Lesson 2 Synthetic Division

Synthetic Division is another method used to divide a polynomial by a binomial of the form $x - a, a \in \mathbb{Z}$. In this method, the variables are removed and only the coefficients are recorded.

Ex. 1) Divide $6x^3 - 19x^2 + 16x - 4$ by $x - 2$

$a = 2$

* good example on pg. 87

2	6	-19	16	-4
		12	-14	4
	6	-7	2	0 ← remainder

add

coefficients

quotient $6x^2 - 7x + 2$ one degree lower than dividend

$6x^3 - 19x^2 + 16x - 4 = (x-2)(6x^2 - 7x + 2)$

Ex. 2) Divide $x^4 - 2x + 4 - 10x^2$ by $x + 3$

$x^4 + 0x^3 - 10x^2 - 2x + 4$

placeholder

-3	1	0	-10	-2	4
		-3	9	3	-3
	1	-3	-1	1	1 ← remainder

$$\frac{x^4 - 10x^2 - 2x + 4}{x+3} = x^3 - 3x^2 - x + 1 + \frac{1}{x+3}$$

one degree lower

Long div'n pg 89 1a, d

Syn div'n worksheet # 2, 5, 8, 9, 11 (or) pg 90 # 2a, c, d, f

worksheet answers

2) $x^2 + x + 6$ rem 9

5) $2x^2 - 7x + 3$ rem 3

8) $2(x^2 + 3x + 7)$ rem 45

9) $x^3 + 2x^2 + 4x + 8$

11) $4(x+3)$ rem 28

11) $4x^2 + 4x + 4$