



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:

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

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

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

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

Make sure to understand why

What to do?

1. Multiply a by c . (Why?) $8 \cdot 5 = 40$
2. Determine factors of the product ac that have a sum of b . $\rightarrow 22$ $2, 20$
3. Break bx up into the two factors you found.
4. Factor by grouping

$$\begin{array}{r} 40 \\ -1 \ 40 \\ \hline 2 \ 20 \\ -4 \ 10 \\ \hline 5 \ 8 \end{array}$$

$$ax^2 + bx + c$$

Factor

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

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

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

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

Factor:

$$2x^2 - 9x + 10$$



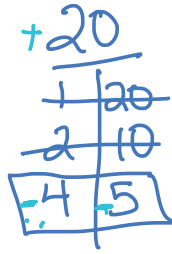
$$2x^2 - 4x - 5x + 10$$

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

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

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 . -4 and -5
- ✓ 3. Break bx into the two factors you found.
- 4. Factor by grouping



Factor:

$$x^2 + x - 12$$



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

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

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

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 . -3 and 4
- ✓ 3. Break bx into the two factors you found.
- 4. Factor by grouping.



Factor:

$$6x^2 - 7x - 5$$



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

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

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

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.

