9/26/2012 – Sec 6.1 Math 1010

#54

$$\left(m^2+\frac{7}{2}m+3\right)\div(2m+3)=\frac{1}{2}m+1$$

$$\boxed{\frac{1}{2}m}+1$$

$$\underline{\underline{2m}}+3\,\overline{\big)\,\cancel{m^2}+\frac{7}{2}m+3}$$

$$-\cancel{m^2}+\frac{-3}{2}m \quad \downarrow$$

$$2\cancel{m}+\cancel{3}$$

$$-\cancel{2}m+\cancel{^-3}$$

$$0$$

$$\frac{m^{\cancel{2}}}{2\cancel{m}}=\frac{m}{2}=\frac{1}{2}m$$

$$\frac{7-3}{2}=\frac{4}{2}=2$$

#42

$$\frac{9k^4+12k^3-4k-1}{3k^2-1}$$

$$\boxed{3k^2+4k+1}$$

$$\underline{3k}^2+0k-1\,\overline{\big)\,\cancel{9k^4}+12\boxed{k^3}+0k^2-4k-1}$$

$$-\cancel{9k^4}+{}^-0\boxed{k^3}+3k^2 \quad \downarrow$$

$$\cancel{12k^3}+3k^2-\cancel{4k}$$

$$-\cancel{12k^3}+{}^-0k^2+\cancel{4k}$$

$$\cancel{3k^2}+0k-\cancel{1}$$

$$-\cancel{3k^2}+0k+\cancel{1}$$

$$0$$

$$2\underbrace{z\cdot z}$$

$$2z^2$$

$$2z+z$$

$$(2+1)z=3z$$

#60 $P(x) = 4x^3 - 8x^2 + 13x - 2$

$D(x) = 2x - 1$

$P(x) = Q(x) \cdot D(x) + r(x)$ ←

Division to find

$23 \div 4$

$$\begin{array}{r} \textcircled{5}\ r\,3 \\ 4 \overline{)\,23} \\ 20 \\ \hline \textcircled{3} \end{array}$$

$\frac{23}{4} = 5 + \frac{3}{4}$

$$23 = \underset{\text{Quotient}}{5} \cdot \overset{\text{dividend}}{4} + \underset{\text{Remainder}}{3}$$

$$\begin{array}{r} 2x^2 - 3x + 5 \\ 2x - 1 \overline{)\, \cancel{4x^3} - 8x^2 + 13x - 2} \\ -\cancel{4x^3} + 2x^2 \quad \downarrow \qquad \downarrow \\ \hline -\cancel{6x^2} + 13x \quad \downarrow \\ +\cancel{6x^2} \mp 3x \quad \\ \hline \cancel{10x} - 2 \\ -\cancel{10x} + 5 \\ \hline 3 \end{array}$$

$$\boxed{\begin{array}{l} Q(x) = 2x^2 - 3x + 5 \\ r(x) = 3 \end{array}}$$

if degree of dividend (what I'm dividing by) is larger than the degree of what I'm dividing into, Then I'm done,

$$4x^3 - 8x^2 + 13x - 2 = (2x^2 - 3x + 5)(2x - 1) + 3$$

#46

$$(3t^4+5t^3-8t^2-13t+2)\div(t^2-5)$$

$$\begin{array}{rl}
 & 3t^2+5t+7 \\
t^2+0t-5 & \overline{)\cancel{3t^4}+5t^3-8t^2-13t+2} \\
 & \underline{-\cancel{3t^4}\mp 0t^3+15t^2} \downarrow \\
 & \cancel{5t^3}+7t^2-13t \\
 & \underline{-\cancel{5t^3}\mp 0t^2+25t} \downarrow \\
 & \cancel{7t^2}+12t+2 \\
 & \underline{-\cancel{7t^2}\mp 0t+35} \\
 & \boxed{12t+37} \leftarrow R.
\end{array}$$

$$3t^2+5t+7+\frac{12t+37}{t^2-5}$$

Sec 6.1 Greatest Common Factors
Factoring by Grouping

Write a polynomial as the product of two or more simpler polynomials is called <u>Factoring</u> the Polynomials

Ex of factoring with Numbers

$6 = 2 \cdot 3 \qquad 12 = 2 \cdot 2 \cdot 3$

Factoring undoes multiplication

to multiply:

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

to factor:

$$\underline{a}b + \underline{a}c = a(b+c)$$

we call this "a" a common factor

the Greatest Common factor (GCF) is the largest term that is a factor of all terms in the polynomial (ie the largest Common Factor)

Ex: $\underset{\overset{\uparrow}{\div 7}}{\underline{7K}} + \underset{\overset{\uparrow}{\div 7}}{\underline{28}} \qquad GCF = 7$

$\underline{7} \cdot K + \underline{7} \cdot 4$

$7(K+4)$

#8 $9z^4 + 81z$ GCF: $9z$

$\underline{9z} \cdot z^3 + \underline{9z} \cdot 9$

$9z(z^3 + 9)$

Ex $3xy + 4$ GCF: 1

Cannot be Factored

Sometimes the GCF is a Binomial

$\underline{\boxed{(x-5)}(x+6)} + \underline{\boxed{(x-5)}(2x+5)}$ GCF $= (x-5)$

$(x-5)[(x+6) + (2x+5)]$

$(x-5)[x+6+2x+5]$

$\boxed{(x-5)(3x+11)}$

Ex: Factoring a Negative

$-4y^5 - 3y^3 + 8y$

GCF: y or GCF: $-y$

$y(-4y^4 - 3y^2 + 8)$ $-y(4y^4 + 3y^2 - 8)$

Instructions are Factor

$$4x^2+6x$$

$$x(4x+6) \checkmark \quad \text{GCF wrong}$$

$$\qquad\qquad x$$

Right GCF : 2x.

$$2x(2x+3)$$

Factoring by Grouping

used most often
- more than 3 terms
- when the GCF of all terms together is 1

Ex: $\underbrace{3x-3y}_{GCF=3}+\underbrace{kx-ky}_{GCF=k}$

$$\underbrace{3(x-y)+k(x-y)}_{\text{GCF is }(x-y)} \leftarrow$$

$$(x-y)(3+k) \checkmark$$

Factor by Grouping

1. Group terms
2. Factor within Each Group
3. Factor the entire Polynomial

Note: If Each Group doesn't have a common factor to factor out, try a different grouping