

$$ax^2 + bx + c$$

Algebra 1: Factoring Trinomials (by Grouping)

Example: $6x^2 + x - 2$

① Multiply "a" and "c" together

$$a = 6, c = -2$$

$$a \cdot c = -12$$

② List factors of the product

Find 2 factors whose sum is "b"

$$\begin{array}{c} -12 \\ \wedge \\ 1 \quad 12 \\ \wedge \\ 6 \quad 2 \\ \wedge \\ -3 \quad +4 \end{array}$$

③ Split the middle term using the 2 factors

$$\begin{array}{c} 6x^2 + x - 2 \\ \wedge \\ 6x^2 - 3x + 4x - 2 \end{array}$$

④ Group the first 2 terms and the last 2 terms

$$\underline{6x^2 - 3x} + \underline{4x - 2}$$

⑤ Factor each group by the greatest common factor

$$\begin{array}{l} \underline{6x^2 - 3x} + \underline{4x - 2} \\ 3x(2x - 1) + 2(2x - 1) \end{array}$$

$$\text{review: } 6x^2 - 3x = 3x(2x - 1)$$

$$4x - 2 = 2(2x - 1)$$

⑥ The first factor is what's in parenthesis (should be the same). The second factor is everything that's not in the parenthesis.

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

⑦ You're done! More examples:

$$\begin{array}{c} \underline{2x^2 + 13x + 15} \\ \wedge \\ \underline{2x^2 + 3x} + \underline{10x + 15} \\ x(2x + 3) + 5(2x + 3) \\ (2x + 3)(x + 5) \end{array}$$

$$\begin{array}{c} 30 \\ \wedge \\ 2 \quad 15 \\ \wedge \\ 3 \quad 10 \\ \wedge \\ 5 \quad 6 \\ \wedge \\ 1 \quad 30 \end{array}$$

$$\begin{array}{c} \underline{6x^2 - 11x - 10} \\ \wedge \\ \underline{6x^2 + 4x} - \underline{15x - 10} \\ 2x(3x + 2) - 5(3x + 2) \\ (3x + 2)(2x - 5) \end{array}$$

$$\begin{array}{c} -60 \\ \wedge \\ 1 \quad 60 \\ \wedge \\ 2 \quad 30 \\ \wedge \\ 3 \quad 20 \\ \wedge \\ +4 \quad -15 \end{array}$$

Video: <https://www.youtube.com/watch?v=2Q81G1WagJY>

* Don't worry about solving at the end! *

Follow along with the video:

① $2x^2 + 5x + 2$

② $7x^2 + 16x + 4$

③ $6x^2 - 17x + 12$