

Honors Algebra II

Notes Section 2.7

Apply the Fundamental Theorem of Algebra

EXAMPLE 1 Find the number of solutions or zeros.

a) $x^3 + 5x^2 + 4x + 20 = 0$

b) $x^4 - 8x^3 + 18x^2 - 27$

Degree: _____

Degree: _____

of Solutions: _____

of Solutions: _____

EXAMPLE 2 Find all zeros of the polynomial function.

a) $x^3 + 7x^2 + 15x + 9$

Step 1 Find the rational zeros (p/q)

Step 2 Find a real zero (synthetic division)

Step 3 Write in factored form. _____

Step 4 Name all zeros. _____

b) $x^5 - 4x^4 + 4x^3 + 10x^2 - 13x - 14$

Step 1 Find the rational zeros (p/q)

Step 2 Find a real zero (synthetic division)

Step 3 Write in factored form. _____

Step 4 Repeat step 2 & 3.

Step 5 Name all zeros. _____

EXAMPLE 3 Write a polynomial function f of least degree that has rational coefficients, with the following leading coefficient and zeros.

a) Leading Coefficient: 1

Zeros: $-1, 2, 4$

$f(x) =$ _____

b) Leading Coefficient: 1

Zeros: 3 and $2+\sqrt{5}$ _____ **the conjugate is also a zero

$f(x) =$ _____

c) Leading Coefficient: 1

Zeros: 2, 2i, 4-√6 _____ **the conjugate is also a zero

f(x) = _____

EXAMPLE 4 Determine the possible #'s of Positive real zeros, Negative real zeros and Imaginary real zeros.

a) $f(x) = x^3 + 2x - 11$

Degree: _____ Total # of Zeros: _____

Sign Changes: _____

f(-x) = _____

Sign Changes: _____

Possible Combinations of Positive, Negative & Imaginary = Total Zeros

b) $g(x) = 2x^4 - 8x^3 + 6x^2 - 3x + 1$

Degree: _____ **Total # of Zeros:** _____

Sign Changes: _____

f(-x) = _____

Sign Changes: _____

Possible Combinations of Positive, Negative & Imaginary = Total Zeros

c) $f(x) = x^6 - 2x^5 + 3x^4 - 10x^3 - 6x^2 - 8x - 8$

Degree: _____ **Total # of Zeros:** _____

Sign Changes: _____

f(-x) = _____

Sign Changes: _____

Possible Combinations of Positive, Negative & Imaginary = Total Zeros

<u>Positive</u>	<u>Negative</u>	<u>Imaginary</u>	<u>Total Zeros</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

EXAMPLE 5 Approximate the real zeros using your graphing calculator.

$$f(x) = x^6 - 2x^5 + 3x^4 - 10x^3 - 6x^2 - 8x - 8$$
