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句股에 對한 數論的 考察

(A Number Theoretical Remark on Right-Angled Triangles)

We are all familiar with the following elementary number theoretical facts:

A set of three integers x, y, z satisfying the conditions $x=2st, y=s^2-t^2, z=s^2+t^2$ for integers $s > t > 0$ such that $\gcd(s, t) = 1$ and $s \not\equiv t \pmod{2}$ are the solutions of the equation $x^2 + y^2 = z^2$

Conversely, all the integral solutions of the equation $x^2 + y^2 = z^2$ satisfying the conditions $\gcd(x, y, z) = 1, 2 \mid x, x > 0, y > 0, z > 0$ are given by the formulas $x=2st, y=s^2-t^2, z=s^2+t^2$ for integers $s > t > 0$ such that $\gcd(s, t) = 1$ and $s \not\equiv t \pmod{2}$.

Let the positive integer n be written as $n=N^2m$ where m is square free. Then m can be represented as the sum of two squares if and only if m contains no prime factor of the form $4k+3$.

Using these facts, we will inspect the Chinese ancient arithmetic texts concerning the right-angled triangles.

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九章算術의 原版과 英文翻譯版의 間隔

國土와 人口와 歷史 等 周邊國에서 부러운 것이 많다. 주비산경과 더불어 구장산술도 중국이 자랑하는 古典이다. 新 판을 같이 보다가 琥珀속에 있는 별레