Factoring: The AC-method for Factoring Trinomials

Preliminaries and Objectives

Preliminaries

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

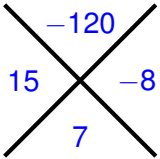
Objectives

- Factor trinomials by splitting apart the middle term.

Example 1

$$(5x-4)(2x+3) = 10x^2 + 15x - 8x - 12$$

$$= 10x^2 + 7x - 12$$

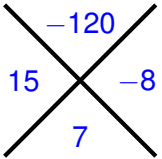


1 2 3 4 5 6 8 15 20 24 30 40 60 120

Example 1

$$(5x-4)(2x+3) = 10x^2 + 15x - 8x - 12$$

$$= 10x^2 + 7x - 12$$

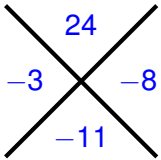


	$2x$	$+3$
$5x$	$10x^2$	$15x$
-4	$-8x$	-12

$(5x-4)(2x+3)$

Example 2

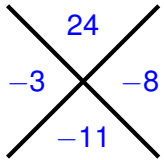
Factor $2x^2 - 11x + 12$



1 2 3 4 6 8 12 24

Example 2

Factor $2x^2 - 11x + 12$

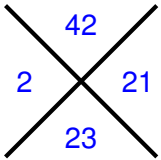


	$2x$	-3
x	$2x^2$	$-3x$
-4	$-8x$	12

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

Example 3

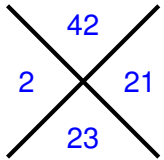
Factor $6x^2 + 23x + 7$



1 2 3 6 7 14 21 42

Example 3

Factor $6x^2 + 23x + 7$

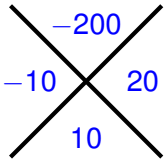


	$3x$	$+1$
$2x$	$6x^2$	$2x$
$+7$	$21x$	7

$(3x + 1)(2x + 7)$

Example 4

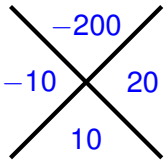
Factor $8x^2 + 10x - 25$



1 2 4 5 8 10 20 25 40 50 100 200

Example 4

Factor $8x^2 + 10x - 25$

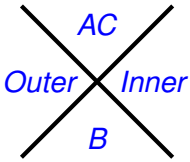


	$4x$	-5
$2x$	$8x^2$	$-10x$
$+5$	$20x$	-25

$(4x - 5)(2x + 5)$

Recap

AC-method



	px	*r*
qx	*First*	*Outer*
s	*Inner*	*Last*

$(px + r)(qx + s)$

- *B* at the bottom, *AC* at the top
- Factor *AC* to find *Outer* and *Inner*
- Factor by grouping
- If possible, continue factoring with other techniques, such as the difference of squares

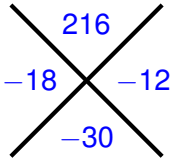
Example 5

Factor $40x^5 - 150x^3 + 135x$

$$= 5x(8x^4 - 30x^2 + 27)$$

$$= 5x(4x^2 - 9)(2x^2 - 3)$$

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



	$4x^2$	-9
$2x^2$	$8x^4$	$-18x^2$
-3	$-12x^2$	27

$5x(4x^2 - 9)(2x^2 - 3)$

Credits

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