

### Order of Operations

BODMAS / PEMDAS

B - Brackets: Perform operations inside parentheses or brackets first.

O - Orders: Evaluate expressions with exponents (powers and roots).

D - Division: Perform division from left to right.

M - Multiplication: Perform multiplication from left to right.

A - Addition: Perform addition from left to right.

S - Subtraction: Perform subtraction from left to right.

### SPECIAL PRODUCTS INVOLVING CUBES

The products are just the result of multiplying out the bracket.

$$(x + y)^3 = x^3 + 3x^2y + 3xy^2 + y^3$$

(Cube of a sum)

$$(x - y)^3 = x^3 - 3x^2y + 3xy^2 - y^3$$

(Cube of a difference)

$$(x + y)(x^2 - xy + y^2) = x^3 + y^3$$

(Sum of 2 cubes)

$$(x - y)(x^2 + xy + y^2) = x^3 - y^3$$

(Difference of 2 cubes)

### Law of Inclusion and Exclusion

#### PROBLEM SETS

For three sets A, B, and C:

$$|A \cup B \cup C| = |A| + |B| + |C| - |A \cap B| - |A \cap C| - |B \cap C| + |A \cap B \cap C|$$

and

$$|A \cap B \cap C| = |A \cap B \cap C| - |A| - |B| - |C| + |A \cap B| + |A \cap C| + |B \cap C|$$

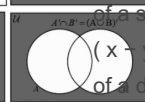
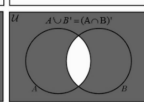
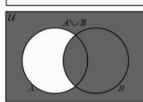
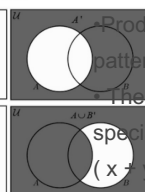
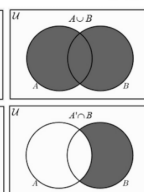
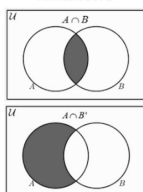
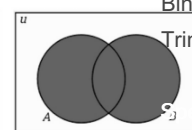
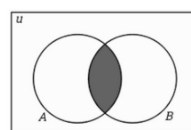
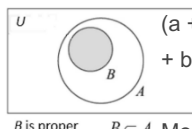
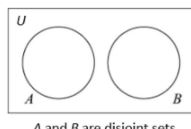
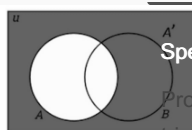
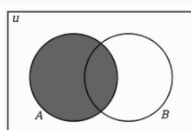
### THE FOIL METHOD

FOIL – is sometimes used to find the product of two binomials.

We multiply,

- the First terms,
- the Outer terms,
- the Inner terms, and then
- the Last terms of each binomials.

### Venn Diagram



### RULES OF EXPONENT

Multiplication Rule	$a^x \times a^y = a^{x+y}$
Division Rule	$a^x \div a^y = a^{x-y}$
Power of a Power Rule	$(a^x)^y = a^{xy}$
Power of a Product Rule	$(ab)^x = a^x b^x$
Power of a Fraction Rule	$\left(\frac{a}{b}\right)^x = \frac{a^x}{b^x}$
Zero Exponent	$a^0 = 1$
Negative Exponent	$a^{-x} = \frac{1}{a^x}$
Fractional Exponent	$a^{\frac{x}{y}} = \sqrt[y]{a^x}$

### Special Product

Product of Sum and Difference of Two Terms

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

### Special Products

Product of a binomial and a trinomial of the form.

$$(a + b)(c + d + e) = ac + ad + ae + bc + bd + be$$

$$\text{Monomial} = 2y^2, 2$$

$$\text{Binomial} = (2y^2 - 2)$$

$$\text{Trinomial} = (2y^3 + y^2 + 2)$$

### Special Products: Square of a Binomial

Products in algebra have patterns that occur frequently

These patterns are called

special products

$$(x + y)^2 = x^2 + 2xy + y^2$$

(Square of a sum)

$$(x - y)^2 = x^2 - 2xy + y^2$$

(Square of a difference)

