6.5 Dividing Monomials

remember, $\frac{b^m}{b^n} = b^{m-n}$

(ex) $\frac{x^5}{x^3} = x^{5-3} = x^2$ $\quad \frac{8x^5}{2x^3} = 4x^2$ $\quad \frac{3x^{10}y^4}{9x^2y^3} = \frac{1}{3}x^8y^1$

technically, this is dividing a monomial by a monomial

Zero-Exponent Rule

any # raised to the zero is 1

$b^0 = 1$

(ex) $5^0 = 1$ $\quad (\frac{2}{3})^0 = 1$ $\quad x^0 = 1$ $\quad 7.429683\ldots^0 = 1$

$(-16)^0 = 1$ $\quad -16^0 = -1$

Quotients to powers

$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$

a fraction raised to a power is the num. raised to that power over the den. raised to that power.

(ex) $\left(\frac{1}{2}\right)^3 = \frac{1^3}{2^3} = \frac{1}{8}$ $\quad \left(\frac{x^3}{4}\right)^2 = \frac{(x^3)^2}{(4)^2} = \frac{x^6}{16}$ $\quad \left(\frac{x^4}{y^2}\right)^6 = \frac{x^{24}}{y^{12}}$

Dividing Polynomials by Monomials

To do this divide each term in the numerator by the monomial in the denominator.

(ex) $\frac{8x^6 + 6x^4 + x^2}{2x^2} = \frac{8x^6}{2x^2} + \frac{6x^4}{2x^2} + \frac{x^2}{2x^2}$

$= 4x^{6-2} + 3x^{4-2} + \frac{1}{2}x^{2-2} = 4x^4 + 3x^2 + \frac{1}{2}x^0$

$= \boxed{4x^4 + 3x^2 + 1/2}$

(ex) $\frac{6x^{10}-8x^7+9x^4-3x^3}{2x^2} = \frac{6x^{10}}{2x^2} - \frac{8x^7}{2x^2} + \frac{9x^4}{2x^2} - \frac{3x^3}{2x^2}$

$= \boxed{3x^8 - 4x^5 + \frac{9}{2}x^2 - \frac{3}{2}x}$

You can check!

Just like to check $\frac{8}{4}=2$ you'd multiply

$2*4=8$ ✓

$\frac{6x^{10}-8x^7+9x^4-3x^3}{2x^2} = 3x^8-4x^5+\frac{9}{2}x^2-\frac{3}{2}x$

Check: $(3x^8-4x^5+\frac{9}{2}x^2-\frac{3}{2}x)*(2x^2)$

$= (3x^8)(2x^2)+(-4x^5)(2x^2)+(\frac{9}{2}x^2)(2x^2)+(-\frac{3}{2}x)(2x^2)$

$= 6x^{10}-8x^7+9x^4-3x^3$ ✓