Math 9 – Unit 2: Algebra One

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Lesson 2.4: More Distributive Property and Powers of Monomials

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) $3x(4x^2-7x+2)+4x^2(2x-3)$ $= 12x^{3} - 21x^{2} + 6x + 8x^{3} - 12x^{2}$

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

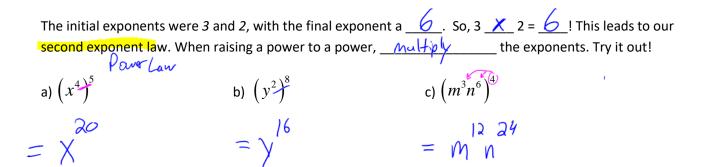
b) $-4y^2(3y^2-5)-5y^3(6+y)$ $= -12x^{4} + 20x^{2} - 30x^{3} - 5x^{4}$ $= -17y^4 - 30y^5 + 20y^2$

c) $3mn(2m-7n)-5m^2(4n+8)+6n^2(3m-n)$ $= 6mn, -2lmn^2 - 20m^2 - 40m^2 + 18mn^2 - 6n^3$ $= -14mn - 3mn^2 - 40m^2 - 6n^3$

MTH1W

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 $\left(\frac{4^3}{4^3}\right)^2 = \left(\frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}\right)^2 = \left(\frac{4}{3} \times \frac{4}{3} \times \frac{4}{3}\right)^2 = \frac{4}{6}$



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.

$$= (3x^{2}y^{5})(3x^{2}y^{5})(3x^{2}y^{5}) = 27x^{6}y^{15}$$

$$Multiply 3x^{3}x^{3} = 3$$

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

a) $(2x^4y^2)^5$ c) $(5a^2b^3c^4d^5)^6$ b) $(-3m^7n)^2$ $= 9 m n^{14} = 15625 a^{12} b^{18} c^{24} d^{30}$ $=32 \chi^{20} \chi^{10}$

 $\left(5 \times 3 \times 67\right)$ $= (625x^{12}y^{24})(1)$ = 625x 12 24 $\left(\frac{2}{7}\right)\left(\frac{4}{7}\right)$

Success Criteria:

= 12xys

- 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.