

5.7 day 2 Notes: Finding Roots of Polynomials

Warm - Up:

1) Write the factors then find the simplest function with the given roots

$$x = 2, -3, 1$$

2) **solve:** $f(x) = x^4 - 8x^3 + 20x^2 - 32x + 64$

- Based on the degree, how many roots/solutions are there?
- Graph the function and list the real roots; note multiplicity
- use synthetic division to reduce to quadratic or lower
- solve for remaining roots.

3) **solve:** $f(x) = 2x^4 + 3x^3 - 26x^2 - 15x + 36$

- Based on the degree, how many roots/solutions are there?
- Graph the function and list the real roots.
- use synthetic division to reduce to quadratic or lower
- solve for the remaining roots

Complex Conjugate and Irrational Root Theorems

These theorems state that if a polynomial has one complex or irrational solution, then the conjugate is also a solution. (i.e. they always come in pairs)

Ex: $a + bi$ and $a - bi$ or $a + \sqrt{b}$ and $a - \sqrt{b}$

Write the simplest polynomial function :

Ex: zeros: 1 and $\sqrt{2}$

4) zeros: 3 and $\sqrt{5}$

Ex. zeros: 1 and $3i$

5) zeros: -3 and $2i$

Ex. zeros: -2 , and $3 - i$

6) zeros : 5 and $1 - i$