x^5+7x^3-9x+1

Algebra 2 3-9 Graphing Factorable Polynomial Functions

x^2+3x-7

Objectives:
1) Find all possible rational zeros of a polynomial function
2) Graph the polynomial function factored form
3) Find all the actual rational zeros
4) Factor a polynomial completely

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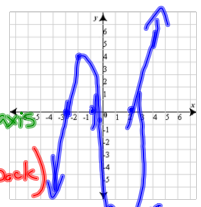
Graphing Polynomial Functions – Ex 1

- Graph $f(x) = (x - 2)(x + 1)(x + 3)$

Degree: 3
ODD
( ) odd exponent the graph will go through the x-axis
( ) even exponent the graph will touch (bounce back) the x-axis



Max: (-1.12, 4.06)
Min: (0.79, -8.21)

- What are the zeros of the graph?

x = 2 x = -1 x = -3
Through Through Through

- Does that relate to the equation in any way?

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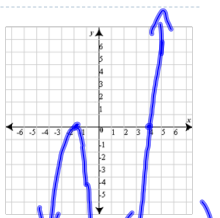
Graphing Polynomial Functions – Ex 2

- Graph $f(x) = (x + 2)^2(x - 4)$

Degree: 3



Min: (2, -32)

- What are the zeros of the graph?

BB x = -2 x = 4
Touch Through

- Does that relate to the equation in any way?

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No clickers & yes calculators.

Have out the 3.9 notes and find the zeros for the next equation.

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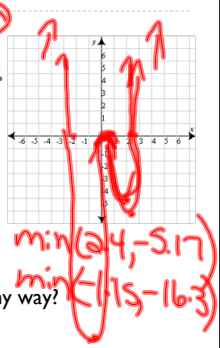
Graphing Polynomial Functions – Ex 3

- Graph $f(x) = (x - 1)^2(x + 2)(x - 3)$

Even/Odd = Even
Pos L.C. or Neg L.C. = Positive
# of Zeros: 3



min (2.4, -5.17)
min (-1.15, -16.3)

BB
- What are the zeros of the graph?

x = 1 x = -2 x = 3

- Does that relate to the equation in any way?

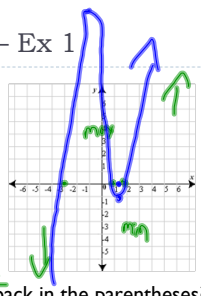
Relationships between the graph and the equation

Skip

Using the graph to factor – Ex 1

- Graph $f(x) = x^3 - 7x + 6$

Even/odd: odd
Pos/Neg L.C.: Positive
# of Zeros: 3



- What are the zeros?

x = -3 x = 1 x = 2

Do any zeros B.B – No

- How do they look if we put them back in the parentheses?

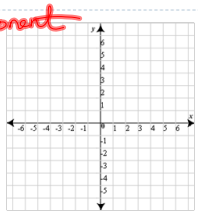
Factored form:
f(x) = (x+3)(x-1)(x-2)

max: (-1.53, 13.1)
min: (1.53, -1.13)

Using the graph to factor – Ex 2

- Graph $f(x) = 2x^3 + 3x^2 - 1$

Standard form: LARGEST Exponent
Even/odd: odd
Pos/Neg L.C.: Positive
# of Zeros: 2



- What are the zeros?

x = -1 x = 0.5

Do any zeros BB? yes

- How do they look if we put them back in the parentheses?

$F(x) = (x+1)^2(x-.5)$ factored form
Add the Exponents

Rational Zero Test

- If a rational number $\frac{r}{s}$ (written in lowest terms) is a zero of the polynomial function

$f(x) = a_n x^n + \ldots\ldots + a_1 x + a_0$

where the coefficients $a_n, \ldots, a_1$ are integers with $a_n \neq 0$ and $a_0 \neq 0$, then **r** is a factor of the constant term a_0 and **s** is a factor of the leading coefficient a_n. skip

You can make a list of all the possible factors by identifying all the possible combinations of $\frac{r}{s}$ most factors possible up to # of factors

*Remember – factors can be positive or negative

x^3+7x+1

3 factors

$(x+1)^2(x-1)(x+5)$

4 factors

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Example 1

- Find the rational zeros of $f(x) = 2x^3 - 7x^2 + 2x + 3$ 2
- r values:
- s values:
- List all the possible rational zeros:

3

- Use a calculator to graph the function.
- Identify the actual zeros of the function. $x=-.5$ $x=1$ $x=3$
- Write the function in factored form.

$f(x)=(x+.5)(x-1)(x-3)$

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Example 2

- Find the rational zeros of $f(x) = x^3 - x^2 - 8x + 12$
- r values:
- s values:
- List all the possible rational zeros:

3

- Use a calculator to graph the function.
- Identify the actual zeros of the function. $x=-3$ $x=2$
- Write the function in factored form.

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

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2 zeros

Max

Mins

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Practice 1

- Find the rational zeros of $f(x) = 2x^3 - 7x^2 - 10x + 24$
- r values:
- s values:
- List all the possible rational zeros:

- Use a calculator to graph the function.
- Identify the actual zeros of the function.
- Write the function in factored form.

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Practice 2

- Find the rational zeros of $f(x) = x^4 + 2x^3 - 8x^2 - 18x - 9$
- r values:
- s values:
- List all the possible rational zeros:

- Use a calculator to graph the function.
- Identify the actual zeros of the function.
- Write the function in factored form.

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