

Section 2.3 Polynomial and Synthetic Division

Objective: In this lesson you learned how to use long division and synthetic division to divide polynomials by other polynomials.

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Division Algorithm

Improper rational expression

Proper rational expression

Synthetic division

Remainder Theorem

Factor Theorem

I. Long Division of Polynomials (Pages 226–228)

Dividing polynomials is useful when . . .

What you should learn

How to use long division to divide polynomials by other polynomials

When dividing a polynomial $f(x)$ by another polynomial $d(x)$, if the remainder $r(x) = 0$, $d(x)$ _____ into $f(x)$.

The result of a division problem can be checked by . . .

Example 1: Divide $3x^3 + 4x - 2$ by $x^2 + 2x + 1$.

II. Synthetic Division (Page 229)

Can synthetic division be used to divide a polynomial by $x^2 - 5$? Explain.

What you should learn

How to use synthetic division to divide polynomials by binomials of the form $(x - k)$

Can synthetic division be used to divide a polynomial by $x + 4$? Explain.

Example 2: Fill in the following synthetic division array to divide $2x^4 + 5x^2 - 3$ by $x - 5$. Then carry out the synthetic division and indicate which entry represents the remainder.

--	--

III. The Remainder and Factor Theorems (Pages 230–231)

To use the Remainder Theorem to evaluate a polynomial function $f(x)$ at $x = k, \dots$

What you should learn
How to use the Remainder Theorem and Factor Theorem

Example 3: Use the Remainder Theorem to evaluate the function $f(x) = 2x^4 + 5x^2 - 3$ at $x = 5$.

To use the Factor Theorem to show that $(x - k)$ is a factor of a polynomial function $f(x), \dots$

List three facts about the remainder r , obtained in the synthetic division of $f(x)$ by $x - k$:

- 1)
- 2)
- 3)

Homework Assignment

Page(s)

Exercises