Homework Qs

Note Title 10/14/2015

4.2 #67 $\dfrac{(x^2)^3}{x^4} = \dfrac{x^6}{x^4} = \dfrac{x^2}{1} = \boxed{x^2}$

Note: $\dfrac{x^4}{x^6} = \boxed{\dfrac{1}{x^2}}$

$\dfrac{8}{24} = \dfrac{1}{3}$

4.2 #77 $\left(\dfrac{x^{-2}}{x^{-5}}\right)^3 = \dfrac{x^{-6}}{x^{-15}} = \dfrac{x^{15}}{x^6} = \dfrac{x^9}{1} = \boxed{x^9}$

4.2 #79 $\left(\dfrac{2a^{-3}b^2}{4a^{-5}b^6}\right)^{-2} = \dfrac{2^{-2}a^6b^{-4}}{4^{-2}a^{10}b^{-12}} = \dfrac{a^6 \cdot 4^2 \cdot b^{12}}{2^2 \; b^4 \; a^{10}}$

$= \dfrac{16\,a^6b^{12}}{4\,a^{10}b^4} = \boxed{\dfrac{4b^8}{a^4}}$

4.2 #85 $\dfrac{(3x^{-2}y^{-4})(4x^3y^{-2})^{-2}}{(3x^3y^{-2})^{-2}} = \dfrac{3x^{-2}y^{-4} \cdot 4^{-2}x^{-6}y^4}{3^{-2}x^{-6}y^4}$

$= \dfrac{3}{x^2y^4 \cdot 4^2x^6} \dfrac{y^4 \cdot 3^2x^6}{y^4} = \dfrac{3 \cdot 9x^6y^4}{16x^8y^8}$

$= \boxed{\dfrac{27}{16x^2y^4}}$

4.3: Operations with monomials (cont'd)

Multiplying

$$(-5x^2y^4)(2x^3y) = \boxed{-10x^5y^5}$$

Dividing Monomials

$$\frac{2x^3}{8x^7} = \boxed{\frac{1}{4x^4}}$$

4.4: Addition and Subtraction of Monomials

Example: $(5x^2 - 6x - 4) + (-3x^2 + 8x - 1)$

$= 5x^2 - 6x - 4 - 3x^2 + 8x - 1$

$= \boxed{2x^2 + 2x - 5}$

Ex: $(-4x^3 - 3x^2 + 7) - (-x^2 + 9x^2 - 8x + 1)$

$= -4x^3 - 3x^2 + 7 + x^2 - 9x^2 + 8x - 1$

$= \boxed{-4x^3 - 11x^2 + 8x + 6}$

4.5: Multiplication of Polynomials

Ex: $4x^3(5x^4 - 7x^2 - 2)$

$= 4x^3(5x^4) + 4x^3(-7x^2) + 4x^3(-2)$

$= \boxed{20x^7 - 28x^5 - 8x^3}$

Note on 4.3:

Ex: $x^2\left(\frac{1}{x} + \frac{1}{x^2}\right)$

$= x^2\left(\frac{1}{x}\right) + x^2\left(\frac{1}{x^2}\right) = \frac{x^2}{x} + \frac{x^2}{x^2} = \frac{x}{1} + 1$

$= \boxed{x+1}$

Ex: $x^3y\left(\frac{2}{x^2} - \frac{3}{xy} + \frac{4}{y}\right)$

$= x^3y\left(\frac{2}{x^2}\right) + x^3y\left(-\frac{3}{xy}\right) + x^3y\left(\frac{4}{y}\right) = \frac{2x^3y}{x^2} - \frac{3x^3y}{xy} + \frac{4x^3y}{y}$

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

$= \boxed{2xy - 3x^2 + 4x^3}$

4.5 Multiplying 2 polynomials that have 2 or more terms

Recall: $c(a+b) = ca + cb = ac + bc$ } same

$(a+b)(c) = ac + bc$

Ex: $(3x - 2)(x + 9)$

$= 3x(x+9) - 2(x+9) = 3x^2 + 27x - 2x - 18$

$= \boxed{3x^2 + 25x - 18}$

Ex: $(4x^2 - 5)(6x + 1)$

$= 4x^2(6x+1) - 5(6x+1)$

$= \boxed{24x^3 + 4x^2 - 30x - 5}$

Ex: $(-4x - 3)(6x^2 - 8x - 2)$

$= -4x(6x^2 - 8x - 2) - 3(6x^2 - 8x - 2)$

$= -24x^3 + 32x^2 + 8x - 18x^2 + 24x + 6$

$= \boxed{-24x^3 + 14x^2 + 32x + 6}$

Ex: $(x^2 - 6x - 3)(2x^2 - 5x + 4)$

$= x^2(2x^2 - 5x + 4) - 6x(2x^2 - 5x + 4) - 3(2x^2 - 5x + 4)$

$= 2x^4 - 5x^3 + 4x^2$
$\quad -12x^3 + 30x^2 - 24x$
$\quad\quad -6x^2 + 15x - 12$

$= \boxed{2x^4 - 17x^3 + 28x^2 - 9x - 12}$

4.6: Special Products

Ex: $(x-3)(x+3)$

$= x(x+3) - 3(x+3)$

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

$= \boxed{x^2 - 9}$

Difference of 2 Squares Pattern

$$(a+b)(a-b) = a^2 - b^2$$

$(a+b)(a-b)$
$= a(a-b) + b(a-b)$
$= a^2 - ab + ab - b^2$
$= a^2 - b^2$

FOIL Acronym (Mnemonic device for remembering how to multiply 2 binomials)

F : First

O : Outer

I : Inner

L : Last

Ex: $(3x-4)(-2x-6)$

$3x(-2x) + 3x(-6) - 4(-2x) - 4(-6)$

First Outer Inner Last

$= -6x^2 - 18x + 8x + 24$

$= \boxed{-6x^2 - 10x + 24}$