

## Sulba Sutras

The most important of these documents are the

Baudhayana Sulbasutra written about 800 BC;

Manava Sulbasutra written about 750 BC;

Apastamba Sulbasutra written about 600 BC.;

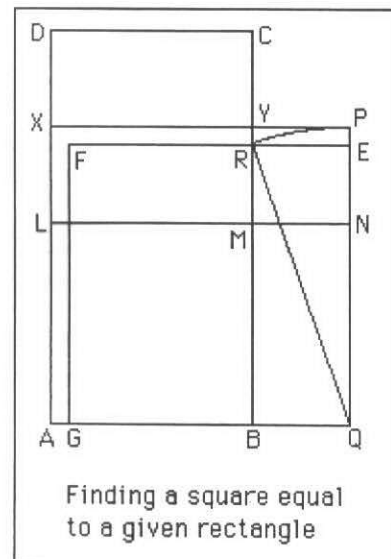
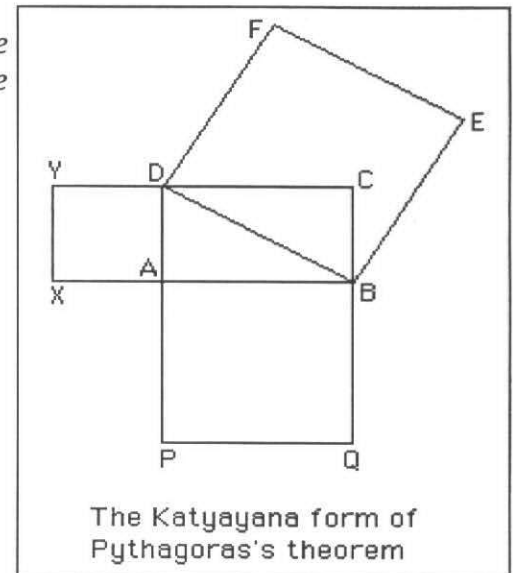
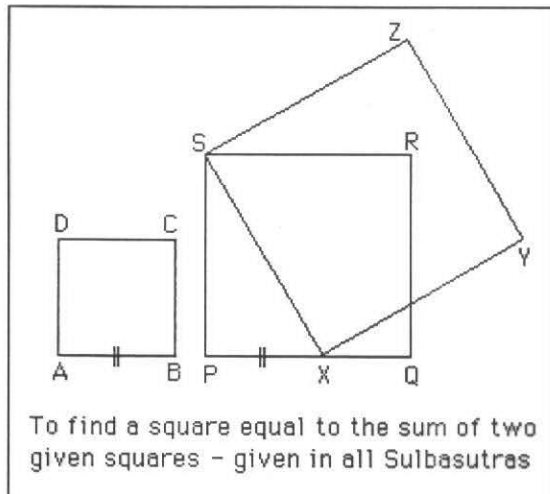
Katyayana Sulbasutra written about 200 BC.

### Pythagoras's theorem.

There are many examples of Pythagorean triples in the Sulbasutras. For example (5, 12, 13), (12, 16, 20), (8, 15, 17), (15, 20, 25), (12, 35, 37), (15, 36, 39),  $(\frac{5}{2}, 6, \frac{13}{2})$ , and  $(\frac{15}{2}, 10, \frac{25}{2})$  all occur.

Baudhayana Sulbasutra : *The rope which is stretched across the diagonal of a square produces an area double the size of the original square.*

Katyayana Sulbasutra: *The rope which is stretched along the length of the diagonal of a rectangle produces an area which the vertical and horizontal sides make together.*



the version as it appears in the Baudhayana Sulbasutra.

# Sulba Sutra ("code of the ropes for measuring the altar")

The code used is as follows:

## The Sanskrit consonants

ka, ta, pa, and ya all denote 1;  
kha, tha, pha, and ra all represent 2;  
ga, da, ba, and la all stand for 3;  
Gha, dha, bha, and va all represent 4;  
gna, na, ma, and sa all represent 5;  
ca, ta, and sa all stand for 6;  
cha, tha, and sa all denote 7;  
ja, da, and ha all represent 8;  
jha and dha stand for 9; and  
ka means zero.

Vowels make no difference and it is left to the author to select a particular consonant or vowel at each step. This great latitude allows one to bring about additional meanings of his own choice. For example kapa, tapa, papa, and yapa all mean 11. By a particular choice of consonants and vowels one can compose a poetic hymn with double or triple meanings. Here is an actual sutra of spiritual content, as well as secular mathematical significance.

*gopi bhagya madhuvrata  
srngiso dadhi sandhiga  
khala jivita khatava  
gala hala rasandara*

While this verse is a type of petition to Krishna, when learning it one can also learn the value of  $\pi/10$  (i.e. the ratio of the circumference of a circle to its diameter divided by 10) to 32 decimal places. It has a self-contained master-key for extending the evaluation to any number of decimal places.

The translation is as follows:

O Lord anointed with the yogurt of the milkmaids' worship (Krishna), O savior of the fallen, O master of Shiva, please protect me.

At the same time, by application of the consonant code given above, this verse directly yields the decimal equivalent of  $\pi$  divided by 10:  $\pi/10 = 0.31415926535897932384626433832792$ . Thus, while offering mantric praise to Godhead in devotion, by this method one can also add to memory significant secular truths.