Factoring: Grouping

Preliminaries and Objectives

Preliminaries

- Distributive Property
- Expanding Binomials (FOIL)
- Factoring: Greatest Common Factors
- Factoring: Difference of Squares

Objectives

- Factor by grouping

Example 1

$$(x^2+9)(x-2) = x^3 - 2x^2 + 9x - 18$$

$(x^2+9)(x-2)$

	x	-2
x^2	x^3	$-2x^2$
$+9$	$9x$	-18

Example 2

Factor $4x^3 - 10x^2 + 6x - 15$

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

	$2x$	-5
$2x^2$	$4x^3$	$-10x^2$
$+3$	$6x$	-15

Example 3

Factor $4x^3 + 16x^2 - 9x - 36$

$$(4x^2 - 9)(x + 4)$$

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

	x	$+4$
$4x^2$	$4x^3$	$16x^2$
-9	$-9x$	-36

Example 4

Factor $3x^4 - 9x^3 + 6x^2 - 18x$

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

$$(3x)(x^2 + 2)(x - 3)$$

	x	-3
x^2	x^3	$-3x^2$
$+2$	$2x$	-6

Exercises

$$2x^3 - 14x^2 + 3x - 21 = (2x^2 + 3)(x - 7)$$

$$x^3 + 5x^2 - 9x - 45 = (x + 3)(x - 3)(x + 5) + 10)$$

$$4x^4 - 28x^3 + 6x^2 - 42x = 2x(2x^2 + 3)(x - 7)$$

Recap

Grouping

- Remove the greatest common factor
- Create grid and find the common factor in each row and column
- If possible, continue factoring with other techniques, such as the difference of squares

Credits

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