9/21/2012 Sec 5.2 (cont.) Math 1010

120 Sec 5.1 Sec 5.3

130

120

$$\left(\frac{5z^3}{2a^2}\right)^{-3}\left(\frac{8a^{-1}}{15z^{-2}}\right)^{-3}$$

$$\frac{5^{-3}z^{-9}}{2^{-3}a^{-6}}\cdot\frac{8^{-3}a^{3}}{15^{-3}z^{6}}$$

$$\frac{2^3 a^{6} 15^3 a^3}{5^3 z^9 8^3 z^6}$$

$$\frac{8 \cdot 3375\, a}{125 \cdot 512\, z^{15}}$$

$$\frac{27000\, a^9}{64000\, z^{15}}$$

$$\boxed{\frac{27a^9}{64z^{15}}}$$

130

$$\frac{(2^1 m^3 x^2)^{-1}(3^1 m^4 x^1)^{-3}}{(m^2 x^3)^3 (m^2 x)^{-5}}$$

$$\frac{2^{-1} m^{-3} x^{-2} 3^{-3} m^{-12} x^{-3}}{m^6 x^9 m^{-10} x^{-5}}$$

$$\frac{m^{10} x^5}{2 m^3 x^2 3^3 m^{12} x^3 m^6 x^9}$$

$$\frac{m^{10} x^5}{2 \cdot 3^3 \cdot x^{14} m^{21}}$$

$$\frac{1}{2 \cdot 3^3 x^9 m^{11}}$$

$$\boxed{\frac{1}{54 x^9 m^{11}}}$$

$3x + 4 + 5x + 2$

Combine Like terms

$8x + 6$

"Like terms" → $3x + 5x$

$(3+5)x$

$8x$

$a(b+c) = ab + ac$ ←

ax^n

$(3x+4) + (5x+2)$

Ex: $(x^3 + x) + (4x+1)$

$x^3 + x + 4x + 1 = x^3 + 5x + 1$

both x terms so combine coefficients by adding

#58 $(2x^5 - 2x^4 + x^3 - 1) + (x^4 - 3x^3 + 2)$

$2x^5 - 2x^4 + x^3 - 1 + x^4 - 3x^3 + 2$

$2x^5 - 2x^4 + x^4 + x^3 - 3x^3 - 1 + 2$

$2x^5 - x^4 - 2x^3 + 1$

or

$$\begin{array}{r} 2x^5 - 2x^4 + 1x^3 - 1 \\ + \quad +1x^4 - 3x^3 + 2 \\ \hline 2x^5 - x^4 - 2x^3 + 1 \end{array}$$

Subtracting is adding in disquise

Subtract is adding the opposite

$$5 - 3 = 5 + {}^{-}3$$

$$(5x+3) - (4x-7)$$

$$(5x+3) + {}^{-}(4x-7)$$

$$5x+3 + {}^{-}4x + 7$$

$$1x + 10$$

$$x + 10$$

or

$$\begin{array}{r} 5x+3 \\ -(4x-7) \\ \hline \end{array}$$

$$\begin{array}{r} 5x+3 \\ -4x + {}^{+}7 \\ \hline x+10 \end{array}$$

Sec 5.3

Every Polynomial is also a function

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + \dots + a_1 x + a_0$$

$$f(x) = -x^2 + 5x$$

$$f(2) = -(2)^2 + 5(2)$$

$$= -4 + 10$$

$$= 6$$

$(2, 6)$ belongs to f

x y

Examine Example 2

Notation: Adding & Subtracting functions

$$f(x) + g(x) = (f+g)(x)$$

$$f(x) - g(x) = (f-g)(x)$$

← telling us x is the input

Not telling us to multiply by x

Domain is the intersection of the Domain of each

Let: $f(x) = x^2 - 9$, $g(x) = 2x$, $h(x) = x - 3$

Find: $(f+g)(x)$

$= f(x) + g(x)$ by defn

$= x^2 - 9 + 2x$

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

Find: $(g+h)(x) = 3x - 3$ ✓

Find: $(f-h)(x)$

$= f(x) - h(x)$

$= (x^2 - 9) - (x - 3)$

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

$= \boxed{x^2 - x - 6}$

Find: $(f+g)(4)$

$= f(4) + g(4)$

$= (4^2 - 9) + 2(4)$

$= (16 - 9) + 8$

$= 7 + 8 = 15$

or

$(f+g)(x) = x^2 + 2x - 9$

$(f+g)(4) = 4^2 + 2 \cdot 4 - 9$

$= 16 + 8 - 9$

$= 15$