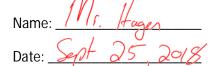
## Math 9 - Unit 2: Algebra One



## **Lesson #5: Dividing Monomials**

**Learning Goal**: We are learning to divide by monomials.

We've added, subtracted, multiplied, and even raised monomials to powers. All that is left is dividing by monomials. First, let's develop a rule with numbers.

Simplify 
$$\frac{4^5}{4^3} = \frac{2}{2} + \frac{2}{2} = 4^2$$

This leads to our 4<sup>th</sup> exponent law. When dividing, <u>Subtract</u> the exponents. Time to put it into practice!

a) 
$$\frac{x^8}{x^5}$$

b) 
$$\frac{y^{72}}{y^{46}}$$

c) 
$$\frac{m^5 n^3}{m^2 n^3}$$

d) 
$$\frac{18p^7q^9}{3p^2q^2}$$

b) 
$$\frac{y^{72}}{y^{46}}$$
 c)  $\frac{m^5 n^3}{m^2 n^1}$  d)  $\frac{18p^7 q^9}{3p^2 q^2}$ 

The final step is to divide a monomial into a polynomial, such as  $\frac{4x^5-2x^3+6x^2}{2x^2}$ . However, first let's look back

at adding fractions so we can see an integral step that we will need to use:

$$\frac{1^{1/4}}{2^{1/4}} + \frac{3^{1/2}}{4^{1/2}} + \frac{5}{8}$$

$$=\frac{9}{8}+\frac{6}{8}+\frac{5}{8}$$

$$\frac{1^{14}}{2^{14}} \frac{3^{12}}{4^{12}} \frac{5}{8} = \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{4 + 6 + 5}{8} = \frac{15}{8}$$

Keep in mind when doing the following questions that the denominator gets applied to all the terms in the numerator.

a) 
$$\frac{4x^5 - 2x^3 + 6x^2}{2x^2}$$

$$= \frac{4x^{5}}{2x^{2}} - \frac{2x^{3}}{2x^{2}} + \frac{6x^{2}}{2x^{2}} = x^{2} = 1$$

$$= 4xy^{4} + 2y^{3}$$

$$= 2x - X + 3$$

b) 
$$\frac{16x^3y^5 + 8x^2y^4}{4x^2y}$$

$$= 4xy^{4} + 2y^{3}$$

c) 
$$\frac{40a^3b^6 - 50a^2b^3 + 10ab}{10ab}$$

d) 
$$\frac{9x^7 + 27x^5 - 15x^4}{-3x^3}$$

$$=4ab^{2}-5ab^{2}+1$$

$$= -3x^{4} - 9x^{2} + 5x$$

e) 
$$\frac{192r^{78}s^{34} - 144r^{65}s^{53} - 256r^{98}s^{23} + 80r^{88}s^{45}}{16r^{33}s^{21}}$$

$$= |2r |^{45} |^{3} - 9r |^{32} |^{32} - |6r |^{65} |^{2} + 5r |^{55} |^{24}$$

## Success Criteria:

- I can divide like variables by subtracting their exponents
- I can understand the difference between dividing coefficients and dividing variables
- I can divide the monomial into each term of a polynomial separately
- I can recognize that when you divide two identical monomials, the result is one.