Multiplication of Three or More Monomials

Understanding of Multiplication of Three or More Monomials

- Multiplying three or more monomials means multiplying their coefficients and applying the laws of exponents to the variables.
- Multiply two monomials first, then multiply the result with the next monomial.
- Use the rule: $a^m \times a^n \times a^p = a^{m+n+p}$ for variables with the same base.

Important Points

- Multiply all the numerical coefficients first.
- For the same variables, add all the exponents together.
- Arrange variables in alphabetical order.
- Keep track of negative signs carefully.

Examples with Solutions

Example: Multiplying Simple Monomials

$> 2x \times 3x^2 \times 4x^3$

Solution: Multiply coefficients: 2 × 3 × 4 = 24

Add exponents:
$$x^1 \times x^2 \times x^3 = x^6$$

Answer: 24x⁶

Example: Multiplying Monomials with Different Variables

≻ a × 2b × 3c

Solution: Multiply coefficients: $1 \times 2 \times 3 = 6$

Variables are different, so write together: abc

Answer: 6abc

Example: Multiplying Monomials with Multiple Variables and Powers

 $\geq 2x^2y \times (-3xy^2) \times 5x^3y$

Solution: Multiply coefficients: $2 \times (-3) \times 5 = -30$

Add exponents of x: $x^2 \times x^1 \times x^3 = x^6$

Add exponents of y: $y^1 \times y^2 \times y^1 = y^4$

Answer: -30x⁶y⁴

Example: Multiplying with Negative Signs

 $(-2m^2) \times (-3m^3) \times (4m)$

Solution: Multiply coefficients: $(-2) \times (-3) \times 4 = 24$

Add exponents of m: $m^2 \times m^3 \times m^1 = m^6$

Answer: 24m⁶

Example: Multiplying Monomials with Fractions

➤ Multiply:
$$\left(\frac{1}{2}\right)p^2 \times \left(\frac{2}{3}\right)p^3 \times \left(\frac{3}{4}\right)p$$
Solution: Multiply coefficients: $\left(\frac{1}{2}\right) \times \left(\frac{2}{3}\right) \times \left(\frac{3}{4}\right)$
 $\left(\frac{1}{2}\right) \times \left(\frac{2}{3}\right) = \frac{1}{3}$
 $\left(\frac{1}{3}\right) \times \left(\frac{3}{4}\right) = \frac{1}{4}$
Add exponents of p: $p^2 \times p^3 \times p^1 = p^6$
Answer: $\left(\frac{1}{4}\right)p^6$

Summary Points

- Multiply all numbers (coefficients) first.
- For the same variable, add all powers together.
- Write variables neatly in alphabetical order.
- Be careful with multiplying negative numbers.
- Fractions should be multiplied step-by-step carefully.