

## Math 9 – Unit 2: Algebra One

## Lesson #5: Dividing Monomials

Name: Mr. HagenDate: Sept 30, 2022**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  $\frac{4^5}{4^3} = \frac{\cancel{4} \times \cancel{4} \times \cancel{4} \times \cancel{4} \times 4}{\cancel{4} \times \cancel{4} \times \cancel{4}} = 4^2$   $5-3=2$ .

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

a)  $\frac{x^8}{x^5}$   
 $= x^3$

b)  $\frac{y^{72}}{y^{46}}$   
 $= y^{26}$

c)  $\frac{m^5 n^3}{m^2 n^1}$   
 $= m^3 n^2$

d)  $\frac{18p^7q^9}{3p^2q^2}$  *divide*  
 $= 6p^5q^7$

e)  $\frac{2x^2y^2}{4x^2y^5}$   
 $= \frac{1}{2}x^0y^{-3}$   
 $= \frac{1}{2}y^{-3}$

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:

$\frac{1}{2} + \frac{3}{4} + \frac{5}{8}$   $CD = 8$

$$= \frac{4}{8} + \frac{6}{8} + \frac{5}{8} = \frac{4+6+5}{8}$$

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

a)  $\frac{4x^5 - 2x^3 + 6x^2}{2x^2}$  *(2x^2) split up into 3 fractions*

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

$$= 2x^3 - x^1 + 3$$

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

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

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

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

$$= 4a^2b^5 - 5ab^2 + \underline{1}a^0b^0$$

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

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

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

$$= 12r^{45}s^{13} - 9r^{32}s^{32} - 16r^{65}s^2 + 5r^{55}s^{24}$$

**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.