

Factoring Special Forms

Summary

1. Always look for a greatest common factor (GCF) to factor out *first*.
2. $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$
3. $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Factoring Sum of Cubes

A **sum of cubes** is an expression in the form

$$a^3 + b^3$$

To start, take the cube root of each term:

- $\sqrt[3]{a^3} = a$
- $\sqrt[3]{b^3} = b$

a	a^3		
b			b^3

Remember: Always check to see if you are able to factor out a GCF first.

Example 1. Factor each completely.

(a) $x^3 + 125$

(b) $27y^3 + 64$

(c) $2x^3 + 54$

Factoring Difference of Cubes

A **difference of cubes** is an expression in the form

$$a^3 - b^3$$

To start, take the cube root of each term:

- $\sqrt[3]{a^3} = a$
- $\sqrt[3]{-b^3} = -b$

a	a^3		
$-b$			$-b^3$

Example 2. Factor each completely.

(a) $x^3 - 216$

(b) $8 - 125y^3$

(c) $5x^3 - 40$