**2.3 Division of Polynomials**

Terminology:

Division Statement:

**Long Division:**

Example 1: Divide P(x) =$3x^{4}-2x^{3}+5x^{2}-3x+1$ by $x-2$.

Write the division statement:

Be very careful in the subtraction line! If a term is missing, then use a zero coefficient!

Example 2: Divide P(x) =$-2x^{4}+3x^{2}+$3x+1 by $ x^{2}+x-1$.

**Synthetic Division:** is a shortcut to long division which works for division by ax+b

Example 3: Divide P(x) =$3x^{4}-2x^{3}+5x^{2}-3x+1$ by $x-2$.

Division Statement:

Example 4: Divide P(x) =$-2x^{4}+3x^{2}+2x+1 $by $x+1$.

Example 5: Divide P(x) =$-4x^{4}+x^{3}-x-\frac{1}{8}$ by$ 2x+1$.

Example6: Divide ($x^{4}-5x^{3}-4x^{2}+5x+3)÷(x^{2}-1)$

Example 7: When polynomial $x^{4}-4x^{3}+mx-2$ is divided by $x+1$ the remainder is $-2$. Determine the value of m.

Example 8: When $kx^{3}+mx^{2}+x-2$ is divided by$ x-1$, the remainder is 6. When this polynomial is divided by$ x+2$, the remainder is 12. Find the values of k and m.