FACTORING FLOW CHART

Start

Is there a common factor?

No

Yes

Factor out the GCF

How many terms are there?

Two

Three

Four

Is it a Difference of Squares?

$$\boldsymbol{A^2 - B^2 = (A - B)(A + B)}$$

Examples:

$$x^2 - 25 = (x - 5)(x + 5)$$

$$9x^2 - 64 = (3x - 8)(3x + 8)$$

Factor into two Binomials

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Examples:

$$x^2 - 4x - 21 = (x - 7)(x + 3)$$

$$10x^2 + 11x + 3 = (2x + 1)(5x + 3)$$

Factor by Grouping

Example: $6ab + 2b + 9a + 3$

$= (6ab + 2b) + (9a + 3)$

$= 2b(3a + 1) + 3(3a + 1)$

$= (3a + 1)(2b + 3)$

By Difference of Squares

Example: $\mathrm{x}^2 - 10\mathrm{x} + 25 - \mathrm{y}^2$

$\underbrace{\mathrm{x}^2 - 10\mathrm{x} + 25}_{\textit{Perfect square trinomial}} - \mathrm{y}^2$

$= (x - 5)^2 - y^2$

$= (x - 5 - y)(x - 5 + y)$

Is it a Difference of Cubes?

$$\boldsymbol{A^3 - B^3 = (A - B)(A^2 + AB + B^2)}$$

Examples:

$$x^3 - 27 = (x - 3)(x^2 + 3x + 9)$$

$$8x^3 - 125 = (2x - 5)(4x^2 + 10x + 25)$$

Is it a Sum of Cubes?

$$\boldsymbol{A^3 + B^3 = (A + B)(A^2 - AB + B^2)}$$

Examples:

$$x^3 + 64 = (x + 4)(x^2 - 4x + 16)$$

$$125x^3 + 1 = (5x + 1)(25x^2 - 5x + 1)$$

Yes

Check each factor. Can it be factored again?

If the answer is **YES,** repeat the process.

If the answer is **NO**, write the final answer as a product of all the factors and the GCF.