L8 - 29/08/2024

Sulva Sutras

(~ 800 – 500 BCE)

- Fire rituals were a very important part of day to day life.
- Took place in chambers
- Householders performed certain rituals everyday.

  Hence, they typically maintained 3 kinds of fires at home –

  Dakshin, Grihpatya, Aahavaniya
- The alters these fires resided in had to be constructed with great care so as to conform to shapes and sizes.

- Dakshin - Semicircle altar

  Garhipatya - Square, Circle altar

  Aahavaniya - Square

- Unit of Measurement -

  Length - Vyam / Vyayam

  OR

  Purusha

  (~ 96 inch)

  Area - 1 sq. Vyam

- These were the simplest kind of fires

- There were other types of rituals for fulfilling specific desires

  eg - for rain, expanding kingdom, well-being of subjects, etc.

- These were supposed to be performed exactly as specified.

  Failing to do so might cause no results or worse, opposite results.

- These rituals required sophisticated altars - combinations of squares, rectangles, triangles, circles, etc.

- Involved transferring the fire from one altar to another s.t the area of the latter is either equal or in fixed proportion to the former.

eg.

unit sq. unit circle

- Such problems led to study of basic properties of triangles, rectangles, circles, etc.

Hence, led to topics we study in Euclidean geometry & number theory.

Reference

- Rigveda Samhita
- Jaittiveya Samhita
- Jaittiveya Brahmna
- Observations of Ram in the hermitage of Agatsya in Chitrakoot & Panchvati

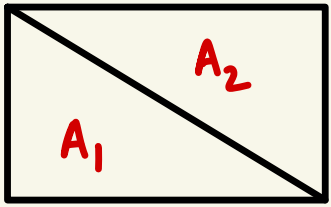
- K Jayashankar (PhD Thesis, 2007)

'Sulva sutras : A critical study'

Geometry

Simple geometrical facts –

- Any diagonal of a rectangle divides it into 2 triangles of same area

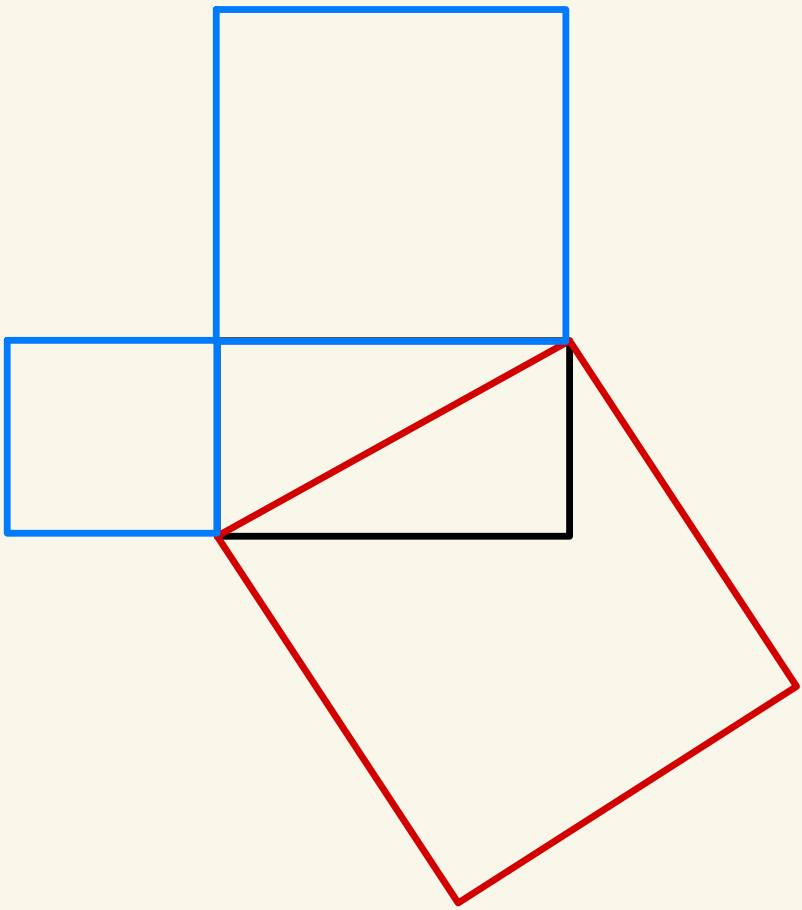


$A_1 = A_2$

- Diagonals of a rectangle have equal length & bisect each other.

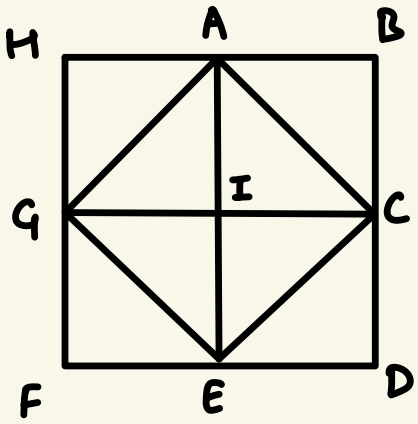
- The perpendicular from vertex to base of an isosceles triangle divides it into 2 triangles of equal area.

Boudhayana (Pythagoras Thm)



Given any rectangle, the area of sq. formed by diag. is equal to the sum of areas of sq. of similar sq. formed by the 2 adjacent sides.

Pf – (for special case)



$$[ACEQ] = [ACI] + [CEI] + [EQI] + [GAI]$$

$$= [ACI] + [CEI] + [ACB] + [CED]$$

$$= [ABCI] + [CDEI]$$

$$\left(\because \begin{array}{l} [EQI] = [ACB] \\ [GAI] = [CED] \end{array} \right)$$

□