

# Multiplying and Factoring Notes

## Multiplication of Algebraic Expression:

**Monomials by Monomial.** to multiply monomials, use the commutative and associative rules for multiplication and in most cases, the theorem of exponents.

**Monomial by a Polynomial.** if a polynomial is to be multiplied by a monomial, the distributive rule is used. The product is the sum of all the products formed by multiplying each term polynomial by the monomial multiplier.

**Sample Problem 1:** Find the product of the following monomials

1.  $(3x^2y)(4xy^3)$

Answer:

$12x^3y^4$

3.  $(3a)(21b^2c)$

Answer:

$63ab^2c$

2.  $(xy^2z^3)(2xy^5)$

Answer:

$2x^2y^7z^3$

**Sample Problem 2:** Find the product of the monomial by polynomials

4.  $3x(4x + 2)$

Answer:

$12x^2 + 6x$

5.  $3a(2a^2 + 4b)$

Answer:

$6a^3 + 12ab$

6.  $5x(x^2 + 3x - 4)$

Answer:

$5x^3 + 15x^2 - 20x$

7.  $6ab(2a + 3b - 4c + 5)$

Answer:

$12a^2b + 18ab^2 - 24abc + 30ab$

## Factoring:

**Factoring Polynomials** is simply the reverse process of special product.

A polynomial with integral coefficient is no longer factorable if:

1. the coefficient have no common factor, and
2. it cannot be expressed as the product of two polynomial of lower degree.

**Sample Problem 3:** Factor the following polynomials

8.  $24x^2 - 18x^3$

Factor:  $(4 \times 6)x^2 - (6 \times 3)x^3$  then GCF  $6x^2$

Answer:

$6x^2(4 - 3x)$

9.  $60ab^5 - 105a^2b^4$

Factor:  $(2^2 \times 3 \times 5)ab^5 - (3 \times 5 \times 7)a^2b^4$

then GCF  $(3 \times 5)ab^4 = 15ab^4$

Answer:

$15ab^4(4b - 7a)$

10.  $28a^2b^4c^5 - 42a^3b^2c^4 + 56ab^3c^3$

factor:  $(2 \times 2 \times 7)a^2b^4c^5 - (2 \times 3 \times 7)a^3b^2c^4 +$

$(2 \times 4 \times 7ab^3c^3) = \text{then GCF } (2 \times 7)ab^2c^3 = 14ab^2c^3$

Answer:

$14ab^2c^3(2ab^2c^2 - 3a^2c^2 + 4b)$