

Chapter 4: Chinese Civilization

§1. Introduction to the Chinese Civilization

Date :- 2300 B.C — 500 B.C
 700 A.D (recent) (ancient)
Location China.

Civilization

- 1- In 2300 B.C, Emperor Yao
- 2- In 1500 B.C, Shang Dynasty
- 3- In 1000, B.C, Attack by Chosun Barbarians.
- 4- In 500 B.C, China entered the Civil War.

§2. Chinese Numeration System

1- Chinese Numeration (1500 B.C, Shang Dynasty)

Symbols :- — = ≡ ☐ 五 六

Value :- 1 2 3 4 5 6

Symbols :- 七 八 九 + 百

Value :- 7 8 9 10 100

2- Rod Numbers :-

Examples :-

67 = $\overline{\text{I}} \overline{\text{II}}$ ($\overline{\text{III}}$ 8)
 60 = $\overline{\text{I}}$ $\overline{\text{II}}$

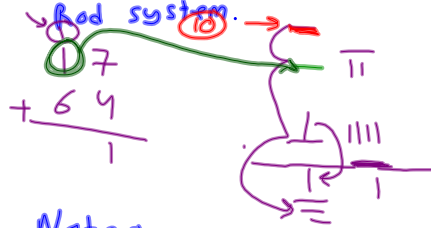
67 = \perp $\overline{\text{II}}$
 60 = \perp

33 = $\equiv \equiv$
 333 = $\equiv \equiv \equiv$
 303 = $\equiv \equiv$
 170 = $\perp \perp$

§ 3 - Computations

Similar to ours.

Example: Add $17 + 64$ using the Rod system.



Note:

Fractions are represented by describing them in terms of words.

$\frac{2}{3} \rightarrow$ || fen zhi ||
"out of"

|||| fen zhi $\frac{1}{8031} \rightarrow \frac{64}{8031}$

§ 4 - Algebra

Earliest books

- "Nine chapters".
- "Sea Island Mathematical Manual".

Contribution

- 1- Solving System of linear equations using column operation.
- 2- Knew Cramer's Rule.
- 3- Knew Pascal's Identity.
- 4- Magic Square.
 - $n \times n$ table.
 - Sum of the rows, columns, diagonals are all equal.
 - magic square is called normal if we use only the numbers $1, 2, 3, \dots, n^2$. ($Sum = \frac{n(n^2+1)}{2}$)

Goal: Find a strategy to create normal magic square of order n

- check!
- Step 1: Fill in the diagonals as you like, provided that they are equal
 - Step 2: Fill the rest (left to right) from $16, 15, 14, 13, \dots, 1$.

§ 5 - Geometry

Contribution

- Approximate π into 7 decimal places. 3.14---
- oldest proof of the Pythagorean theorem.