Warm Up

- Divide using synthetic division.

$$x^4 - 6x^2 + 3x - 2 \; by \; x - 3$$

Unit 3, Polynomials and Polynomial Functions

Finding Rational Zero's

Review

- If the problem is factorable say so, and factor.

$$x^2 + 3x - 4$$

$$3x^2 - x - 10$$

$$x^2 - 10x + 19$$

$$5x^2 + 10x - 15$$

$$x^3 - 3x^2 + 2x - 1$$

Recap

- How does factoring a quadratic help us to graph it?
- Can this be applied to other degree polynomials?

Solving for zero's

- Look at the following problem.

$x^3 - 2x^2 - 9x + 18$

If I told you that 2 was a solution for this function how could you use that to find the other solutions?

Examples

- $x^3 - 8x^2 + 4x + 48$, one zero is 4
- $2x^3 - 14x^2 - 56x - 40$, one zero is 10
- $9x^3 + 10x^2 - 17x - 2$, one zero is -2

You try

- $2x^3 + 3x^2 - 39x - 20$; one zero is 4
- $x^3 - 14x^2 + 47x - 18$; one zero is 9

Warm-Up!

- Solve for the remaining zeroes.

$$x^3 + 3x^2 + 10x + 8, one\ zero\ is\ -1$$

VOCAB

- THE RATIONAL ZERO THEOREM
  - If $f(x) = a_n x^n + \cdots + a_1 x + a_0$ has integer coefficients, then every rational zero of f has the following form:
    - $\frac{p}{q} = \frac{factors\ of\ the\ constant}{factors\ of\ the\ leading\ coefficient}$

TODAY

- Use the rational zero theorem to find all possible zeros

Directions (Finding Zeros)

- WRITE THE PROBLEM IN STANDARD FORM
  - DOESN'T need missing terms
- Look at the constant
  - Factor it
- Look at the leading coefficient
  - Factor it
- LIST ALL COMBINATIONS
  - All answers have a plus/minus

I DO (Finding Zeros)

- List all possible rational zeros

1. $f(x) = x^3 + 2x^2 - 11x - 12$
2. $f(x) = x^4 + 2x^2 - 24$
3. $f(x) = 2x^5 + x^2 + 16$
4. $f(x) = 10x^4 - 3x^3 - 29x^2 + 5x + 12$

WE DO (Finding Zeros)

- List all possible rational zeros

1. $f(x) = 3 - 2x^5 - 7x + 4x^2$
2. $f(x) = 8x^2 - 12x - 3$
3. $f(x) = 3x^7 - x^4$
4. $f(x) = 7 - 4x^2 + 7x^5 + 3x$

YOU DO (Finding Zeros)

- List all possible rational zeros

1. $f(x) = -7x^2 + 40 + x^3 + 2x$
2. $f(x) = x^3 - 8x^2 - 23x + 30$
3. $f(x) = x^4 - 5x^3 + 7x^2 + 3x - 10$
4. $f(x) = x^3 + 72 - 5x^2 - 18x$

Review

- Today we learned how to find all possible zeros using the rational zero theorem

HOMEWORK

- Worksheet
  - 6.6B (1 – 3)

Warm Up

- Please turn in old warm-ups, start new ones with…

List all possible rational zeros

1. $f(x) = x^2 + 26 + 2x^3 - 4x$

2. GET YOUR CALCULATOR

TODAY

- We will find all real zeros of a polynomial

Directions (Finding REAL Zeros)

- Find all possible zeros using RZT (yesterday)
- Plug your answers into synthetic division
  - If your remainder is zero then it's a REAL zero
  - If your remainder isn't then it is NOT a real zero
- Once you find an answer remember to take the opposite for the equation
  - Example -2 means I write x + 2
  - Example 3/4 means I write 4x - 3

Directions (Finding REAL Zeros)

- Find all possible zeros using RZT (yesterday)
- Plug your answers into the equation using direct substitution for the x
- Once you find an answer that equals zero remember to take the opposite for the equation
  - Example -2 means I write x + 2
  - Example 3/4 means I write 4x - 3

Algebra 2
Chapter 6
Polynomials and Polynomial Functions
Lesson 6
Finding Rational Zeros

TODAY

- We will find all real zeros of a polynomial

DIRECTIONS

- In your calculator
  - Type the problem into y=
  - Then you can either use the table
  - Or use the graph and find the zeros

I DO (Finding REAL Zeros)

- List all possible rational zeros

1. $f(x) = x^3 + 2x^2 - 11x - 12$
2. $f(x) = x^4 + 2x^2 - 24$
3. $f(x) = 2x^5 + x^2 + 16$
4. $f(x) = 10x^4 - 3x^3 - 29x^2 + 5x + 12$

Warm-Up

- List All possible zeroes for the following function.

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

WE DO (Finding REAL Zeros)

- List all possible rational zeros

1. $f(x) = 3 - 2x^5 - 7x + 4x^2$
2. $f(x) = 8x^2 - 12x - 3$
3. $f(x) = 3x^7 - x^4$
4. $f(x) = 7 - 4x^2 + 7x^5 + 3x$

YOU DO (Finding REAL Zeros)

- List all possible rational zeros

1. $f(x) = -7x^2 + 40 + x^3 + 2x$
2. $f(x) = x^3 - 8x^2 - 23x + 30$
3. $f(x) = x^4 - 5x^3 + 7x^2 + 3x - 10$
4. $f(x) = x^3 + 72 - 5x^2 - 18x$

Review

- Today we learned how to find all REAL zeros of a polynomial

HOMEWORK

- Worksheet
  - 6.6B (10 - 16)