

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 $x - 2$ $\leftarrow a = 2$

* good example on pg. 87

$$\begin{array}{r|rrrr}
 2 & 6 & -19 & 16 & -4 \\
 & \downarrow & \nearrow & \nearrow & \nearrow \\
 & 6 & -7 & 2 & 0
 \end{array}$$

\leftarrow remainder

quotient $6x^2 - 7x + 2$ \leftarrow 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 $x + 3$

$$\begin{array}{r|rrrrr}
 -3 & 1 & 0 & -10 & -2 & 4 \\
 & \downarrow & \nearrow & \nearrow & \nearrow & \nearrow \\
 & 1 & -3 & -1 & 1 & -3
 \end{array}$$

\leftarrow remainder

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

\leftarrow one degree lower

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

Long div'n pg 89 1a, d

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

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