

## Guide to Factoring Polynomials

**Factor out GCF:** Factor out the greatest common factor of all the terms.

EXAMPLE:

How many terms are there?

### Binomials

**Difference of Squares:**

$$a^2 - b^2 = (a - b)(a + b)$$

EXAMPLE:

**Sum of Squares:**

$$a^2 + b^2 = (a - bi)(a + bi)$$

EXAMPLE:

**Sum of Cubes:**

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

EXAMPLE:

**Difference of Cubes:**

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

EXAMPLE:

\*If a quadratic expression is not factorable, use quadratic formula.

### Trinomials

**Quadratic Trinomials:** Find factors with product  $ac$  and sum  $b$ .

$$ax^2 + bx + c$$

EXAMPLE:

**Perfect Square Trinomials:**

$$a^2 + 2ab + b^2 = (a + b)^2$$

$$a^2 - 2ab + b^2 = (a - b)^2$$

EXAMPLES:

**Quartic Trinomials:**

$$ax^4 + bx^2 + c = (_x^2 + _)(_x^2 + _)$$

EXAMPLE:

\*If a quadratic expression is not factorable, use quadratic formula.

### Polynomials of 4 terms

**Factor by grouping:**

$$\begin{aligned} ax + ay + bx + by &= a(x + y) + b(x + y) \\ &= (a + b)(x + y) \end{aligned}$$

EXAMPLE: