

Algebra 1: 7.2 Multiplying Polynomials

Key Idea: EVERYTHING in the **first polynomial** must be distributed to EVERYTHING in **the next polynomial!**

Remember to ADD exponents if you are multiplying the same bases together.

Ex: $-3x^1(2x^2 - x + 4)$

$$\underline{-6x^3} + \underline{3x^2} - \underline{12x}$$

$$\underline{-3x^1 \cdot 2x^2 = -6x^3}$$

$$\underline{-3x^1 \cdot -x^1 = 3x^2}$$

$$\underline{-3x \cdot 4 = -12x}$$

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Ex: Remember, Everything must distribute. This will create several terms. Just write them all out.

$$(2x - 3) \cdot (x + 5)$$

$2x \cdot x = 2x^2$
 $2x \cdot 5 = 10x$
 $-3 \cdot x = -3x$
 $-3 \cdot 5 = -15$

$2x^2 + 10x - 3x - 15$
combine like terms
 $2x^2 + 7x - 15$

This Method is called FOILing.

First terms
Outer terms
Inner terms
Last terms.

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

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

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

$x^3 + 2x^2 - 17x - 10$

The diagram shows the multiplication of $(x+5)(x^2-3x-2)$. Colored arrows indicate the distribution: a red arrow from x to x^2 , a green arrow from x to $-3x$, a blue arrow from x to -2 , a purple arrow from 5 to x^2 , an orange arrow from 5 to $-3x$, and a green arrow from 5 to -2 . The resulting terms are underlined in the same colors: x^3 (red), $-3x^2$ (green), $-2x$ (blue), $+5x^2$ (purple), $-15x$ (orange), and -10 (green). The final simplified polynomial $x^3 + 2x^2 - 17x - 10$ is boxed, with $2x^2$ highlighted in yellow and $-17x$ highlighted in green.

Ex: $(n-3)(n^2-2n+4)$

$n^3 - 2n^2 + 4n - 3n^2 + 6n - 12$

Combine Like terms.

$n^3 - 5n^2 + 10n - 12$

The diagram shows the multiplication of $(n-3)(n^2-2n+4)$. Colored arrows indicate the distribution: a red arrow from n to n^2 , a blue arrow from n to $-2n$, a red arrow from n to 4 , a blue arrow from -3 to n^2 , a red arrow from -3 to $-2n$, and a blue arrow from -3 to 4 . The resulting terms are underlined in the same colors: n^3 (red), $-2n^2$ (blue), $+4n$ (red), $-3n^2$ (blue), $+6n$ (red), and -12 (blue). A purple arrow points from the text "Combine Like terms." to the $-2n^2$ and $-3n^2$ terms. The final simplified polynomial $n^3 - 5n^2 + 10n - 12$ is boxed, with $-5n^2$ highlighted in yellow and $+10n$ highlighted in green.

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Homework:

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