

## **Topic: Long Division (Chapter 12.5)**

### **Materials Needed: Computer, Textbook**

Students will go to my webpage and click on the files page to access the assignment for Calamity day six. The students may also refer to their textbook (page 668 Ex. 4 and Ex. 5)

Students will use the website Khan Academy ([www.khanacademy.org](http://www.khanacademy.org)) and watch the video on long division.

### **Assignment: Worksheet**

Students will print the worksheets from the "Files Page" of my webpage

Students will complete the 2 problems provided and create their own problem for the last division

# Algebra I Lesson – Long Division

Before you attempt a long division with Polynomials, here is a long division with whole numbers to review

Ex. 1

$$\begin{array}{r}
 22520 \\
 6 \overline{) 135120} \\
 \underline{12} \phantom{00} \\
 15120 \\
 \underline{12} \phantom{00} \\
 3120 \\
 \underline{30} \phantom{00} \\
 120 \\
 \underline{12} \phantom{00} \\
 0
 \end{array}$$

(6 divides into 13 ; twice)  
 (Mult. the divisor 6 by the quotient 2 ; 12)  
 (Subtract and bring down the next digits)  
Repeat (6 divides into 15 ; twice)  
 (Mult. the divisor 6 by the quotient 2 ; 12)  
 (Subtract and bring down the next digits)  
Repeat (6 divides into 31 ; 5 times)  
 (Mult. the divisor 6 by the quotient 5 ; 30)  
 (Subtract and bring down the next digits)  
Repeat (6 divides into 12 ; twice)  
 (etc)

$$135,120 \div 6 = 22,520$$

Now that you have reviewed a normal division problem, here is a long division with Polynomials

Ex. 2

$$\begin{array}{r}
 3x^2 - 7x + 16 \\
 x+2 \overline{) 3x^3 - x^2 + 2x - 5} \\
 \ominus 3x^3 + 6x^2 \\
 \hline
 -7x^2 + 2x - 5 \\
 \oplus -7x^2 + 14x \\
 \hline
 16x - 5 \\
 \ominus 16x + 32 \\
 \hline
 -37
 \end{array}$$

(x divides into  $3x^3$  ;  $3x^2$ )  
 (Mult the divisor  $x+2$  by the quotient  $3x^2$  ;  $3x^3 + 6x^2$ )  
 (Change the signs and add instead of Subt ;  $-3x^3 - 6x^2$ )  
 (Bring down the next terms and Repeat)  
 (x divides into  $-7x^2$  ;  $-7x$ )  
 (Mult the divisor  $x+2$  by the quotient  $-7x$  ;  $-7x^2 - 14x$ )  
 (Change the signs and add instead of Subt. ;  $7x^2 + 14x$ )  
 (Bring down the next term and Repeat)  
 (x divides into  $16x$  ;  $16$ )  
 (Mult the divisor  $x+2$  by the quotient  $16$  ;  $16x + 32$ )  
 (Change the signs and add instead of Subt. ;  $-16x - 32$ )  
 (-37 is the remainder)

★ We write our answer as  $3x^2 - 7x + 16 + \frac{-37}{x+2}$

Go to the website for Kahn Academy and watch the video on long division. He will give an example of the step by step procedure (He chooses to subtract instead of changing the signs and adding. I think it is much easier to change the signs and add, look at my Ex. 2 and follow the division process). The website is [www.khanacademy.org](http://www.khanacademy.org)

After you watch the video on long division your homework is to complete the 2 divisions below and create your own long division problem with a divisor of  $x - 3$ . The dividend must contain 4 terms, which means it will start with an  $x$  to the third power as the 1<sup>st</sup> term.

$$1.) \quad x+4 \overline{) 5x^3 + 21x^2 + 8x + 16}$$

$$2.) \quad 2x+1 \overline{) 8x^4 - 4x^3 + 2x^2 - x + 3}$$

$$3.) \quad x-3 \overline{)$$