

Lesson 4: Dividing Polynomials

Goals:

- Divide a polynomial by a constant.
- Divide a polynomial by a monomial.

Division of a Monomial by a Monomial

Since division is the opposite of multiplication, when we have a monomial divided by a monomial, we divide the coefficients and subtract the exponents on the similar bases.

Note: the answer in a division question is called the quotient.

$$\frac{x^a}{x^b} = x^{a-b}$$

$$x^0 = 1$$

For example $\frac{8x^7}{4x^4} = 2x^3$

Example 1

Divide the following polynomials.

a) $\frac{15x^2}{5} = \frac{15}{5} x^2$
 $= 3x^2$

b) $\frac{20m^4}{-5m^3} = \frac{20}{-5} m^{4-3}$
 $= -4m$

c) $-\frac{100x^{10}y^8z^5}{25x^8y^4z^3} = -\frac{100}{25} x^{10-8} y^{8-4} z^{5-3}$
 $= -4x^2y^4z^2$

d) $\frac{-3x^{11}y^9}{12x^5y^9} = -\frac{3}{12} x^{11-5} y^{9-9}$
 $= -\frac{1}{4} x^6$