

Factors - Language and Method



Key idea

a is a **factor** of n when $n \div a$ is a whole number.

List the factors of 24

Use **factor pairs** that multiply to 24:

1×24 , 2×12 , 3×8 , 4×6 .

Factors: 1, 2, 3, 4, 6, 8, 12, 24.

Common mistake

A **factor** divides a number; a **multiple** is made by multiplying it.

4 is a factor of 20; 20 is a multiple of 4.

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Prime and Composite Numbers



Key idea

A **prime** has exactly two factors:
1 and itself.

A **composite** number has more
than two.

Test 79

Test primes up to $\sqrt{79} < 9$: not
2, 3, 5, 7, so 79 is prime.

Common mistake

1 is **not** prime (only one factor).
2 is the only even prime, so “all
primes are odd” is false.

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Common Factors and HCF



Key idea

A **common factor** is in both factor lists. The **HCF** is the greatest shared factor.

Find HCF(18, 24)

18: 1, 2, 3, 6, 9, 18

24: 1, 2, 3, 4, 6, 8, 12, 24

Common: 1, 2, 3, 6, so $\text{HCF} = 6$.

In context

Cut 36 cm and 45 cm ribbons into equal pieces, no waste:

$$\text{HCF}(36, 45) = 9 \text{ cm.}$$

Common mistake

A common factor is not always the HCF — always pick the **greatest** shared factor.

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Prime Factor Decomposition



Key idea

A **factor tree** splits a number until every branch ends at a prime. That prime product is unique.

Decompose 72

$$72 = 8 \times 9 = 2 \times 2 \times 2 \times 3 \times 3.$$

Index form: $2^3 \times 3^2$.

Reverse the form

$$2^2 \times 3 \times 5^2 = 4 \times 3 \times 25 = 300.$$

Common mistake

Do not stop a tree at a composite number.

$36 = 3 \times 3 \times 4$ is unfinished, because $4 = 2 \times 2$.

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HCF from Prime Factors



Key idea

Write each number in index form, then multiply the **lowest** power of every shared prime.

Find HCF(84, 126)

$$84 = 2^2 \times 3 \times 7$$

$$126 = 2 \times 3^2 \times 7$$

$$\text{HCF} = 2 \times 3 \times 7 = 42.$$

Common mistake

Use the **lowest** power of each shared prime, not the highest. The highest powers give the LCM instead.

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