Course Number

Instructor

Date

Section 4.2 Complex Solutions of Equations

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

What you should learn
How to determine the numbers of solutions of polynomial equations

I. The Number of Solutions of a Polynomial Equation
(Pages 317–318)

The Fundamental Theorem of Algebra implies that a polynomial equation of degree *n* has _____ solutions in the complex number system. These solutions can be . . .

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

You can use a graph to check the number of _____ solutions of an equation.

Every second-degree equation, $ax^2 + bx + c = 0$, has precisely two solutions given by the Quadratic Formula. The expression _____ is called the **discriminant,** and can be used to determine whether the solutions are real, repeated, or complex:

1) If the discriminant is less than zero, the equation has _____ solution(s).
2) If the discriminant is equal to zero, the equation has _____ solution(s).
3) If the discriminant is greater than zero, the equation has _____ solution(s).

Example 2: Use the discriminant to find the number and type of solutions of the quadratic equation $x^2 - 2x + 2 = 0$. Then find the solutions of the equation.

II. Finding Solutions of Polynomial Equations (Page 319)

What you should learn
How to find the solutions of polynomial equations

If the complex number $a + bi$ (where $b \neq 0$) is a solution of a polynomial equation with real coefficients, then we know that _____ is another solution of the equation.

III. Finding Zeros of Polynomial Functions (Pages 320–321)

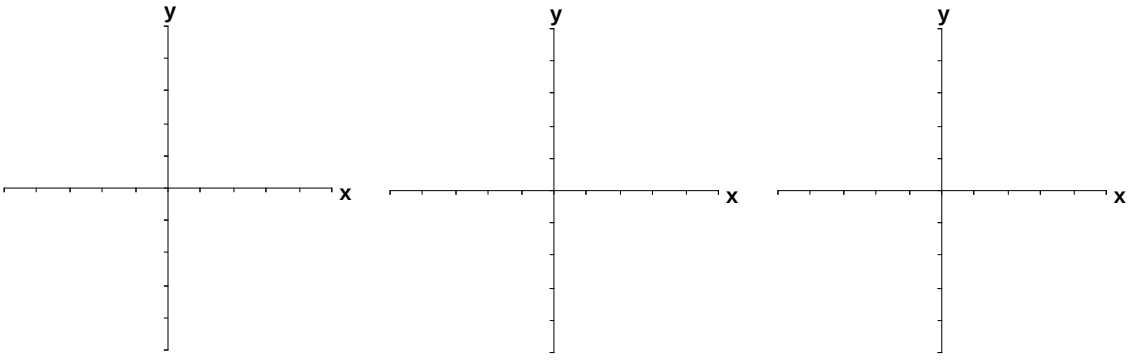
What you should learn
How to find the zeros of a polynomial function and how to find a polynomial function given the zeros of the function

The problem of finding the zeros of a polynomial function is essentially the same as . . .

The zeros of the polynomial function $f(x) = x^5 - 3x^2 + 4$ are simply . . .

Example 3: Find all the zeros of the polynomial function $f(x) = x^4 + 5x^2 - 36$, given that $3i$ is a zero of f.

Example 4: Find a fourth-degree polynomial function with real coefficients that has -5, 5, and $-2i$ as zeros.



Homework Assignment

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