

Factoring By Grouping

Example 1:

Multiply:

$$(x + 4)(x + 3)$$

Step 1: $x(x + 4) + 3(x + 4)$

Step 2: $x^2 + 4x + 3x + 12$

Step 3: $x^2 + 7x + 12$

Consider the polynomial in Step 2:

$$x^2 + 4x + 3x + 12$$

We can factor this polynomial and get the original product.

Factoring is simply the distributive property in reverse.

Step 1: Group the first two terms and the last two terms together.

Step 2: Factor out the greatest common factor (GCF) in the first two terms.

Step 3: Cheat! The second group will be factorable resulting in the **same** binomial from Step 2.

Step 4: Factor out the binomial

$$x^2 + 4x + 3x + 12$$

Step 1

$$x(x + 4) + 3(x + 4)$$

Step 2 & 3

$$(x + 4)(x + 3)$$

Step 4

Example 2:

Factor by Grouping:

a.) $6x^2 - 5x + 12x - 10$

b.) $7w^2 + 14w - w - 2$

c.) $16a^3 - 4a^2b^2 - 4ab + b^3$

Factoring By Grouping

Practice Problems

Factor each polynomial by grouping:

1. $x^2 + 2x + x + 2$

2. $a^2 - 6a + a - 6$

3. $15x^2 + 15xy - 5xz - 6yz$

4. $5m - 6p - 2mp + 15$