Math 9 – Unit 2: Algebra One Name: Ms. Jarvis

Lesson 2.4: More Distributive Property and Powers of Monomials Date: Sep 24, 2025

Learning Goal: We are learning to expand and simplify more complicated expressions.

Let's start off by continuing our lesson on the Distributive Property. Take a look at the following questions:

Expand AND simplify (put your answers in descending order):

a) $3x(4x^2-7x+2)+4x^2(2x-3)$

$= 12x^3-21x^2+6x+8x^3-12x^2$

$= 20x^3-33x^2+6x$

b) $-4y^2(3y^2-5)-5y^3(6+y)$

$= -12y^4+20y^2-30y^3-5y^4$

$= -17y^4-30y^3+20y^2$

c) $3mn(2m-7n)-5m^2(4n+8)+6n^2(3m-n)$

$= 6m^2n-21mn^2-20m^2n-40m^2+18mn^2-6n^3$

$= -14m^2n-3mn^2-40m^2-6n^3$

Now we are going to go back to discussing monomials. How do we simplify $(3x^2y^5)^3$? This is called a monomial raised to a power. How does the outside exponent affect the question? First, how does it work with just a number?

Simplify $(4^3)^2 = (4^3)(4^3) = (4)(4)(4)(4)(4)(4) = 4^6$

The initial exponents were *3* and *2*, with the final exponent a 6. So, 3 x 2 = 6! This leads to our second exponent law. When raising a power to a power, MULTIPLY the exponents. Try it out!

a) $(x^4)^5$

$= x^{20}$

b) $(y^2)^8$

$= y^{16}$

c) $(m^3n^6)^4$

$= (m^3)^4(n^6)^4$

$= m^{12}n^{24}$

That's all well and good (hopefully), but how do you handle a question with a coefficient?

Consider the expression from before, $(3x^2y^5)^3$. Expand it without using the laws.

$= 3^3 \cdot (x^2)^3 \cdot (y^5)^3$

$= 27x^6y^{15}$

The coefficient was just raised to the power of 3! Awesome. Try out some more, this time following the laws.

a) $(2x^4y^2)^5$

b) $(-3m^7n)^2$

c) $(5a^2b^3c^4d^5)^6$

d) $\left(3x^2y^5\right)^2\left(2xy^3\right)$

e) $\left(-4m^3n^2\right)^3\left(3m^4n^3\right)^2$

Success Criteria:

- I can use the distributive property to multiply a polynomial with a monomial
- I can use the distributive property to combine multiple variables into a single term
- I can simplify a monomial raised to a power by multiplying the exponents of each variable
- I can recognize that when a coefficient is raised to a power, it is NOT NOT NOT multiplied
- I can understand that raising to the power of zero equals one.