祖沖之

# Extraordinary Chinese People

## Ancient times

## Zu Chongzhi

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Stanford House

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## Zu Chongzhi



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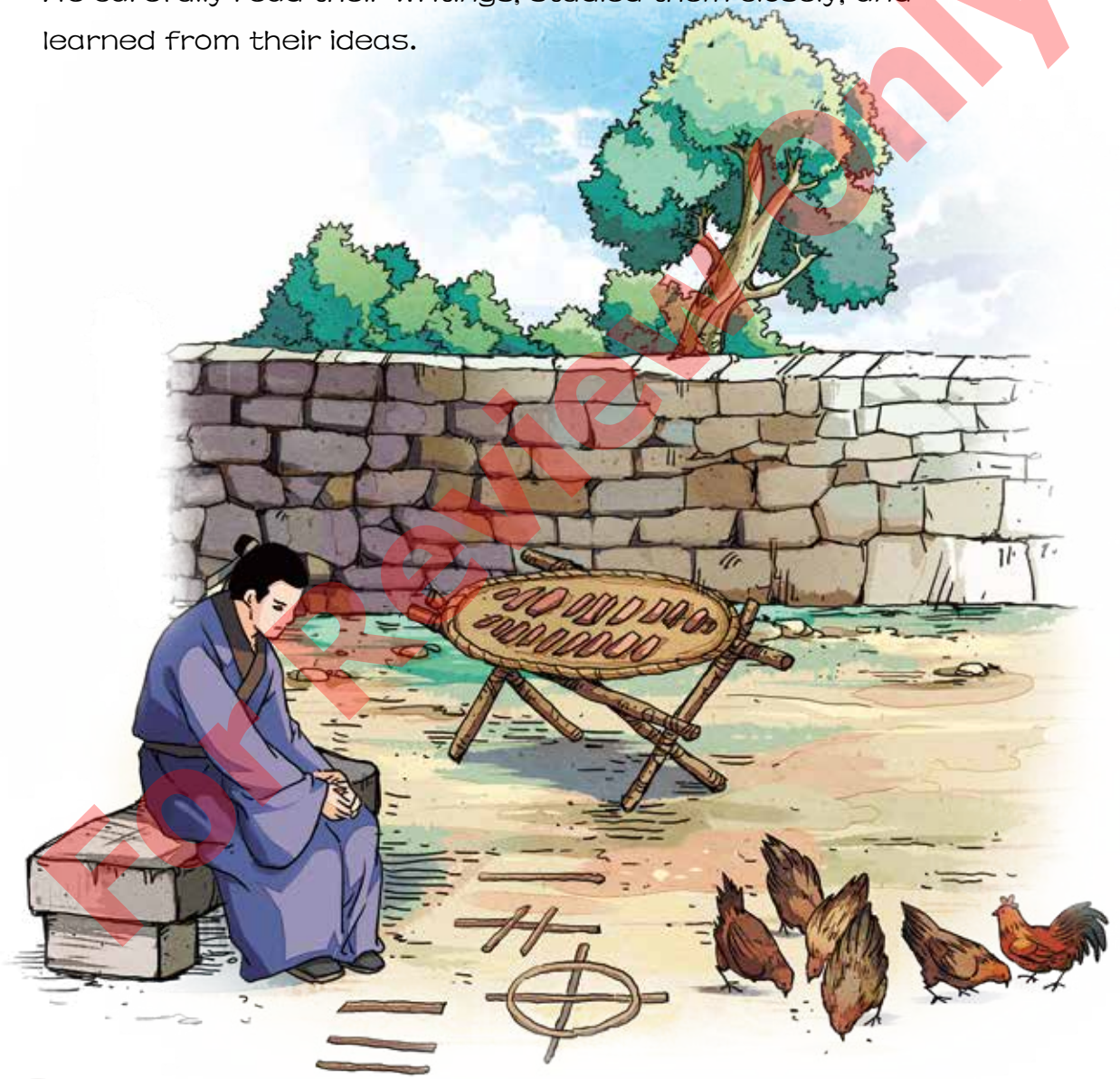
**Zu Chongzhi** (祖沖之) (429-500) was a brilliant Chinese mathematician and astronomer, renowned for calculating 'pi' to seven decimal places.

Zu Chongzhi's family came from Hebei. His father and other elders had all served as officials in the Southern Dynasties, where they were responsible for looking after palace buildings. For generations, the Zu family had studied astronomy and calendars in depth. From an early age, Zu Chongzhi was surrounded by these ideas. They made him curious and excited about many different subjects.

Zu Chongzhi received a rigorous education in mathematics, astronomy, and calendrical science from his family. He also studied the works of earlier scholars such as Liu Xin (劉歆), Zhang Heng (張衡), Wang Fan (王蕃), and Liu Hui (劉徽). He carefully read their writings, studied them closely, and learned from their ideas.



*What subjects did Zu Chongzhi study from his family?*

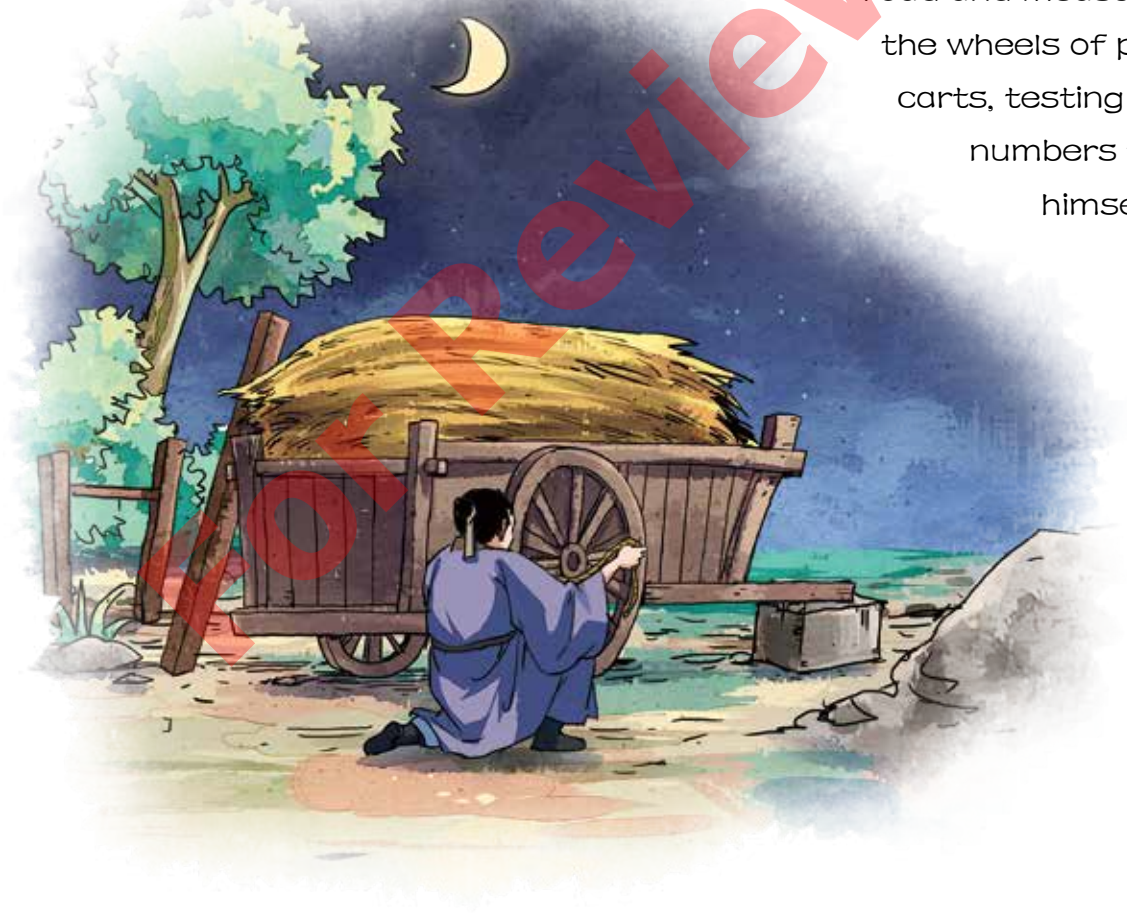
Mathematicians in China had long studied 'pi', which shows the ratio of a circle's circumference to its diameter. But Zu Chongzhi was the first in the world to calculate it so precisely — up to the seventh decimal place! This was a groundbreaking achievement.



*To how many decimal places did Zu Chongzhi calculate pi?*

When Zu Chongzhi was a boy, he was fascinated by pi. Sometimes he could not sleep at night because he kept wondering if something his teacher had said was not quite right.

One night, young Zu Chongzhi sneaked out with his mother's shoelace. He ran to the village road and measured the wheels of passing carts, testing the numbers for himself.



After measuring the wheels himself, Zu Chongzhi discovered something surprising — the wheel's diameter was actually a little shorter than one-third of its circumference. He then applied Liu Hui's (劉徽) 'circle-cutting' method, drawing polygons inside a large circle and measuring them with bamboo sticks. He calculated tirelessly, determined to find the most accurate value of the circle's ratio.



*What tool did Zu Chongzhi use to measure the polygons inside the circle?*

After repeated calculations, he finally narrowed pi down to between 3.1415926 and 3.1415927 — the most accurate value in the world at that time.

His discovery was so advanced that it took more than a thousand years before a German mathematician named Ludolph van Ceulen reached the same result.