Lesson Title 5.7 Synthetic Division of Polynomials DAY ONE NOTES B2A2 Date _____

OBJECTIVE 1: SYNTHETIC Dividing to Divide by a Polynomial

****OPPOSITE OF LONG DIVISION! It can only be used when dividing by a linear equation.****

STEPS:

1. Rewrite the dividend in standard form (from left to right) as the coefficients only. Replace any missing terms with a zero or you will get the wrong answer.
2. On the left, your divisor is what x =’s NOT the factor. ie: (x + 2) means you divide by – 2.
3. Move from left to right, drop down the first number.
4. Multiply that number by the divisor and write it under the second number of your dividend.
5. Add those numbers and repeat the process.
6. When you run out of numbers in the dividend, your last value is the remainder.
7. Write answer out, always starting one less than original dividend power.

TASK 1: Divide using synthetic division, and write your answer in simplest form.

a) $x^4 - 2x^3 + 6x + 5$ by $(x - 1)$

1	1	-2	0	6	5
+	↓	1	-1	-1	5
	1	-1	-1	5	10

$x^3 - x^2 - x + 5$ R. 10

or

$x^3 - x^2 - x + 5 + \frac{10}{x-1}$

b) $x^4 + 3x^3 - 5x^2 + 6x + 12$ by $(x + 3)$

-3	1	3	-5	6	12
+	↓	-3	0	15	-36
	1	0	-5	21	-24

$x^3 - 5x + 21$ R. -24

or

$x^3 - 5x + 21 - \frac{24}{x+3}$

c) $P(x) = 2x^3 - 4x^2 + 5$ by $(x - 2)$

2	2	-4	0	5
+	↓	4	0	0
	2	0	0	5

$2x^2$ R. 5

or

$2x^2 + \frac{5}{x-2}$

d) $P(x) = x^3 - 5x - 2$ by $(x - 2)$

2	1	0	-5	-2
+	↓	2	4	-2
	1	2	-1	-4

$x^2 + 2x - 1$ R. -4

or

$x^2 + 2x - 1 - \frac{4}{x-2}$

Common Mistakes: · missing zeros; opposite sign of factor; one less power in the answer, ↓ 1st #, add & multiply

$(2x^3 - x^2 - 13x + 1) \div (x - 3)$

3	2	-1	-13	1
+	↓	6	15	6
	2	5	2	7

$(4x^3 - 3x^2 + 6x + 5) \div (x - 1)$

1	4	-3	6	5
+	↓	4	1	7
	4	1	7	12

Still need help with:

$2x^2 + 5x + 2$ R. 7

$4x^2 + x + 7$ R. 12