

## Greatest Common Factors and Factoring by Grouping

\_\_\_\_\_ is the reverse process of multiplication.

Multiplication:  $3 \cdot 5 = 15$

Factoring:  $15 = 3 \cdot 5$

Multiplication:  $3x(2x + 5) = 6x^2 + 15x$

Factoring:  $6x^2 + 15x = 3x(2x + 5)$

### Greatest Common Factor (GCF)

**GCF of a polynomial:** \_\_\_\_\_ of the coefficients times each variable to the \_\_\_\_\_ power.

ex: What is the GCF of  $6x^2 + 15x$ ? \_\_\_\_\_

**Ex 1.**

Factor:  $18x^3y^2 - 27xy^3$

**Ex 2.**

Factor:  $3x^2y + 6x^4y^2 - 12x^3y^6$

**Ex 3.**

Factor:  $-4x^3 + 12x^2 + 8x$

### Factoring by Grouping

**Ex 4.**

Factor:  $2(x - 3) + 7a(x - 3)$

**Ex 5.**Factor by grouping:  $x^3 - 4x^2 + 5x - 20$ **Factoring by grouping:**

1. \_\_\_\_\_ terms that have common monomial factor.
2. \_\_\_\_\_ common monomial factor from each group.
3. \_\_\_\_\_ remaining common binomial factor.

**Ex 6.**Factor by grouping:  $3x^3 - 2x^2 - 6x + 4$ **Note:** Sometimes need to rearrange terms to get method to work.**Ex 7.**Factor by grouping:  $3x^2 - 8y + 12x - 2xy$ 

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**Practice**

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1. Factor:  $9x^4 + 18x^3 + 6x^2$
2. Factor:  $15x^4y^6 - 3x^3y^5 + 12x^4y^4$
3. Factor:  $-5x^3 + 50x^2 - 10x$
4. Factor:  $4y(a - b) - (a - b)$
5. Factor by grouping:  $x^3 - 2x^2 + 5x - 10$
6. Factor by grouping:  $xy - 5x + 9y - 45$
7. Factor by grouping:  $2x^3 - 10 + 4x^2 - 5x$
8. Factor by grouping:  $x^3 - 2 + 3x^3y - 6y$

Q: The more you take, the more you leave behind. What are they?