

Topic: Rules Of Simplifying Algebraic Expressions

1. Order of Operations

Written and discussed already

2. The Distributive Property

Remove parentheses by multiplying the outside factor by every term inside:

- **Formula:**

$$a(b+c) = ab + ac$$

- **Example:**

$$3(2x + 5) = 6x + 15$$

- ***Note on negative signs:***

Distributing a negative number changes every sign inside the parentheses

$$-2(x - 3) = -2x + 6$$

3. Combining Like Terms

Like terms share identical variables and exact same exponents. Add or subtract their coefficients while keeping the variable part unchanged:

- **Formula:**

$$ax^n + bx^n = (a+b)x^n$$

- **Example:**

$$5x^2 - 2x^2 = (5 - 2)x^2 = 3x^2$$

4. Rules of Exponents (Powers)

When terms with powers are multiplied or divided, simplify using exponent laws:

- **Product Rule:**

$$x^a \cdot x^b = x^{a+b} \text{ (add exponents when multiplying same bases)}$$

- **Quotient Rule:**

$$x^a \div x^b = x^{a-b} \text{ (subtract denominator exponent from numerator)}$$

- **Zero Exponent Rule:**

$x^0 = 1$ (any non-zero base to the power of zero equals 1)

- **Negative Exponent Rule:**

$$x^{-a} = \frac{1}{x^a}$$

5. Final Formatting Rules

- Arrange the final simplified expression neatly:
- Write variable terms with the **highest exponents first** (descending order).
- List multiple variables in **alphabetical order** (e.g., xy before yz).
- Put **constant numbers** (standalone numbers) at the very end.