

## Twenty-second International Linguistics Olympiad

Taipei (Taiwan), July 20–27, 2025

## Individual Contest Problems

## Rules for writing out the solutions

Do not copy 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. If you do not do this, your work may be mislaid or misattributed.

Unless stated differently, you should describe any patterns or rules that you identified in the data. Otherwise your solution will not be awarded full marks.

**Problem 1 (20 points).** Here are some numbers in Dzongkha and their numerical values:

1 – ci      3 – sum      8 – ge      12 – cupi      17 – cupdyn      19 – cygu

For higher numbers, Dzongkha uses two different systems (referred to here as A and B).

Below are some numbers written in both systems, as well as their numerical values:

System A	System B	Value	System A	System B	Value
ke ci da pi	tsapi	22	ke ko-da sum	ŋaŋa	55
ke ci da ŋa	tsaŋa	25	ke sum da cuɖu	døndu	76
ke pje-da pi	sumcu	30	ke ʒi	gepcu	80
ke ci da cyʒi	soʒi	34	ke ʒi da gu	ʒagu	89
ke pi da dyn	ʒedyn	47	ke ceŋa	sumja	300

Finally, some equalities are given with left-hand side written in system A and right-hand side written in system B. Some numbers are missing.

	System A		System B
(1)	cusum + ke pje-da ʒi	=	jasum
(2)	piɕu pi	=	piɕu × ʒipcu
(3)	piɕu ci da ke sum da gu	=	(ŋapcu × gu) + cygu
(4)	piɕu pje-da pi + ke pje-da ɖu	=	ŋapja + pija cutām
(5)	(pi × ko) + pje	=	pi
(6)	(piɕu ko-da sum × pje) + ke pje-da sum	=	ɖukja
(7)	piɕu ci da ke cuɖu da cuɖu	=	(ʒaʒi × ʒi) + ʒipja
(8)	pi × piɕu ci da ke cutām da gu	=	(____ <sub>X</sub> × piɕu) + copge
(9)	____ <sub>Y</sub> + ke ci da ʒi	=	jaɖu
(10)	____ <sub>Z</sub> + ke ko-da ɖu	=	dynja + sumja

(a) Fill in the blanks X–Z with Dzongkha numbers.

(b) Write with digits the equalities (1–10).

(c) Write in Dzongkha in both systems: 75; 570.

△ The Dzongkha language belongs to the Sino-Tibetan family. It is spoken by approx. 171,000 people in Bhutan.

The words are given in a simplified transcription. ɖ, ʒ, p, ŋ, ɕ and ʒ are consonants. ā, ø and y are vowels.

—Vlad A. Neacșu