

# Factoring Toolbox

## Factoring Polynomials with Four Terms

(x + 2)(x - 5)

### GCF First

Factor out the GCF first, if there is one.

$$\begin{aligned}6x^2 + 4x - 8x + 10 \\ = 2(3x^2 + 2x - 4x + 5)\end{aligned}$$

### Factor by Grouping

$$\begin{aligned}12x^2 + 8x - 21x - 14 \\ = (4x - 7)(3x + 2)\end{aligned}$$

## Factoring Polynomials with Three Terms

(x + 2)(x - 5)

### GCF First

Factor out the GCF first, if there is one.

$$6x^2 + 9x - 15 = 3(2x^2 + 3x - 5)$$

### Coefficient of $x^2$ is 1

Trial and error or AC method.

$$x^2 + 7x + 12 = (x + 3)(x + 4)$$

### Coefficient of $x^2$ is not 1

AC method or trial and error.

$$12x^2 + 8x - 15 = (2x + 3)(6x - 5)$$

### Perfect Square Trinomial

Use the patterns

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

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

$$x^2 + 6x + 9 = (x + 3)^2$$

$$x^2 - 10x + 25 = (x - 5)^2$$

## Factoring Polynomials with Two Terms

(x + 2)(x - 5)

### GCF First

Factor out the GCF first, if there is one.

$$6x^2 + 4x = 2x(3x + 2)$$

### Difference of Squares

Use the difference of squares pattern.

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

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