lulumath

Factoring Trinomials ($ax^2 + bx + c$) by Decomposition

(Video Notes)

Video Link

Factoring Trinomials ($ax^2 + bx + c$) by Decomposition

What background knowledge will I need?

- How to multiply a binomial by a binomial
- How to factor by grouping

Expand:

$(2x + 5)(4x + 1)$

$2x(4x+1)+5(4x+1)$

$8x^2 + 2x + 20x + 5$

$8x^2 + 22x + 5$.

Factor

$8x^2 + 22x + 5$

ax^2+bx+c

$8x^2 + 2x + 20x + 5$

$2x(4x+1)+5(4x+1)$

$(4x+1)(2x+5)$

Make sure to understand why

What to do?

$8 \cdot 5$

1. Multiply *a* by *c*. (Why?) $8 \cdot 5 = 40$
2. Determine factors of the product *ac* that have a sum of *b*. → 22
3. Break *bx* up into the two factors you found.
4. Factor by grouping

40	
1	40
2	20
4	10
5	8

2, 20

Factor:

$2x^2 - 9x + 10$

$2x^2 - 4x - 5x + 10$

$2x(x-2) - 5(x-2)$

$(x-2)(2x-5)$

What to do?

1. Multiply *a* by *c*. $2 \cdot 10 = 20$
2. Determine factors of the product *ac* that have a sum of *b*. -9 -4 and -5
3. Break *bx* up into the two factors you found.
4. Factor by grouping

$+20$	
~~1~~	~~20~~
~~2~~	~~10~~
-4	-5

Factor:

$1x^2 + 1x - 12$

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

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

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

What to do?

1. Multiply *a* by *c*. $1 \cdot -12 = -12$
2. Determine factors of the product *ac* that have a sum of *b*. 1 -3 and 4
3. Break *bx* up into the two factors you found.
4. Factor by grouping.

-12	
~~1~~	~~12~~
~~2~~	~~6~~
-3	4

Factor:

$6x^2 - 7x - 5$

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

$3x(2x+1) - 5(2x+1)$

$(2x+1)(3x-5)$

30

1	30
2	15
3	10
5	6

What to do?

1. Multiply *a* by *c*. $6 \cdot -5 = -30$
2. Determine factors of the product *ac* that have a sum of *b*. -7, 3 and -10
3. Break *bx* up into the two factors you found.
4. Factor by grouping.