

Synthetic Division and Remainder Theorem Video Lecture

Section 5.7

Course Learning Objective:

- 1) Simplify polynomial expressions.**
- 2) Solve applications involving polynomials.**

Weekly Learning Objectives:

- 1) Use synthetic division to divide a polynomial by a binomial.**
- 2) Use the remainder theorem to evaluate polynomials.**

Synthetic Division and The Remainder Theorem

This is a shortcut to long-division by a linear binomial.
You must be dividing by a binomial of the form:

$$x + c$$

$$x - c$$

$$ax + b$$

$$ax - b$$

$$(4x^3 - 3x^2 + 2x - 3) \div (x - 2) =$$

$$\frac{5p^3 - 6p^2 + 3p + 14}{p + 1} =$$

$$\frac{x^4 + 81}{x-3} =$$

$$(2x^3 + 5x^2 - 11x + 4) \div (2x - 1)$$

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

a) Find $P(2)$ by substitution.

b) Use synthetic division to find the remainder when $P(x)$ is divided by $x - 2$.

Remainder Theorem:

If a polynomial $P(x)$ is divided by $x - c$, then the remainder is $P(c)$.

Use the remainder theorem to find $P(4)$ if $P(x) = 4x^6 - 25x^5 + 35x^4 + 17x^2$

Find the remainder when dividing $(x^{100} - 2x^{98} + 7x^2 - 1) \div (x - 1)$

