Notes & Steps

Key idea

Factorising is the reverse of expanding. Find the highest common factor (HCF) of all terms, write it outside the bracket, then put what's left inside. Expanding checks your answer.

Steps

1. Find the HCF of the coefficients (the numbers).
2. Find the HCF of the variables (lowest power of each letter).
3. Write the HCF outside the bracket: HCF$(\dots)$.
4. Divide each term by the HCF. Write the results inside.
5. Check: expand your answer — you should get back the original expression.

Examples

- $6x + 9$: HCF = 3, so $3(2x + 3)$
- $x^2 + 5x$: HCF = x, so $x(x + 5)$
- $2x^2 + 6x$: HCF = $2x$, so $2x(x + 3)$
- $4a - 10$: HCF = 2, so $2(2a - 5)$
- $-3x - 6$: HCF = -3, so $-3(x + 2)$
- $8y^2 - 12y$: HCF = $4y$, so $4y(2y - 3)$

Common mistake

Only factoring the coefficient and leaving the variable. Factorise $x^2 + 5x$ as $x(x + 5)$, not $x^2(1 + \frac{5}{x})$ or forgetting the x. Check by expanding!

Notes & Steps

Example 1: numbers only

Factorise $6x + 9$. HCF of 6 and 9 is 3.

$$3(2x + 3)$$

Check: $3 \times 2x + 3 \times 3 = 6x + 9$

Example 2: variable in common

Factorise $x^2 + 4x$. HCF of x^2 and $4x$ is x.

$$x(x + 4)$$

Check: $x \times x + x \times 4 = x^2 + 4x$

Example 3: both

Factorise $6x^2 + 9x$. HCF of $6x^2$ and $9x$ is $3x$.

$$3x(2x + 3)$$

Check: $3x \times 2x + 3x \times 3 = 6x^2 + 9x$

Example 4: negative

Factorise $-4x - 8$. HCF is -4.

$$-4(x + 2)$$

Check: $-4 \times x + (-4) \times 2 = -4x - 8$

Try these

1. Factorise $5x + 15$.
2. Factorise $x^2 + 7x$.
3. Factorise $6a^2 - 9a$.

Common mistake

Forgetting to check your answer. Always expand your factorised form to see if you get back the original expression. If not, find the right HCF.