*
13. *will already come for him tomorrow*
14. *will always really live*

⚠ Yaminahua belongs to the Pano-Tacanan family. It is spoken by approx. 2,000 people in Peru, Brazil, and Bolivia.

sh, **ts**, and **y** are consonants. The mark **~** indicates nasalization.

—Ziche Chen

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Good luck!

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Solutions

Problem 1.

- (a) 1. $1930 + 4895 = 6825$
 2. $3702 + 564 = 4266$
 3. $20 \times 50 = 1000$
 4. $13 \times 11 \times 7 = 1001$
 5. $6 \times 6 \times 6 \times 6 = 1296$
 6. $5 \times 5 \times 5 \times 5 \times 5 = 3125$

- (b) 7. 9011
 8. 8778
 9. 3443

- (c) $2348 =$ 
 $5479 =$ 
 $7680 =$ 

Problem 2.

- (a)

















| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| F | C | I | A | H | E | B | D | G |

- (b)

| | | | | | | | | | | |
|----|----|----|----|----|----|----|----|----|----|----|
| 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Q | L | N | T | S | K | J | M | P | R | O |

Problem 3.

- (a) 1. anyahan
 2. karáyum
 3. katuangan
 4. lasénggu

- (b) 5. 
 6. 
 7. 
 8. 













Problem 4.

- (a) 1. *You (m. sg.) called me.*
2. *You (pl.) beat (prs.) us.*
3. *He does not like his buffalo.*
4. *I did not see my friend.*
- (b) 5. *n nanəkɔ*
6. *mbaastam weengo*
7. *mɪn saagom amakwɔ*
8. *sɪ weem ikni*

Problem 5.

- (a) 1. *kept crying*
2. *make him come*
3. *eat each other all night*
4. *will always really know it*
5. *make him sit*
6. *say it to his detriment*
7. *keep stealing it for him*
- (b) 8. *yoitaifayamea*
9. *mātsōpakei*
10. *nashikoī*
11. *yometsoanāshī*
12. *kafasāxōpakefaiyamea*
13. *oxōtoshifainaka*
14. *nikoītitaianaka*