

# FUNDAMENTAL THEOREM OF ALGEBRA

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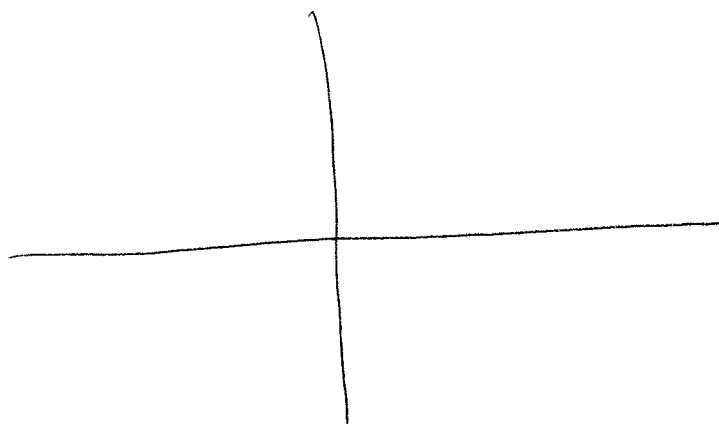
Degree of Poly = # of zeros.

$$y = (x-x_1)(x-x_2)(x-x_3)\dots(x-x_n)$$

$$y = (x^2+1)(x^2+6x+13)(x^2-1) \quad \text{degree} = 6$$

$$y = (x+i)(x-i)(x+3-2i)(x+3+2i)(x+1)(x-1)$$

zeros  $-i, +i, -3+2i, -3-2i, -1, +1$



# Complex Factors

$$(x+i)(x-i)$$

Zero:  $-i, i$

Complex  
Roots

$$x^2 + \cancel{ix} - \cancel{ix} - i^2$$

$$x^2 + 1 \quad \text{Real  
Function}$$

Conjugate Pairs

$$(A+Bi)(A-Bi) = A^2 + B^2$$

Ex

$$(x+3-2i)(x+3+2i)$$

zero:  $-3+2i$       zero:  $-3-2i$

$$(x+3)^2 + 4 = x^2 + 6x + 13$$

# Complex Numbers

$$\sqrt{-1} = i \quad \text{imaginary unit}$$


$$\sqrt{-4} = 2i$$

$\sqrt{4} \sqrt{-1}$

$$\sqrt{-5} = \sqrt{5}i$$

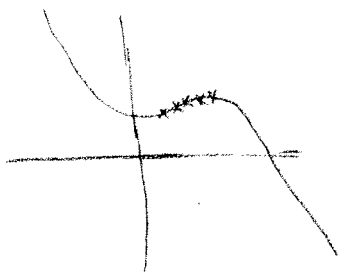
$$i \cdot i = i^2 = -1$$

$$\frac{2+2i}{3+6i} = \frac{2}{5} - \frac{2}{15}i$$

<p>GROUP NAME: MEABS</p> <p>Logo: </p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: Ahmed</p>
<p>Date: _____</p> <p>Topics: _____</p>	<p>Writer/Prep: Jen/Kero</p> <p>QC/Leader: Daniella</p>

Instructions: Find zeros for Cubic + Quartic Reg.

Cubic



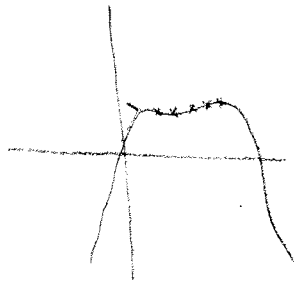
zeros: 10.5840

- a = -.0208...
- b = .3607...
- c = -1.148...
- d = 3.5809...

2 complex

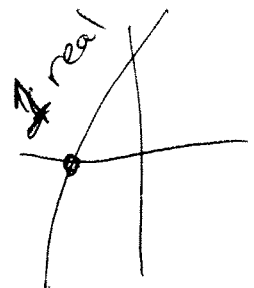
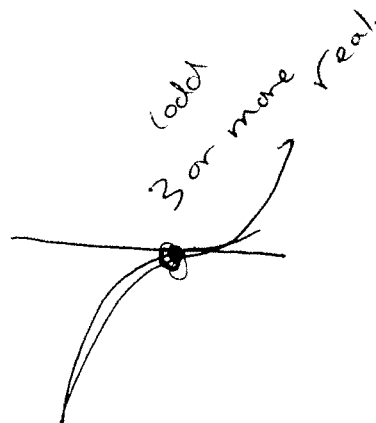
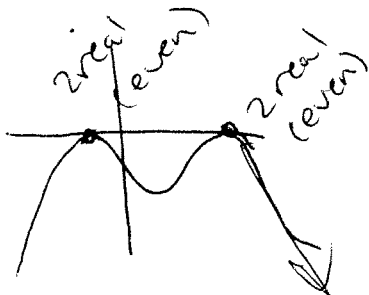
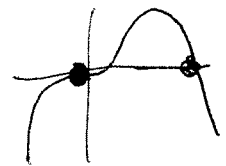
complex  
 $2.849... + 3.9587...i$   
 $2.849... - 3.9587...i$

quartic



zeros: 9.334, -1.329 + 2 complex

- a = -20.0625
- b = .0856...
- c = -.35625
- d = .7483...
- e = 1.845...



GROUP NAME: Big Wizards



Student Names (First and Last)

Speaker/Presenter: JASON HAYES

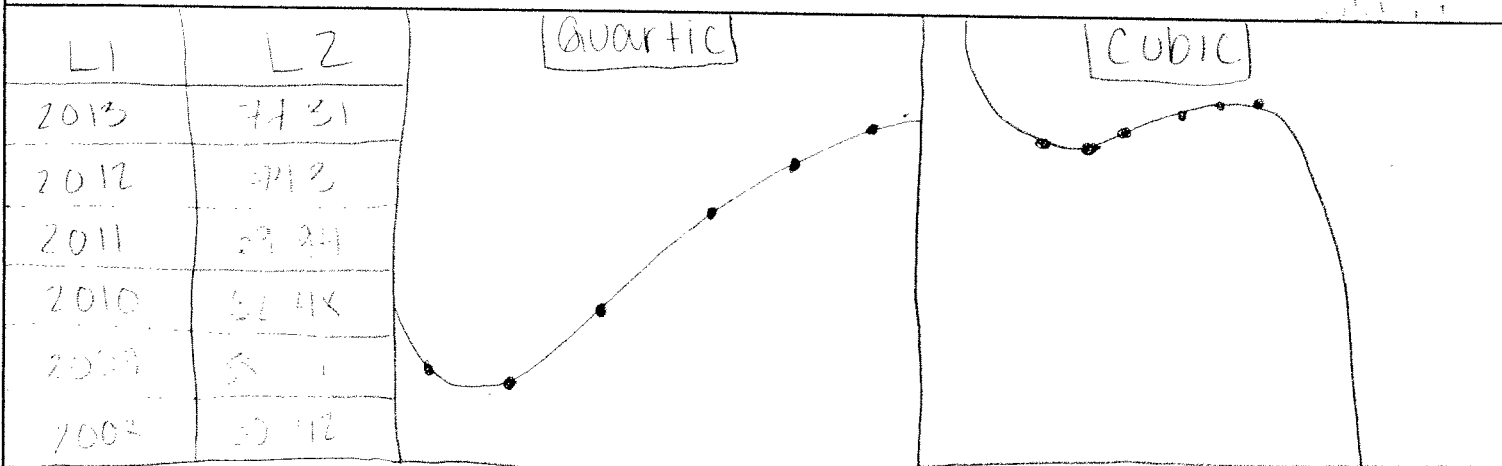
Date: 9/10/13

Writer/Prep: Giulliana Fonseca

Topics: Finding zeroes

QC/Leader: Rachel Kalston

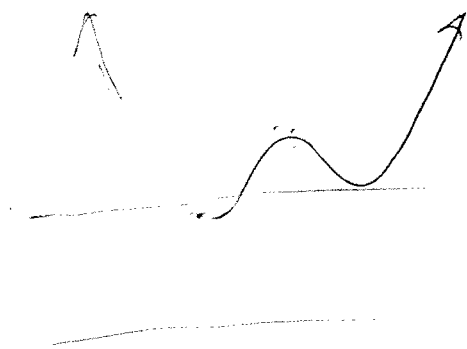
Instructions: to find the zeroes in our cubic and quartic regressions and determine how many complex zeroes there are



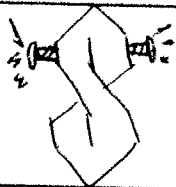
no real zeroes

zero = 2016

two complex zeroes



GROUP NAME: Science



Logo:

Student Names (First and Last)

Speaker/Presenter: David Graff

Date: September 10, 2013

Writer/Prep: Noha Patwardhan

Topics:

QC/Leader: Jenna Garofalo

Instructions:

Cubic Regression

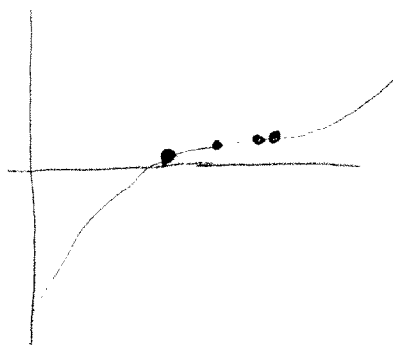
$$y = ax^3 + bx^2 + cx + d$$

$$a = .0011998...$$

$$b = -7.22...$$

$$c = 14491.65...$$

$$d = -9693108.078$$



} called a Jig,  
3 FACES!

NO max  
or min.

two complex zeros =  $\left\{ \begin{array}{l} x = 2095 ; 178 \\ x = 2095 ; -178 \end{array} \right.$

one real zero =  $x = 1825 ; 0$

GROUP NAME: **10**

Logo:

*Forever + Always*

Date: \_\_\_\_\_

Topics: \_\_\_\_\_

Student Names (First and Last)

Speaker/Presenter: Elise, Tabbi

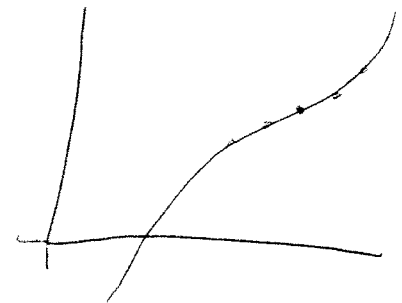
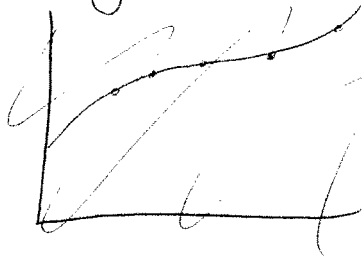
Writer/Prep: Justin

QC/Leader: Dallon

Instructions:

Red	Blue
75,000	80,000
85,000	92,000
97,000	113,000
126,000	129,000
146,000	152,000

$$y = 2.58...x^3 + -0.087...x^2 + 10.69x + -340.44...$$



zero  $x = 48.002$