

CLASS 8

MATHS

REVISION NOTES

Revision Notes: Class 8 Maths Chapter 1 A Square and A Cube

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Class 8 Maths Chapter 1: A Square and A Cube — Quick Revision Notes

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Square number / perfect square: $n \times n = n^2$; the squares of natural numbers (1, 4, 9, 16, 25...) are called perfect squares.

Odd factor count: Every perfect square has an odd number of factors (one factor pairs with itself) — the basis of the 100-lockers puzzle, where only square-numbered lockers stay open.

Last-digit test: A perfect square can only end in 0, 1, 4, 5, 6 or 9 — never 2, 3, 7 or 8. (Necessary but not sufficient — not every number ending in these digits is a square.)

Zero-count rule (squares): Squaring doubles the trailing-zero count, so a perfect square always has an **even** number of trailing zeros.

Odd/even parity: An even number squares to an even number; an odd number squares to an odd number.

Consecutive-odd-number pattern: The sum of the first n consecutive odd numbers is n^2 ($1=1^2$; $1+3=2^2$; $1+3+5=3^2$...).

Numbers between consecutive squares: Exactly $2n$ numbers lie between n^2 and $(n+1)^2$.

Square root: If $y=x^2$, x is a square root of y , written $\sqrt{y}$. Methods: repeated subtraction of consecutive odd numbers, prime factorisation (pairing identical primes), or estimation by bracketing between known squares.

Cube number / perfect cube: $n \times n \times n = n^3$; numbers like 1, 8, 27, 64, 125... are perfect cubes. A number is a perfect cube only if every prime factor's exponent is a multiple of 3.

Cube root: If $y=x^3$, x is the cube root of y , written $\sqrt[3]{y}$. Method: prime factorisation, grouping each prime into triples; or estimate using the last-digit rule ($1 \rightarrow 1$, $8 \rightarrow 2$, $7 \rightarrow 3$, $4 \rightarrow 4$, $5 \rightarrow 5$, $6 \rightarrow 6$, $3 \rightarrow 7$, $2 \rightarrow 8$, $9 \rightarrow 9$) plus bracketing between known cubes.

Zero-count rule (cubes): Cubing multiplies the trailing-zero count by 3, so a perfect cube's trailing zeros are always a multiple of 3 (never exactly 1 or 2).

Consecutive-odd-number pattern (cubes): The n th run of n consecutive odd numbers sums to n^3 (e.g. $7+9+11=3^3$).

Taxicab numbers: A number expressible as a sum of two positive cubes in two different ways. 1729 (Hardy–Ramanujan number) = $1^3+12^3 = 9^3+10^3$; the next two are 4104 and 13832.

History: Babylonians compiled square/cube tables on clay tablets (≈ 1700 BCE). In Sanskrit mathematics, *varga* = square and *ghana* = cube; *varga-mula/ghana-mula* = square/cube root (Aryabhata, Brahmagupta) — the origin of the word 'root' traces to Sanskrit *mula*.