

Section 4.4: Theorems about zeros of Polynomial Functions

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11:05 AM

Fundamental Theorem of Algebra:

every polynomial of degree n for $n \geq 1$
has at least one complex zero

↑
reals are a subset of complex

why do we care?

every polynomial of degree $n \geq 1$ can be
written as

$$f(x) = a_n (x - c_1)(x - c_2)(x - c_3) \dots (x - c_n)$$

↑ n zeros
↑ leading coefficient

example: give a polynomial of degree 3 with zeros
-1, 0, and 4 (answers may vary)

↓ any real

$$P(x) = a(x+1)(x-0)(x-4)$$
$$= 2x(x+1)(x-4)$$

note: if polynomial has real coeffs,

then if $a + bi$ is a zero, then
 $a - bi$ is also a zero
complex conjugates

if polynomial has rational coeffs,

then if $a + \sqrt{b}$ is a zero, then

$a - \sqrt{b}$ is also a zero