Ancient Chinese Mathematics

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Early Chinese Mathematicians and Mathematical Works

- 汉《九章算术》
  Nine Chapters of the Mathematical Arts
- 三国时代 Three Kingdoms 刘徽 Liu Jui
- 南北朝 Northern & Southern Dynasties 祖冲之Zu Chongzhi
- 隋唐 Sui & Tang Dynasties 《十部算经》
- 宋元 Song & Yuan dynasties 秦李杨朱四大家

Chinese Remainder Theorem

The Chinese Remainder Theorem

There is an unknown number such that when it is divided by 3, you get a remainder of 2; when it is divided by 5, you get a remainder of 3; and when it is divided by 7, you get a remainder of 2. What is the number?

答曰: 二十三

Answer: 23

Since when it is divided by 3 you get a remainder of 2, set 140; since when it is divided by 5 you get a remainder of 3, set 63; and since when it is divided by 7 you get a remainder of 2, set 30. Add them to get 233, from which you subtract 210 to get the answer.

宋刻《孙子算经》卷一

Master Sun’s Mathematical Manual Vol 1
Problem 20 (三斜求积)

Given a field bounded by 3 sides: the shortest side is 13 \( li \), the intermediate side is 14 \( li \) and the longest side is 15 \( li \). What is the area of the field?

Qin presented the formula

\[ A = \sqrt{\frac{a^2c^2 - \left(\frac{a^2 + c^2 - a'c'}{2}\right)^2}{4}} \]

which is equivalent to Heron’s formula

\[ A = \sqrt{s(s-a)(s-b)(s-c)}, \quad s = \frac{1}{2}(a+b+c) \]

Problem 28: Measuring the width of a river from the edge of a cliff

A General was leading his army to a battle when they came across a river. The general who was 5 \( chi \) tall was standing on a 3 \( zhang \) high cliff. Between the cliff and the river was sandy ground. The general raised a rod of bamboo that is 3 \( chi \) 4 \( chun \) long to 5 \( chun \) below his eye level. What is the width of the river?