Guiding Question: Can you use synthetic division to graph higher degree polynomials?

p.84-85 Using Synthetic Division w/Graphs 5.1-5.4

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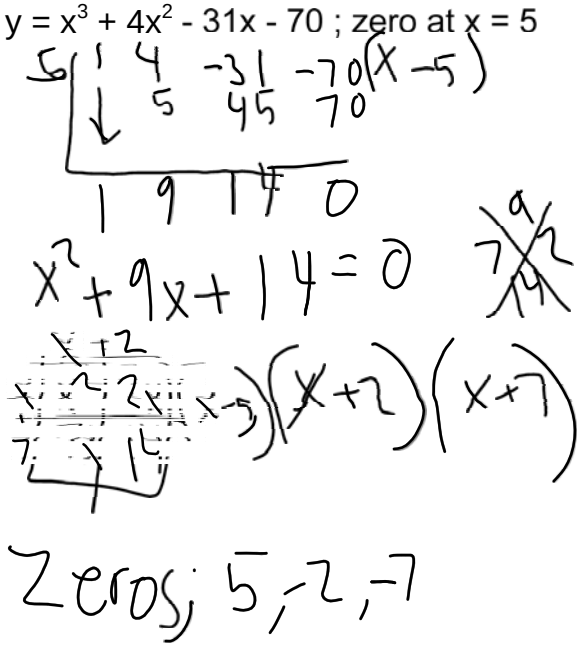
Warm-up: Write the polynomial equation in factored form. One zero has been given. Then identify all the zeros

$y = x^3 + 4x^2 - 31x - 70$; zero at $x = 5$



Homework - What questions do you have?

Algebra 2 Homework **Name:** _____
Using Synthetic Division Day 1 **Period:** _____ **Date:** _____

Use synthetic division to find the polynomial function's Factored Form and Zeros.

1.) $f(x) = x^3 + 9x^2 - 37x - 165$; zero at $x = 5$

Factored Form: f(x) = _____

Zeros: 5, -3, -11

2.) $f(x) = x^3 - 3x^2 - 16x - 12$; zero at $x = -2$

Factored Form: f(x) = _____

Zeros: -2, -1, 6

3.) $f(x) = x^3 - 10x^2 - 3x + 108$; zero at $x = 4$

Factored Form: f(x) = _____

Zeros: 4, 9, -3

Find the zeros, determine the degree, leading coefficient, graph and end behavior.

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

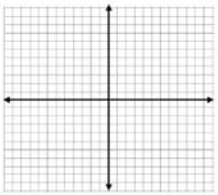
Zeros:

Degree:

Even/Odd:

Leading Coefficient:

End Behavior: $x \to +\infty$ f(x) →
$x \to -\infty$ f(x) →



5. $f(x) = -x(x+6)^2(x-4)$

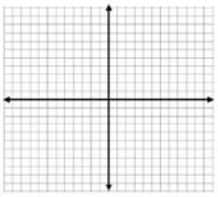
Zeros:

Degree:

Even/Odd:

Leading Coefficient:

End Behavior: $x \to +\infty$ f(x) →
$x \to -\infty$ f(x) →



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

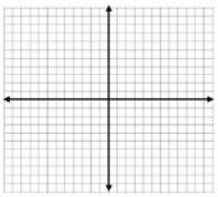
Zeros:

Degree:

Even/Odd:

Leading Coefficient:

End Behavior: $x \to +\infty$ f(x) →
$x \to -\infty$ f(x) →



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Find all zeros of the polynomial using the given zero, identify the important information, then sketch the graph.

1. $f(x) = x^3 + 6x^2 - x - 6$, zero at x=1

(x−1)

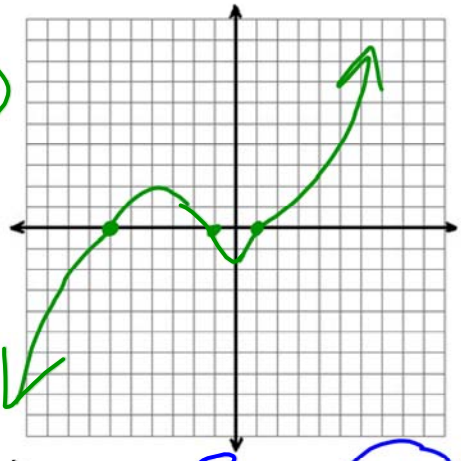
1	1	6	−1	−6
	↓	1	7	6
	1	7	6	0
	x^2	x	C	R

$x^2 + 7x + 6 = 0$

$(x+6)(x+1)$

$(x-1)$

Zeros: 1, −6, −1



Degree: 3 Even / Odd

Leading Coefficient: Pos / Neg

End Behavior: $x \to +\infty, f(x) \to +\infty$
$x \to -\infty, f(x) \to -\infty$

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2. $f(x) = x^3 + 2x^2 - 57x + 54$, zero at x=-9

$(x+9)$

$-9 \mid 1 \quad 2 \quad -57 \quad 54$

$\quad\quad\quad\downarrow \quad -9 \quad +63 \quad -54$

$\quad\quad 1 \quad -7 \quad 6 \quad 0$

$\quad\quad x^2 \quad x \quad C \quad R$

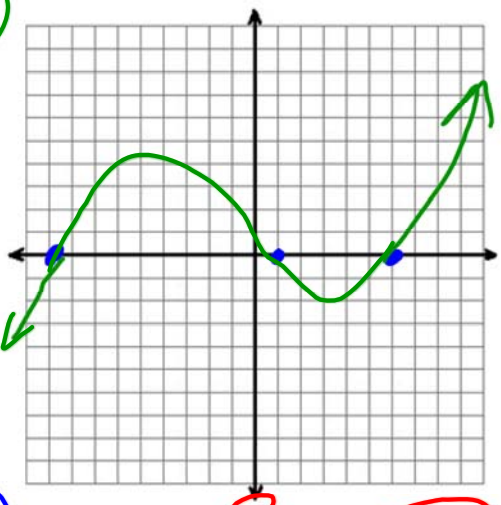
$x^2 - 7x + 6 = 0$

x	−1
x	x^2	−1x
−6	−6x	6

$-6 \cdot -1 = 6$, $-6 + -1 = -7$

$(x-1)(x-6)(x+9)$

Zeros: $-9, 1, 6$



Degree: 3 Even / Odd

Leading Coefficient: Pos / Neg

End Behavior: $x \to +\infty, f(x) \to +\infty$

$x \to -\infty, f(x) \to -\infty$

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Partner Work -- Practice!