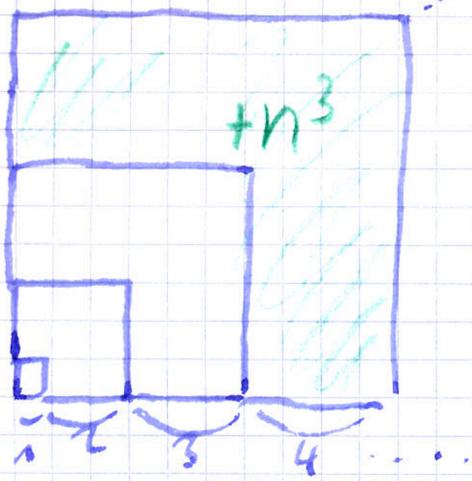
$\to a_n = \sum_{i=1}^{n} \boxed{?} = (?)^2$

Haftendorn 2009
kubikzahlen.pdf



Summe der
dritten Potenzen
der Kubikzahlen

Haftendorn 09

$$\boxed{\sum_{i=1}^{n} i^3 = \left(\frac{n(n+1)}{2}\right)^2 = a_n}$$

unten Gauß-kante

$a_n = a_{n-1} + n^3 \quad a_1 = \underline{\underline{1}} \qquad \left(\frac{1\cdot 2}{2}\right)^2 = 1^2 = \underline{\underline{1}}$

$a_2 = 1 + 2^3 = \underline{\underline{9}} \qquad \left(\frac{2\cdot 3}{2}\right)^2 = 3^2 = \underline{\underline{9}}$ IV

IA $a_n = \left(\frac{n(n+1)}{2}\right)^2$ Ziel $a_{n+1} = \left(\frac{(n+1)(n+2)}{2}\right)^2$

$n \leadsto n+1$

$a_{n+1} = a_n + (n+1)^3 \overset{=}{\scriptstyle IA} \frac{1}{4} n^2 (n+1)^2 + (n+1)^3$

$= \frac{1}{4}(n+1)^2 \left(n^2 + 4(n+1)\right) = \frac{1}{4}(n+1)^2 (n^2 + 4n + 4)$

$= \frac{1}{4}(n+1)^2 (n+2)^2 = \left(\frac{(n+1)(n+2)}{2}\right)^2$

$\underline{\underline{qed}}$

Angesetzter Winkel in Takt n

$= n^2 + 2\frac{(n-1)(n)}{2} \cdot n$

$= n^2 + (n-1)n^2$

$= n^2(1 + n - 1) = \underline{\underline{n^3}}$