First International Olympiad in Theoretical, Mathematical and Applied Linguistics

8–12 September 2003, Borovetz, Bulgaria

Individual Contest

Problem 1 (20 marks)

In 1916 the Russian scholar Jacob Linzbach invented a universal writing system, which he thought should be understandable to all people, regardless of their native tongue. Linzbach called his new language 'Transcendental Algebra'.

Several sentences have been written in Linzbach's language and translated into English:

1. $(\frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}\dot{\imath}\dot{\Lambda}} + \frac{\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}})^{\leqslant}$ — The father and the brother are talking.
2. $\dot{n}(> \dot{I})^{[\!]\!-\!-\mathrm{t}}$ — The giants are working without haste.
3. $(\frac{\dot{\imath}\dot{\Lambda}(-\dot{\Lambda}\dot{\Lambda})}{(-\dot{\Lambda}\dot{\Lambda})})^{\not{}} = \boxtimes$ — The orphans are writing a letter.
4. $(-\dot{n}\dot{I}_1)^{\not{}} - \mathrm{t} = \dot{I}_2$ — It wasn't us who wrote about you (sg.).
5. $\boxtimes^{\sqrt{\not{}}} - \mathrm{t} = -\dot{\Delta}_3$ — It was not by her that the letter was written.
6. $(\frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}\dot{\imath}\dot{\Lambda}})^{-\smile} = [\!]\!-$ — The father doesn't like the work.
7. $((> \dot{I}) - \smile)^{\frown} - \mathrm{t} = \frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\imath}\dot{\Lambda}}$ — The wicked giant ate the parents.
8. $\dot{\Delta}_3^{-\mathrm{t}}$ — She is not in a hurry.

Assignment 1. Translate into English:

9. $\dot{I}_3^{\smile - \sqrt{\smile}}$
10. $(\frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}\dot{\Lambda}\dot{\imath}} - \leqslant)^{\not{}} + \mathrm{t} = \frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}\dot{\imath}\dot{\Lambda}} + \frac{\dot{\Lambda}\dot{\Lambda}\dot{\imath}\dot{\Lambda}}{\dot{\Lambda}\dot{\imath}\dot{\Lambda}}$
11. $\dot{\Delta}_2^{[\!]\!-\!+\mathrm{t}-\leqslant} - \mathrm{t}$
12. $\boxtimes^{\sqrt{\frown}} - \mathrm{t} = \frac{\dot{\imath}\dot{\Lambda}}{\dot{\mathrm{t}}} - \frown$

Assignment 2. Write in 'Transcedental Algebra':

13. It wasn't about them that my husband and I (*say:* I and the husband) talked.
14. The people are working reluctantly.
15. The good widow loves the unemployed dwarf.
16. You (pl.) will be talked about.

Explain your solution. (Ksenia Guiliarova)

Problem 2 (25 marks)

Below you see arithmetic equalities written in Egyptian Arabic[1]. All summands, as well as all sums except the last one, are represented as fractions in which neither the numerators nor the denominators are greater than 10, nor is any denominator equal to 1:

$$tumn + tumnēn = talatt\ itmān \quad (1)$$
$$saba\text{ʕ}t\ itlāt + suds = \text{ʕ}ašart\ irbā\text{ʕ} \quad (2)$$
$$tus\text{ʕ}ēn + tus\text{ʕ} = sudsēn \quad (3)$$
$$xamast\ ixmās + sub\text{ʕ} = tamant\ isbā\text{ʕ} \quad (4)$$
$$sub\text{ʕ}ēn + xumsēn = \frac{24}{35} \quad (5)$$

Assignment 1. Write these equalities in figures.

Assignment 2. The equality $rub\text{ʕ} + \text{ʕ}ašart\ itsā\text{ʕ} = saba\text{ʕ}t\ isdās$ is missing a sign. Which one?

Note: The letter *š* is pronounced as English *sh*, *x* as the *ch* in *loch*; ʕ is a specific Arabic consonant. A bar above a vowel indicates length. (Ivan Derzhanski)

Problem 3 (15 marks)

Consider the following expressions in Basque[2] and their unordered English translations (some words have been left out):

urtarrilaren hogeita hirugarrena, larunbata;
otsailaren lehenengo osteguna;
abenduaren lehena, _____;
azaroaren hirugarren ostirala;
irailaren lehena, astelehena;
abenduaren azken astea;
ekainaren bederatzigarrena, igandea;
irailaren azken asteazkena;
urriaren azken larunbata;
_____ *bigarrena, ostirala.*

the first Thursday of February; *the last Wednesday of* _____; *the first of December, Wednesday*; *the last* _____ *of December*; *the ninth of June, Sunday*; *the twenty-third of January,* _____; *the last Saturday of October*; *the third Friday of November*; _____ *of September, Monday*; *the second of January, Friday.*

Assignment 1. Match up the expressions with their translations and fill in the gaps.

Assignment 2. Translate into Basque:

the first Monday of December; *the twenty-ninth of November, Saturday*; *the second week of January*; *the third of February, Monday.*

Assignment 3. How do you think the Basque names of days of the week *astelehena*, *asteazkena*, *asteartea* might be translated literally? (Alexandre Arkhipov)

[1] The Egyptian dialect of the Arabic language is spoken by about 45 million people. Thanks to Egypt's considerable economic, political and cultural influence and most of all to the great quantity and popularity of its radio and television programmes, this dialect is also widely understood by speakers of other Arabic dialects.

[2] Basque is spoken by more than 500 thousand people in Basque Country (an autonomous province of Spain) and in France. It has not been proven to be related to any other language.

Problem 4 (20 marks)

Several sentences in Adyghe[3] are written in a simplified romanisation and accompanied by their English translations:

1.	*śanyćyr hakum deʁəuco.*	He puts the kettle into the stove.
2.	*syda laʁəm tyrizərər?*	What does he throw onto the plate?
3.	*aχśər pχwanʏm tyreʁafə.*	He drops the money onto the chest.
4.	*śywanyr ʔanym tyreʁəuco.*	He puts the cauldron onto the table.
5.	*syda pχənṭəḳum ćiʁafərər?*	What does he drop under the stool?
6.	*laʁər tyda zyćiʁəucorər?*	Where does he put the plate?
7.	*laʁər tyda zytyrizərər?*	Where does he throw the plate?

Assignment 1. Offer more precise translations of sentences 6 and 7 (even if they don't sound quite so natural in English).

Assignment 2. Translate into English:

8. *pχənṭəḳur hakum dezə.*
9. *aχśər tyda zydiʁafərər?*

Assignment 3. Translate into Adyghe:

10. He puts the plate under the kettle.
11. What does he throw under the chest?
12. What does he drop into the cauldron?

Assignment 4. Translate into Adyghe in all possible ways:

13. Where does he put the table?

Note: *ć*, *ć̣*, *ḳ*, *ʁ*, *ś*, *ṭ*, *χ*, *z*, *ʔ* are specific consonants, *ə* and *ʏ* are vowels of the Adyghe language.

(Yakov Testelets)

[3]The Adyghe language is of the Abkhaz-Adyghean (North West Caucasian) language family. It is spoken by over 300 thousand people, mostly in the Republic of Adyghea (Russian Federation).

Problem 5 (20 marks)

The table below contains French verbs with prefixes and the corresponding verbs without prefixes, along with the English translations of all. The shaded cells mean that there is a prefixed verb there with no prefixless counterpart. In some verbs the prefixes have been left out.

réagir	react		
__assortir	pick again	*assortir*	pick
recommencer	recommence	*commencer*	begin
recomposer	compose anew	*composer*	compose
réconcilier	reconcile	*concilier*	reconcile
réconforter	comfort	*conforter*	comfort
recréer	recreate	*créer*	create
récréer	amuse		
__curer	clean	*curer*	clean
redire	say again	*dire*	say
réduire	reduce		
rééditer	publish again	*éditer*	publish
refaire	redo, remake	*faire*	do, make
__former	reform		
__former	form again	*former*	form
__futer	refute		
réincarner	reincarnate	*incarner*	incarnate
rejouer	resume playing	*jouer*	play
__lancer	throw again	*lancer*	throw
__munérer	remunerate		
rénover	renovate		
réopérer	operate again	*opérer*	operate
repartir	depart once more	*partir*	depart
__partir	distribute		
répéter	repeat		
résonner	sound	*sonner*	sound
révéler	reveal		

Assignment. Fill in the gaps using information from the table. Explain your solution.

(Boris Iomdin)

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