

## Division of Polynomials: Notes

Step 1) Make sure Polynomial is in Standard form (Descending Order)

Step 2) Divide the term with the highest power inside by the highest power outside.

Step 3) Multiply what's up top by the outside polynomial

Step 4) Subtract and bring down the next term.

Step 5) Repeat 2,3,4

Step 6) Write Final Answer with Remainder if necessary.

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Example:

$$\begin{array}{r}
 \phantom{x-5} \overline{x^2 - 4x - 5} \\
 \underline{x-5} \overline{x^3 - 9x^2 + 15x + 25} \\
 \phantom{x-5} \underline{x^3 + 5x^2} \\
 \phantom{x-5} -4x^2 + 15x + 25 \\
 \phantom{x-5} \underline{+ 4x^2 + 20x} \\
 \phantom{x-5} -5x + 25 \\
 \phantom{x-5} \underline{+ 5x + 25} \\
 \phantom{x-5} 0
 \end{array}$$

$$\frac{x^3}{x} = x^2$$

$$\begin{array}{r}
 26 R2 \\
 22 \overline{) 5.74} \\
 \underline{-44} \\
 134 \\
 \underline{-132} \\
 2
 \end{array}$$

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$$\begin{array}{r}
 \text{4x+3 R } \frac{-31}{x+5} \\
 \text{x+5} \overline{) 4x^2 + 23x - 16} \\
 \underline{4x^2 + 20x} \phantom{-16} \\
 3x - 16 \\
 \underline{3x + 15} \\
 -31
 \end{array}$$

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Is  $x-2$  a factor of  
 $f(x) = x^5 - 32$   
 $\uparrow$   
 $x-2 \overline{) x^5 - 32}$   
 $f(2) = 2^5 - 32$   
 $f(2) = 32 - 32 = 0$   
~~No~~ No Remainder  
 $x-2$  is a factor of  $f(x)$

is  $x-2$  a factor of  
 $x^3 - 3x^2 - 4x$   
 $(-2)^3 - 3(-2)^2 - 4(-2)$   
 $-8 - 12 + 8$   
 $= -12$   
 Not Equal to zero  
 Not a factor

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