A difference of squares can be factored using the formula
\[ a^2 - b^2 = (a + b)(a - b). \]

**Example:** Factor \( x^2 - 9y^2. \)
\[
x^2 - 9y^2 = (x)^2 - (3y)^2 \quad \text{Write terms as perfect squares.}
= (x + 3y)(x - 3y) \quad \text{Use the formula.}
\]

The same method can be used to factor any expression which can be written as a difference of squares.

**Example:** Factor \( 4(x + 1)^2 - 25y^4. \)
\[
4(x + 1)^2 - 25y^4 = (2(x + 1))^2 - (5y^2)^2
= [(2(x + 1)) + (5y^2)][(2(x + 1)) - (5y^2)]
= (2x + 2 + 5y^2)(2x + 2 - 5y^2)
\]

**Note:** The sum of squares \( a^2 + b^2 \) cannot be factored.
Perfect Square Trinomials can be factored using the formulas

\[ a^2 + 2ab + b^2 = (a + b)^2. \]

\[ a^2 - 2ab + b^2 = (a - b)^2. \]

**Example:** Factor \(9x^2 + 30x + 25\).

\[ 9x^2 + 30x + 25 = (3x)^2 + 2(3x)(5) + (5)^2 \]

Write terms as perfect squares.

\[ = (3x + 5)^2 \]

Use the formula.

**Example:** Factor \(36m^2 - 60mn + 25n^2\).

\[ = (6m)^2 - 2(6m)(5n) + (5n)^2 \]

\[ = (6m - 5n)^2 \]

A difference of cubes can be factored using the formula

\[ a^3 - b^3 = (a - b) (a^2 + ab + b^2). \]

**Example:** Factor \(8x^3 - 27\).

\[ 8x^3 - 27 = (2x)^3 - (3)^3 \]

Write terms as perfect cubes.

\[ = (2x - 3) (4x^2 + 6x + 9). \]

Use the formula.

A similar method can be used to factor any expression which is the sum of cubes.

\[ a^3 + b^3 = (a + b) (a^2 - ab + b^2). \]

**Example:** Factor \(n^3 + 64\).

\[ n^3 + 64 = (n)^3 + (4)^3 \]

Write terms as perfect cubes.

\[ = (n + 4) (n^2 - 4n + 16). \]

Use the formula.