

Taxes in Sanskrit mathematical sources

A. Keller
SAW seminar
02/2012

Ganitasārakaumudī

GSK

“The moonlight of the essence of mathematics”

by Ṭhakkura Pherū (ca. 1270-1323)

a śvetāmbara Jain

b. in Haryana, worked in Delhi

SaKHYa, Manohar, 2009

Yield of Grains

GSK.5.9 All the spices, garden cresses, fenugreek, leafy vegetables, kora grains etc. (...) are for a tax (*karassa*) of one hundred *dammas* per *viggahaya*.

Yield of Sugarcane Juice and oil

Yield of Regional Tax (*desa-kara-phala*)

GSK.5.14 Ten for a she-goat, the same for a cow, twice that for a she-buffalo, and four vayallas for a plough. For fire of hearth, the heart tax, excepting things related to barbers, jewels and dowry

Tolls

GSK.4.47 There is a temple with four doors. At each of them is one Yakṣa <image> equal to the door <in height>. In the middle of them (i.e., at the centre of the temple) is <located the image of> the lord of gods (Indra). A pious man laid all the plentiful flowers by half each time <he paid hommage to> the image, giving one to Yakṣa while passing through each door. If the remainder, twenty, remains with him, how many <flowers> did he possess in total?

Computing with fractions

GSK. part-mother class (*bhāga-mātr-jāti*)

2.10. Three diminished by <its> half, this less by <its> quarter, this less by its one-sixth. Likewise, a half deprived of <its> one-third, this of <its> one-fourth. What are the results separately?

Pātīganita of Śridhāra (VIIIth century) PG

K.S. Shukla, Lucknow, 1959

PG 77. Ex. 101. After giving way one (out of a certain number), then **one-sixth** (*śaṣṭha*) of what remains, the **one-fourth** (*caturtha*) of what remains after that, then one-third (*tryaṁśa*) of what remains after that, and then the square root of the original number, the residue left is five. (What is that number?)

Rangacarya, Madras, 1912

GSS 3.127. *Karṣas* three, eight, four and ten diminished by a quarter, a half, a **twelfth** (*dvadasāṁśa*) and **a sixth** (*śaṣṭha*) of a *karṣa* are offered by certain men for the worship of *tīrthaṅkaras*. What is (the sum) when they are added?

GSS.3.133. A certain fraction is diminished (in consecution) by one fourth (*carana*) one fifth (*pañcamabhāga*), and one sixth (*śaṣṭha*) of itself; another fraction is similarly diminished by one half, one sixth (*śadāṁśa*) and one fifth (*pañcamāṁśa*) of itself; yet another is similarly diminished by two fifth, one fourth and sixth of itself. The sum of these (quantities so diminished) is one half. What are the unknown fractions here?

GSS.4.29 Of a collection of mango fruits, the king (took) one sixth (*ṣadbhāga*); the queen took one fifth (*pañcama*) of the remainder, and three chief princes took one fourth, one third and one half (of that same remainder); and the youngest child took the remaining three mangoes. O you, who are clever in (working) miscellaneous problems on fractions, give out the measure of that (collection of mangoes).

Proportionate division

GSS.6.80 Here, a hundred and twenty gold pieces are divided among four servants in the proportional parts of a half, a third, a quarter and a sixth. O arithmetician, tell me quickly what they obtained.

Vallikākuṭṭīkāra

On a certain man bringing mango fruits, <his> elder son took one fruit first and then half of what remained. The younger did similarly; and the other took the other half. <Find the number of fruits brought by the father>.

Tax ratios evoked

1/6 or 1/8 or 1/10 or (1/12) of the yield

1/50 or 1/20th of cattle and gold

Sheperds 1/4 on each cow, 1/2
panna on each buffalo, 1/4 panna
on 8 sheeps

Tax ratios evoked

1/6 or 1/8 or 1/10 or (1/12) of the yield

1/50 or 1/20th of cattle and gold

Sheperds 1/4 on each cow, 1/2
panna on each buffalo, 1/4 panna
on 8 sheeps

Monetary Units

GSK.1.3. *Paṭikāṇī* and *kāṇī*, *paṭivissam̄sa* and *vissam̄sa*; it should be known that these <units> up to *visova* are **twenty times** <the preceding unit of currency>

GSK1.4.a **Twenty** *visova* <make> one *damma* and **fifty** *dammas* one <silver> *tamkaya*



taṇka

PG.1.9 A *purāṇa* is **sixteen** *pañas*; a *pana* should be <measured> by **four** *kākiṇīs*/

And one *kākiṇī* by **five times four** *varāraṭakas* (cowries)//



pañas



kākiṇīs



Capacity and gold weights

GSK.1.8. **Four** *karapuḍas* (the hand joined and hollowed) <make> one *pāṭī*, four *pāṭīs* it is said <make> one *māṇaya*, four *māṇayas* one *seṭī*, and sixteen *seṭīs* become one *pattha* (skt *prastha*).

AS.19.2.



Ten *māṣa*-beans (mung beans) make one *māṣaka* of gold, or **five** *guñja*-berries (crab's eye)/



19.3. Sixteen of these make one *suvarṇa* or *karsa*/

19.4. A *pala* is equivalent to four *karsas*/