

## Problem 9. Central Pamerican sums

Northern and Central Pame are distinct but related languages spoken in the state of San Luis Potosí in Mexico by approximately 5,000 people each.

In the following examples, you may like to know the following pronunciation facts.

- ñ - palatal nasal, like *ni* in *onion*.
  - ʃ - postalveolar fricative, like *sh* in *shell*, but ejective ('spat out')
  - k' – velar stop like *k* in *kiss*, but ejective.
  - ɿ - ee sound as in *fee*, but with 'creaky' voice.
  - ? - glottal stop, like the *t* in London *butter* (often written *bu'er*).
  - û – oo sound as in *zoo*, but nasalised like *on* in French *bonjour*.



First, here are some numbers in **Northern Pame**:

- (1) 9 = kara tenhiuj sante
  - (2) 13 = kara tenhiuj git̄s'aj
  - (3) 17 = kanuje tenhiuj sante
  - (4) 20 = kanuje tenhiuj giriuij
  - (5) 26 = karnu? tenhiuj nuji
  - (6) 30 = karnu? tenhiuj tiria
  - (7) 35 = giriuij tenhiuj rnu?

And now some arithmetic equalities in **Central Pame** (where \* means ‘multiplied by’):

- (8) *nda ntsaw? + seska?ai nda ntsaw? nda = nda lien tilijūhūj*  
 (9) *kijnui + nda ntsaw? = seska?ai nui*  
 (10) *nda lien nda \* nui = nui lien nui*  
 (11) *tilijūhūj + kik'ai = tilija \* nui*  
 (12) *seska?ai ranhū? \* ranhū? = nda lien seska?ai nda ntsaw? nda*  
 (13) *seska?ai kik'ai + kik'ai = nui \* seska?ai*  
 (14) *kik'ai + ranhū? = nda ntsaw?*  
 (15) *nda + nui = ranhū?*

And finally an equality in both languages:

- (16) Northern Pame: Central Pame:  
 teriuhip \* kara tenhiup nuji = ranhū? lien seska?ai,

**Q.9.1.** On the answer sheet, write out the following numbers in Northern Pame: 2, 31.

**Q.9.2.** Write out the following numbers in Central Pame: 9, 56, 60.

**Q.9.3.** Explain clearly and succinctly how the number systems of Northern Pame and Central Pame work and how they differ. [NB This question will only be marked as a tie-breaker.]

## Answer sheet

<b><u>9.1.</u></b> Northern Pame
<b>2:</b>
<b>31:</b>
<b><u>9.2.</u></b> Central Pame
<b>9:</b>
<b>56:</b>
<b>60:</b>

**Q.9.3.** Explanation

## Solution and marking.

Scoring: max 18

- Q.9.1,2. 1 for each correct Pame word (max 13)
  - Ignore spelling errors (one letter wrong per word)
  - Require correct position, but only relative to preceding correct words.
    - e.g. for 56 = *lien nui seska?ai tilijs*, accept all words except *nui*
    - for 56 = *lien nda ntsaw? nda*, accept *lien*
- Q.9.3. DON'T MARK THIS QUESTION!

<b>9.1.</b> Northern Pame
<b>2:</b> <i>nuji</i>
<b>31:</b> <i>karnu? tenhiuj teriuhip</i>
<b>9.2.</b> Central Pame
<b>9:</b> <i>nda ntsaw? nda</i>
<b>56:</b> <i>nui lien seska?ai tilijs</i>
<b>60:</b> <i>ranhū? lien</i>

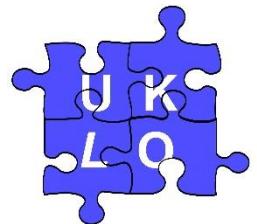
## Commentary

### Northern Pame:

- **base:** tenhiuj = 8;
- **order:** multiplier\_base\_addend, i.e. the numbers have the following form:  
 $\alpha \text{ tenhiuj } \beta = 8 * \alpha + \beta$ , where  $1 \leq \alpha, \beta \leq 7$ ;
- numbers between 1 and 3 have two different names which are used as multipliers and addends, respectively.

	1	2	3	4	5	6	7
$\alpha$	kara	kanuje	karnu?	giriuj			
$\beta$	sante	nuji	rnu?	giriuj	gitʃ'aj	tiria	teriuhiij

Your name:



# The UK Linguistics Olympiad 2018

## Central Pame:

Since the two languages are cognate, it can be expected that at least some words with identical meanings are going to turn out to be more or less similar.

1	nda	5	kik'ai	9	nda ntsaw? nda
2	nui	6	tilija	10	seska?ai
3	ranhū?	7	tilipūhūn	20	nda lien
4	kipui	8	nda ntsaw?	β*20	β lien

- **base:** 20, subbase 10 (**seska?ai**);
- **order:** multiplier\_base\_addend, i.e. the numbers have the following form:  
**seska?ai**  $\beta = 10 + \beta$ ,  $\beta \geq 1$ ;  
**α lien**  $\beta = \alpha * 20 + \beta$ ,  $\alpha \geq 1$ ,  $\beta \geq 1$ .