WORKSHEET 2 | POLYNOMIALS

2

NAME: _____ SCORE: _____

Objectives:

1. Perform long division
2. Perform synthetic division

TASKS

Complete the long division story.

Divide $3x^3 - 5x^2 + 10x - 3$ by $3x + 1$.	
I start with the long-division set-up:	$3x+1\overline{)3x^3-5x^2+10x-3}$
Looking only at the leading terms, I divide $3x^3$ by $3x$ to get x^2. This is what I put on top:	
I multiply this x^2 by the $3x + 1$ to get $3x^3 + 1x^2$, which I put underneath:	$\begin{array}{r} x^2 \\ 3x+1\overline{)3x^3-5x^2+10x-3} \\ 3x^3+1x^2 \end{array}$
Then I change the signs, add down, and remember to carry down the "$+10x - 3$" from the original dividend, giving me a new bottom line of $-6x^2 + 10x - 3$:	$\begin{array}{r} x^2-2x \\ 3x+1\overline{)3x^3-5x^2+10x-3} \\ \underline{-3x^3+1x^2} \\ -6x^2+10x-3 \end{array}$
Dividing the new leading term, $-6x^2$, by the divisor's leading term, $3x$, I get $-2x$, so I put this on top:	
Then I multiply $-2x$ by $3x + 1$ to get $-6x^2 - 2x$, which I put underneath. I change signs, add down, and remember to carry down the "-3 from the dividend:	
My new last line is "$12x - 3$. Dividing the new leading term of $12x$ by the divisor's leading term of $3x$, I get $+4$, which I put on top. I multiply 4 by $3x + 1$ to get $12x + 4$. I switch signs and add down. I end up with a remainder of -7:	
Since the remainder in this case is -7 and since the divisor is $3x + 1$, then I'll turn the remainder into a fraction (the remainder divided by the original divisor), and add this fraction to the polynomial across the top of the division symbol. Then my answer is this:	

Check your work above using synthetic division. Complete the details below.

$-\frac{1}{3}$ | 3 -5 10 -3

$-\frac{1}{3}$ | 3 -5 10 -3

$-\frac{1}{3}$ | 3 -5 10 -3

---

3 -6

$-\frac{1}{3}$ | 3 -5 10 -3

$-\frac{1}{3}$ | 3 -5 10 -3

---

3 -6

$-\frac{1}{3}$ | 3 -5 10 -3

---

3 -6

$-\frac{1}{3}$ | 3 -5 10 -3

---

3 -6