Twitter Thread by agamshastra

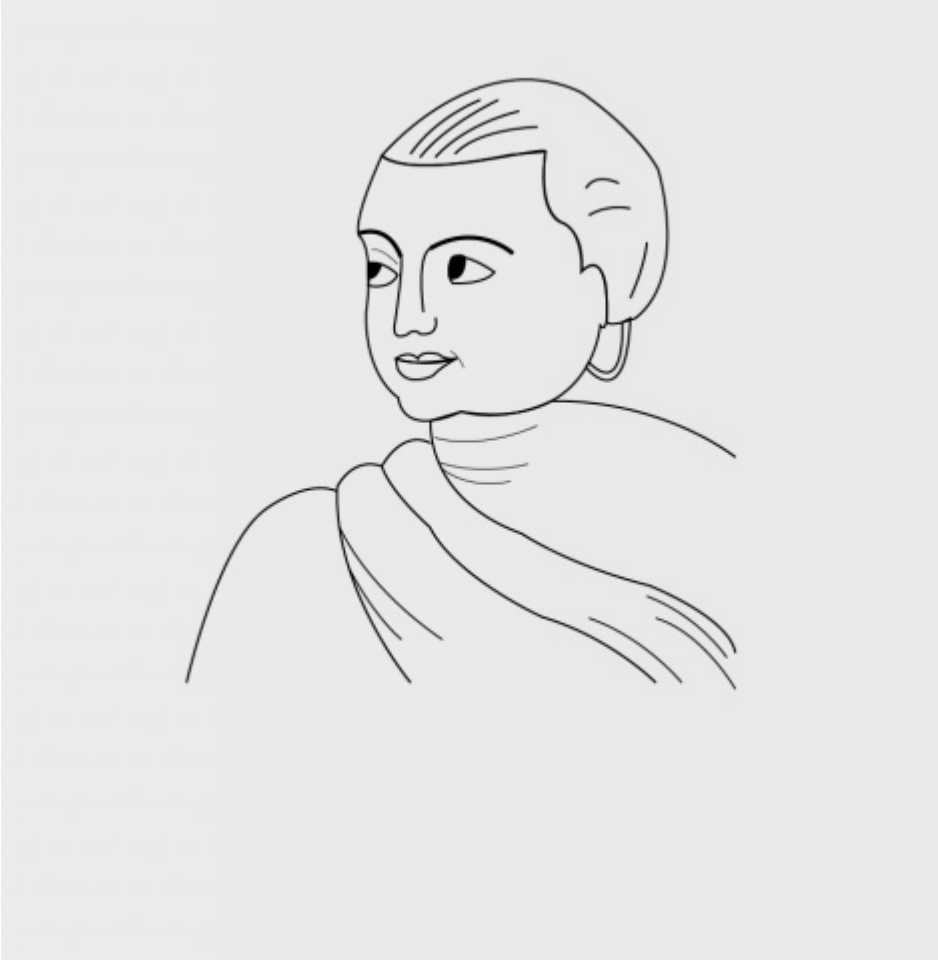


agamshastra
@truejainology

Some 1300 years ago in Karnataka there lived a genius who wrote "Ga■itas■rasan■graha" (which is earliest text devoted entirely to mathematics)

The man who's work later borrowed by Arabs & Europeans

Thread on "Mah■v■racharya" astounding but forgotten legacy



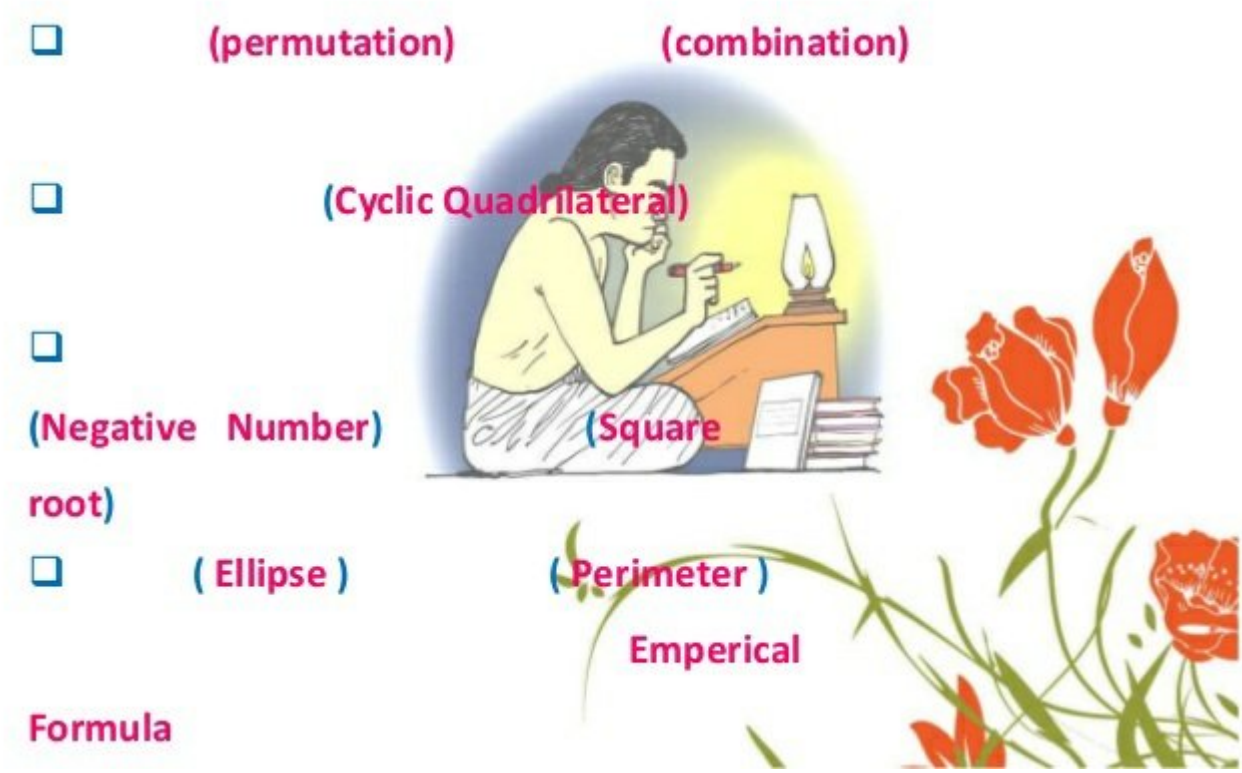
Mah■virach■rya was patronised by rashtrakuta king amoghavarasha

His book"Ga■ita-s■ra-sa■graha"is earliest text devoted entirely to Mathematics

He has described the currently used method of calculating(LCM)of given numbers.The same method was used in Europe later in1500CE

Mahavira wrote "Ga■ita-s■ra-sa■graha" (GSS) in 8th century CE which contains some 1100 slok■s & contains elementary topics in arithmetic , algebra , geometry , measurements , logic , number theory , dynamical systems etc

A sheer mathematical genius



He was devout jain
His magnum opus "Ganit sara sangraha " start with a sloka bowing to the glory of the jinas

"■■■■■■■■■■■■■■■■■■■■■ ■■■■■■■■■■ ■■■■■■■■■,
■■■■■■■■■■ ■■■■■■■■ ■■■■ ■■ ■■■■■■■■■■■■"

He also praised his predecessor aryabhata , brahmagupta & other greats in his works

Both Brahmagupta and Mahāvīra give the formula for the area of a quadrilateral in terms of the sides a, b, c, d and s (where $2s = a+b+c+d$) as

$$\sqrt{(s-a)\ (s-b)\ (s-c)(s-d)}$$

and neither of them has observed that this formula holds good only for a cyclic figure.

For the volume of a sphere, Mahāvīra gave an approximate formula as $\frac{9}{2}\ (\frac{1}{2}d)^3$ and the accurate one as $\frac{9}{10} \cdot \frac{9}{2}\ (\frac{1}{2}d)^3$. The latter gives the value of π as 3.0375. Mahāvīra also treated *kuṭṭaka*[5] (simple and simultaneous indeterminate equations of the first degree, viz. $\frac{ax \pm c}{b} = y$). What is more, he treated in an ingenious manner the ellipse, for the area of which he gave the following formula:

$$\text{(circumference)} \times \frac{1}{4}\text{(semi-minor axis)}.$$

The importance & popularity of "Ga■ita-s■ra-sa■graha"was so huge that it enjoyed statues of most important textbook of mathematics in South Indian for over 3 centuries

A large no of manuscript copies of
"Ga■ita-s■ra-sa■graha"whr discovered in Kerala shows it's popularity

> Aryabhata School of Mathematics appears to have some connection and sympathy for the Jaina mathematics. Bhaskara I quoted "Prakrt" verses of the Jains in his commentary. Another piece of evidence is the voluminous manuscripts of Jaina Mahavira's "Ganita Sara Sangraha" found in Kerala.

Mah■vira was the world's first mathematician to give the general formula for n C r in combinations .

Further he was one of the first mathematician to have given an approximate expression for the circumference of an ellipse(aayata vritta)

> Mahāvīra is the world's first mathematicican to give the general formula to find the number of ways of selecting (out of 'n' objects 'r' objects) at a time, without any regard for the order of selection denoted by
> ${}^{n}C_{r}$
> and ${}^{n}C_{r} = \frac{n(n-1)(n-2)\ldots(n-r+1)}{1.2.3\ldots\ldots r}$

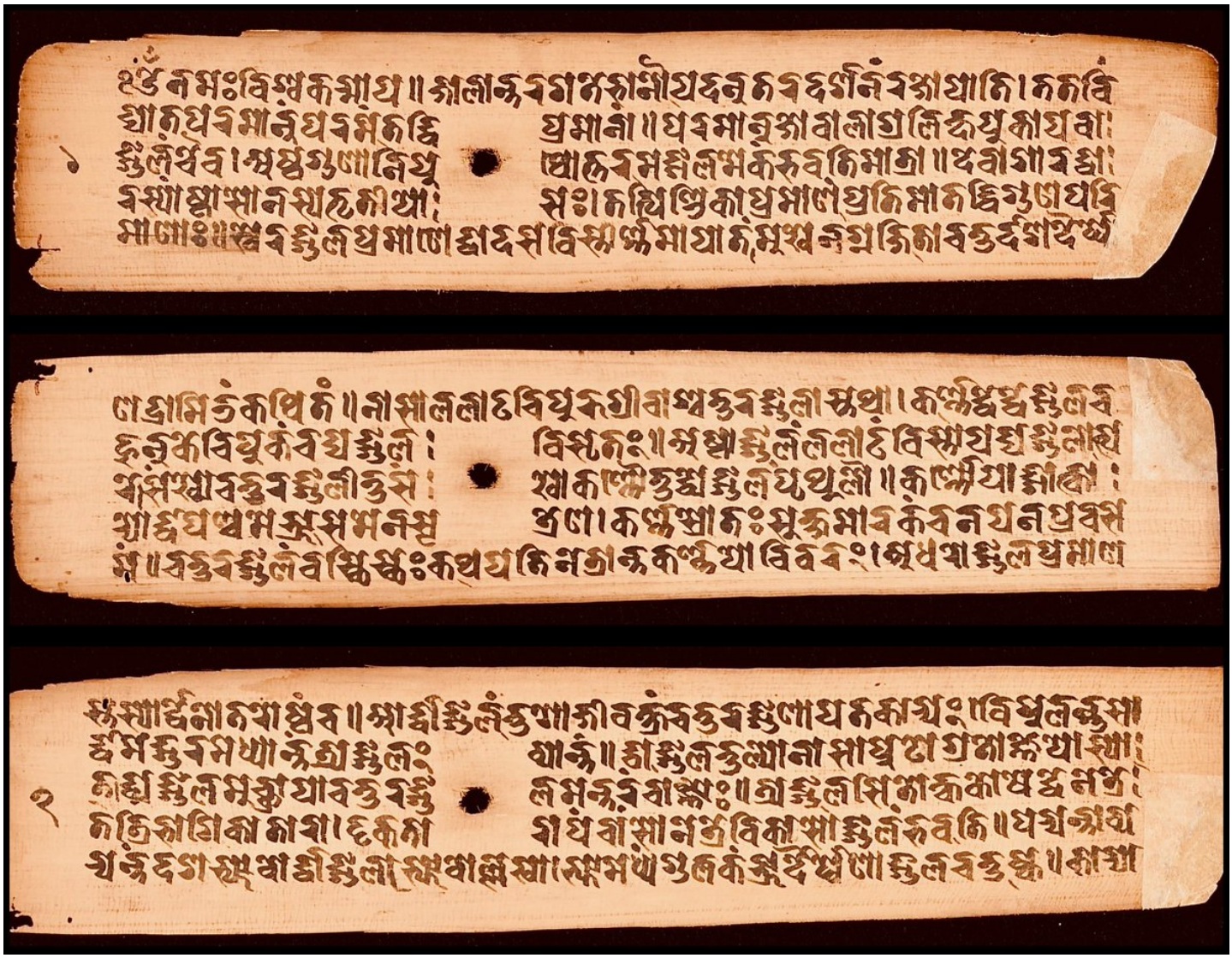
Mah■vira also made an important remark in connection with "root of negative number" .

He clearly mentioned in his work that a "negative number cannot have a square root" . This is the first remark on clear recognition of the imaginary quantities in mathematics .

He was the first one to write arithmetic in present day form , he described in details the current method of finding lowest common multiple. therefore, it was an invention not by John napier but by our very own scholar mahaviracharya in its actual form.

Mahaviracharya work was an important link in the continuous chain of Indian mathematics ,it acquired pride place particularly in South India

His work was recognised by great chalukyan ruler Raja Raja narendra who got it translated in telugu by mathematician pavuluri mallana



The credit tht Mahavira rightly deserves for discovery of various methods in the field of mathematics hs gone almost unnoticed by historians

Mahavira by his sheer achievements in several branches of mathematics has a distinct position in the history of indian & world mathematics