

Name: _____

Multiplying Polynomials

When you multiply higher-degree polynomials, you follow the same process that you used to multiply binomials, only there are more terms to multiply.

	EXAMPLE	EXAMPLE
	$(x + 7)(2x^2 - 4x + 5)$	$(x - 5)(3x^2 + 2x - 8)$
Distribute 1 st group	$2x^2(x + 7) - 4x(x + 7) + 5(x + 7)$	$3x^2(x - 5) + 2x(x - 5) - 8(x - 5)$
Distribute into each group & simplify	$2x^2(x) + 2x^2(7) - 4x(x) - 4x(7) + 5(x) + 5(7)$ $2x^3 + 14x^2 - 4x^2 - 28x + 5x + 35$	$3x^2(x) + 3x^2(-5) + 2x(x) + 2x(-5) - 8(x) - 8(-5)$ $3x^3 - 15x^2 + 2x^2 - 10x - 8x + 40$
Combine like terms	$2x^3 + 10x^2 - 23x + 35$	$3x^3 - 13x^2 - 18x + 40$

1. $(x - 7)(2x^2 - x + 6)$	2. $(x - 11)(3x^2 - 6x + 4)$	3. $(x - 12)(-3x^2 - 10x + 12)$

4. $(x + 8)(x^2 - 4x - 8)$	5. $(x - 9)(-5x^2 + 9x + 5)$	6. $(x + 5)(-2x^2 - 4x + 3)$

7. $(x - 9)(4x^2 + 8x + 6)$	8. $(x - 5)(-3x^2 - 10x + 1)$	9. $(x - 6)(-7x^2 + x + 7)$

The problems below follow a pattern. As you are working, look for the pattern and use it to create a set of rules.

10. $(x + 2)(x^2 - 2x + 4)$	11. $(x - 2)(x^2 + 2x + 4)$	12. $(x + 3)(x^2 - 3x + 9)$

13. $(x - 3)(x^2 + 3x + 9)$	14. $(x + 4)(x^2 - 4x + 16)$	15. $(x - 4)(x^2 + 4x + 16)$

16. $(x + 5)(x^2 - 5x + 25)$	17. $(x - 5)(x^2 + 5x + 25)$	18. $(x + 6)(x^2 - 6x + 36)$

What do you notice about how these polynomials are setup and about what happens when they are multiplied?

Rule 1: $(a + b)(a^2 - ba + b^2) =$

Rule 2: $(a - b)(a^2 + ba + b^2) =$

Use the rule to multiply the polynomials.

19. $(x - 6)(x^2 + 6x + 36)$	20. $(x + 10)(x^2 - 10x + 100)$	21. $(x - 10)(x^2 + 10x + 100)$

You can also use the rule backwards to factor the polynomial.

22. $x^3 - 8$	23. $x^3 + 8$	24. $x^3 - 64$
25. $x^3 + 64$	26. $x^3 - 27$	27. $x^3 + 27$