Course Number
Instructor
Date

Section 3.4 The Fundamental Theorem of Algebra

Objective: In this lesson you learned how to determine the number of zeros of polynomial functions and find them.

Important Vocabulary	Define each term or concept.
Fundamental Theorem of Algebra	
Linear Factorization Theorem	
Conjugates	

I. The Fundamental Theorem of Algebra (Pages 264–265)

> ***What you should learn***
> How to determine the number of zeros of polynomial functions and how to find all zeros of polynomial functions, including complex zeros

In the complex number system, every *n*th-degree polynomial function has __________________ zeros.

Example 1: How many zeros does the polynomial function $f(x) = 5 - 2x^2 + x^3 - 12x^5$ have?

An *n*th-degree polynomial can be factored into ____________________ linear factors.

Example 2: List all of the zeros of the polynomial function $f(x) = x^3 - 2x^2 + 36x - 72$.

II. Conjugate Pairs (Page 266)

> ***What you should learn***
> How to find conjugate pairs of complex zeros

Let *f*(*x*) be a polynomial function that has real coefficients. If $a + bi$, where $b \neq 0$, is a zero of the function, then we know that _________________ is also a zero of the function.

III. Factoring a Polynomial (Pages 266–268)

What you should learn
How to find zeros of polynomials by factoring

To write a polynomial of degree $n > 0$ with real coefficients as a product without complex factors, write the polynomial as . . .

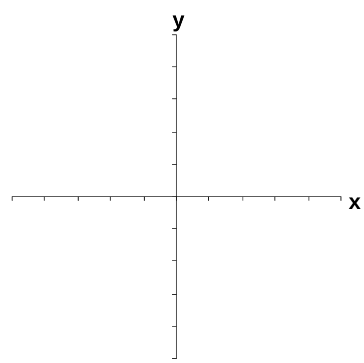
A quadratic factor with no real zeros is said to be

____________________________________.

Example 3: Write the polynomial $f(x) = x^4 + 5x^2 - 36$
(a) as the product of linear factors and quadratic factors that are irreducible over the reals, and
(b) in completely factored form.

Explain why a graph cannot be used to locate complex zeros.

Additional notes



Homework Assignment

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