

直式開方法

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利用 $(a+b)^2 = a^2 + 2ab + b^2$ ，我們可以將一個數開方。

底下是求 $\sqrt{21}$ 之近似值的方法，因為將右邊的橫式計算，用直式的方法加以表示，所以我們將此方法稱為**直式開方法**。

The diagram illustrates the digit-by-digit method for finding the square root of 21. It consists of three stages of long division and corresponding algebraic expansions.

Stage 1: The long division shows 4 as the first digit, with a remainder of 5.00. The algebraic expansion is $21 = (4.\square)^2 = 4^2 + 2 \cdot 4 \cdot (0.\square) + (0.\square)^2$. Red circles highlight $2 \cdot 4$ and 5.00 . A red arrow points from $2 \cdot 4$ to the 8 in the long division, and another points from 5.00 to the 0 in the long division.

Stage 2: The long division shows 4.5 as the first two digits, with a remainder of .7500. The algebraic expansion is $21 = (4.5\square)^2 = (4.5)^2 + 2 \cdot (4.5) \cdot (0.0\square) + (0.0\square)^2$. Red circles highlight $2 \cdot (4.5)$ and $.7500$. A red arrow points from $2 \cdot (4.5)$ to the 5 in the long division, and another points from $.7500$ to the 0 in the long division.

Stage 3: The long division shows 4.58 as the first three digits, with a remainder of .7264. The text "然後一直做下去" (then keep going) is written next to it.

其實我更中意的是利用「算幾不等式」作開方，不過上面的方法已經很夠用了！