Multiples & Factors

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Factors (The Dividers)

Numbers that fit **exactly** into another.

- **Finite:** There is a fixed count.
- **Always:** 1 and the number itself.
- **Squares:** Have an *odd* number of factors (e.g., 9: 1, 3, 9).

Multiples (The Products)

The "Times Table" of a number.

- **Infinite:** They never end.
- **Smallest:** The number itself.
- **Check:** x is a multiple of y if $x \div y$ is a whole number.

Prime Factorization & Indices

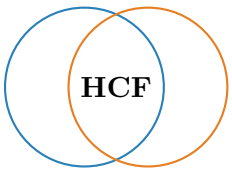
Every number > 1 is either prime or a product of primes.

- **Index Form:** Write results as $2^a \times 3^b \times 5^c$.
- **Perfect Squares:** All prime exponents must be **even**.
- **Perfect Cubes:** All prime exponents must be **multiples of 3**.

The Panda Math Tutor

HCF vs. LCM: The Strategy

Feature	HCF	LCM
Primes	**Common** only	**All** factors
Powers	**Lowest**	**Highest**
Context	*Sharing/Cutting*	*Cycles/Repeating*



Union = LCM

Common Traps & Pitfalls

1. **The "1" Trap:** 1 is **NOT** a prime number. 2 is the only even prime.
2. **Ordering:** Factors $\leq$ Number $\leq$ Multiples.
3. **Primality Test:** Check prime divisors up to $\sqrt{n}$.
4. **Formula:** For 2 numbers: $HCF(a,b) \times LCM(a,b) = a \times b$.

Quick Exam Shortcuts

Make N a perfect square: Multiply by the prime factors needed to make all exponents even (e.g., $12 = 2^2 \times 3^1 \rightarrow$ multiply by 3 to get 36).
Remainders: Smallest value with remainder $r = LCM(a,b,c) + r$.