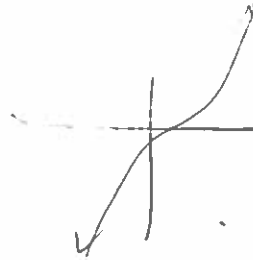


# WANT

Cubic Regression

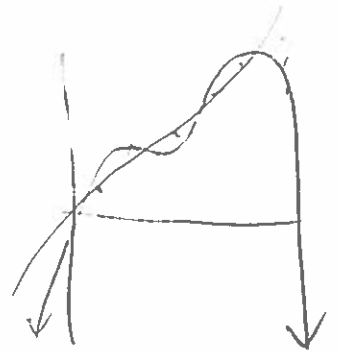
$$y = 3.7x^3$$

$$\begin{aligned} & - .007x^2 \\ & + .5025x \\ & - 1190 \end{aligned}$$



Quartic Regression

$$y = \begin{aligned} & -6.07x^4 \\ & + .0015x^3 \end{aligned}$$



## Prediction

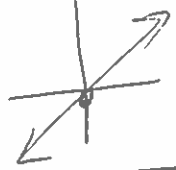
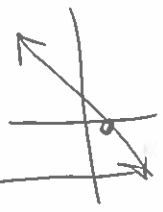
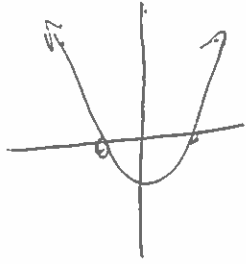
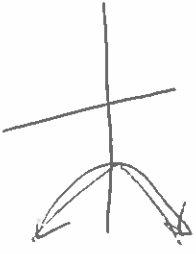
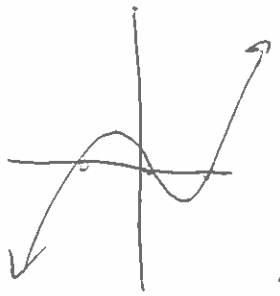
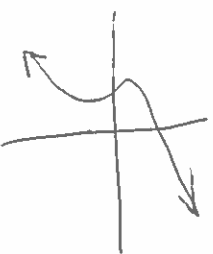
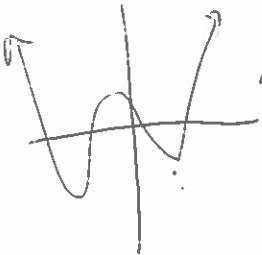

~~How many~~ will I sell at \$100.

If I charge \$100

→ My cubic regression predicts  
I sell 6.52 mil

→ My quart regression predicts  
I sell 3.53 mil

# Polynomials

	Degree.	X-int	FACES	<del>LEADING</del> LEADING COEFFICIENT $a > 0$	COEFFICIENT $a < 0$
Linear $y = ax + b$	1	1	1		
Quadratic $y = ax^2 + bx + c$	2	2 1 0	2		
Cubic $y = ax^3 + bx^2 + cx + d$	3	3 2 1	3 (5.9)		
Quartic $y = ax^4 + bx^3$	4	4 3 2 1	4 $(n+1)$ 2		

ODD DEGREE

LEAD (+)

(-)

Disco  
Right

Disco  
Left

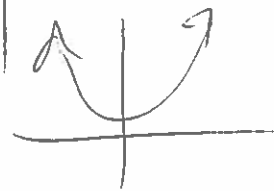


END BEHAVIOR

EVEN DEGREE

HAPPY  
PARABOLA

SAD  
PARABOLA



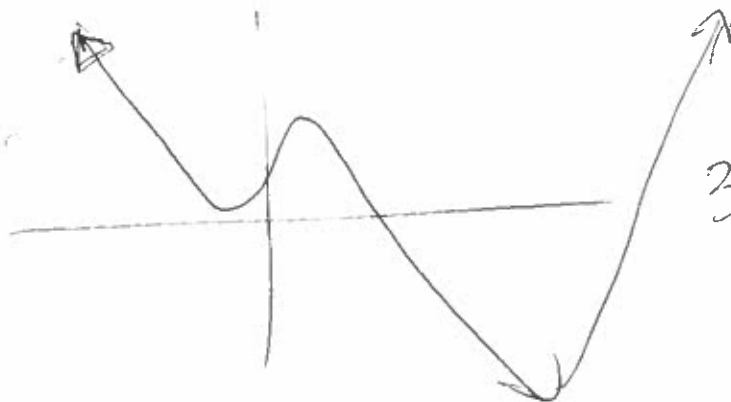
Question

$$f(x) = \underline{a} x^4 + \dots$$

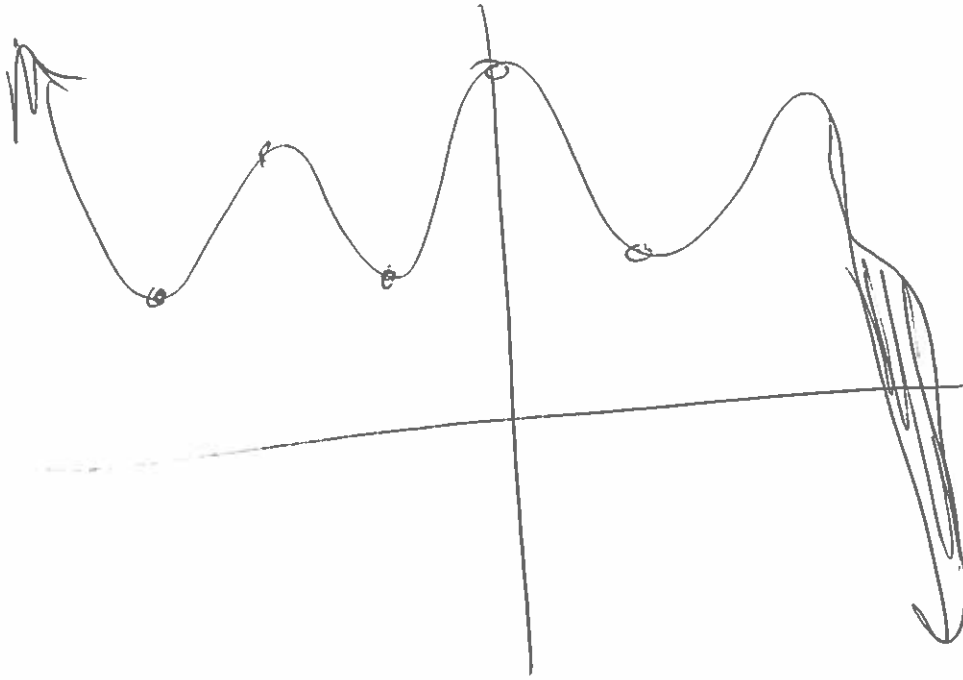
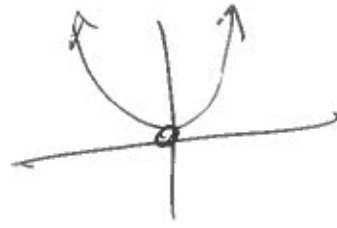
$a > 0$  (+)

HAPPY

3 faces +



$$y = x^{10}$$



FACES? 7      END BEHAVIOR: DISJO  
Left

DEGREE? 7, 9, 11, 13       $a < 0$

Turning Points = MAX/MIN  
= EXTREMA  
↳ 1 less than degree

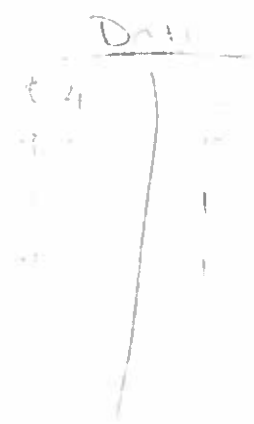
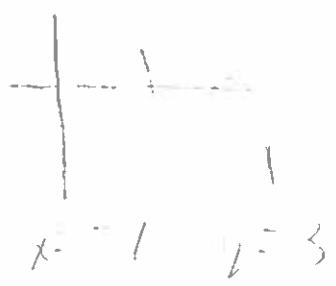
GROUP NAME: Precalc 11  
 Date: 1/20/14  
 Independent Variable (x-axis): price  
 Dependant Variable (y-axis): cookie price sales

Student Names (First and Last)  
 Speaker/Presenter: \_\_\_\_\_  
 Writer/Prep: Mica Contreras  
 Leader/Collaborator: \_\_\_\_\_

Conclusion (in words): If we charge \$5, we'll sell 5 boxes, which is our maximum profit.

Supporting Work: Quatic

$$y = -.19x^2 + 3.57x - 5.83$$



table

$$y = .07x^3 - 1.57x + 8.89$$



GROUP NAME: MATH LOVERS  
 Date: 1/30/14  
 Independent Variable (x-axis): Price  
 Dependent Variable (y-axis): Boats (D. Dre)

Student Names (First and Last)  
 Speaker/Presenter: Osmar Behman  
 Writer/Prep: Karthik Ramesh  
 Leader/Collaborator: Nacer Cheema

Conclusion (in words):  
 The price of a boat is  $\$111$  for the cubic and  $\$214$  for the quartic.  
 $x, y_1 = 214.31$

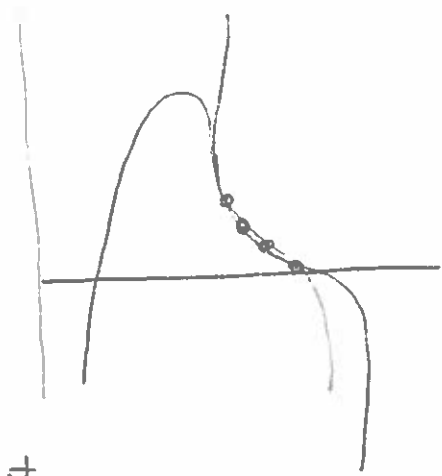
Supporting Work:

Price	Boats
\$199	3
\$185	5
\$170	7
\$160	15
\$150	25

quartic Reg

$$y = ax^4 + bx^3 + \dots + c$$

$a = -6.297915E^{-6}$   
 $b = .0040738808$   
 $c = -.9674601814$   
 $d = 99.09550092$   
 $e = -3632.440728$



Stat  $\rightarrow$  1:  
 $2^{nd}$   $y = \text{STAT} \text{plot}$

STAT plot 1: ENTER

Zoom 9:

STAT  $\rightarrow$  4: Cubic

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

$a = -3.135084E^{-4}$   
 $b = .1744528327$   
 $c = -32.5063576$   
 $d = 2033.922163$



*Team 2*

GROUP NAME:

Student Names (First and Last)

Date: 30 Jun 14

Speaker/Presenter: Paul Klos

Independent Variable (x-axis): miles

Writer/Prep: Byron Wilson

Dependant Variable (y-axis): gas \$

Leader/Collaborator: Ricky Wilson

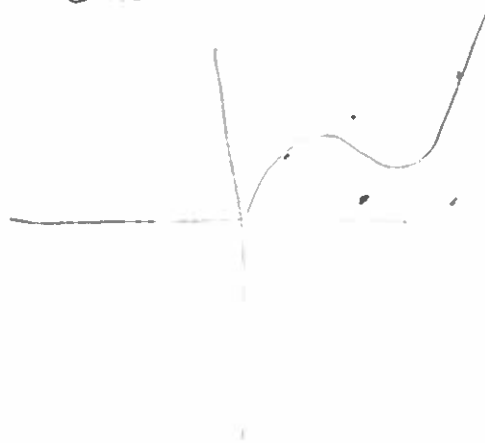
Conclusion (in words): If we travel 24 miles, gas would be  
Quad 3.35      cubic 3.28

Supporting Work:

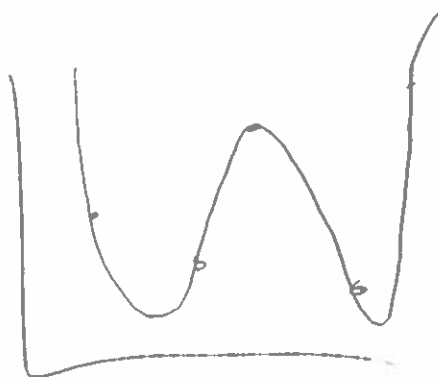
Data

L1	L2
10	3.3
20	3.15
30	3.45
40	3
50	3.55

Cubic



Quart Reg



GROUP NAME: We love science

Date: 01/30/14

Student Names (First and Last)

Speaker/Presenter: Marta Truszkowski

Independent Variable (x-axis): # Cupcakes

Writer/Prep: LOUE KENNETH

Dependant Variable (y-axis): TIME

Leader/Collaborator: Yvette Aguilar

Conclusion (in words): The Cubic Reg tells us we will make 130 Cupcakes in 85 min and the Quartic Reg tells us we will make 130 Cupcakes in 83 min

Supporting Work:

Time	Cupcake
24	24
35	45
47	72
67	96
78	120

Cubic Reg

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

$$a = 0$$

$$b = .0016 \dots$$

$$c = .330 \dots$$

$$d = 15.2 \dots$$



x = 72      y = 45

Quartic Reg

$$y = ax^4 + bx^3 + \dots + e$$

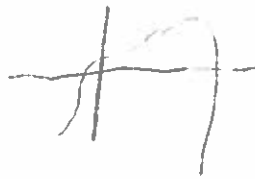
$$a = -5.02 \dots$$

$$b = 1.44 \dots$$

$$c = -.012 \dots$$

$$d = .895 \dots$$

$$e = 7$$





GROUP NAME: <u>Monely Light</u>	Student Names (First and Last)
Date: <u>1/30/14</u>	Speaker/Presenter: <u>Allyssa Campbell</u>
Independent Variable (x-axis): <u>Price</u>	Writer/Prep: <u>Allyssa Campbell</u>
Dependant Variable (y-axis): <u>Sales Dollars</u>	Leader/Collaborator: <u>Vivian Law</u>

Conclusion (in words): If we sell our product for \$150, we will sell 200 units. This represents the maximum of a quadratic regression.

Supporting Work:

1) STAT 1-1-14

L	11
1	19
1	13
1	0
1	2
1	1

2) 2nd (stat) pt, 20014

3) STAT 1-1-14

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

$$a = 0.0001$$

$$b = -0.0002$$

$$c = 0.0003$$

$$d = 0.0001$$

cubic

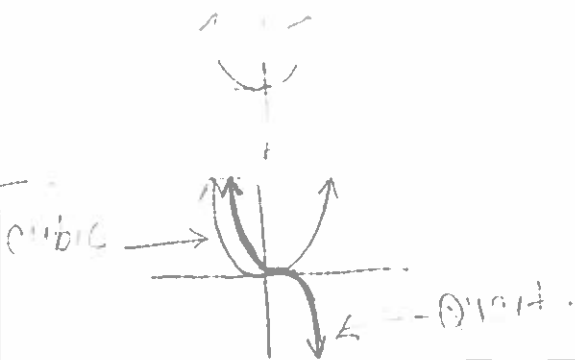
$$4) y = \sqrt[3]{x^3 - 1}$$



QUADRATIC

3) STAT 1-1-14  
7 QUADRATIC

4) 12 = (1) (NEWS) (2) (2) (1)



$$-y = a + by^3 + cy^2 + dy + e$$

$$a = -3.50$$

$$b = -3.437$$

$$c = 2.7386$$

$$d = -0.235$$

$$e = 29.1502$$

GROUP NAME: This Group's Best Group

Student Names (First and Last)

Date: 1/30/14

Speaker/Presenter: Jesse Schuman

Independent Variable (x-axis): Price Being Charged

Writer/Prep: Emily Roffert

Dependant Variable (y-axis): Revenue

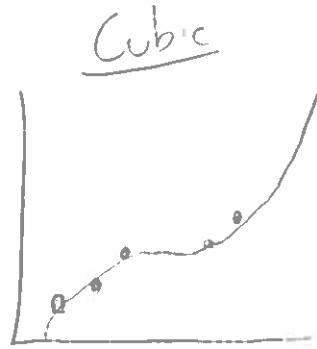
Leader/Collaborator: Stephen Burns

Conclusion (in words): Predictions.

If I charge \$700 my cubic regression predicts I'll make \$276.59  
 If I charge \$700 my quartic regression predicts I'll make \$635.78

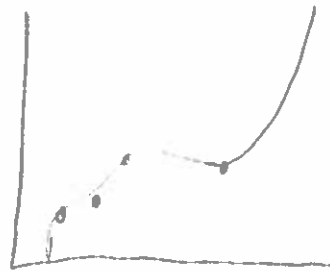
Supporting Work:

Price	Profit
200	50
250	70
300	85
475	93
500	100



$$5.775...x^3 - .0066...x^2 + 2.565...x - 244.21...$$

Quartic



$$3.6265...x^4 - .0098...x^3 + .0167...x^2 - 2.117...x + 156.0013$$

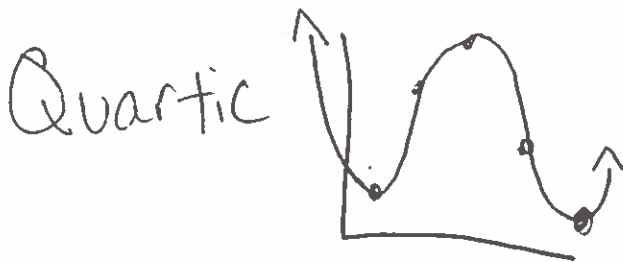
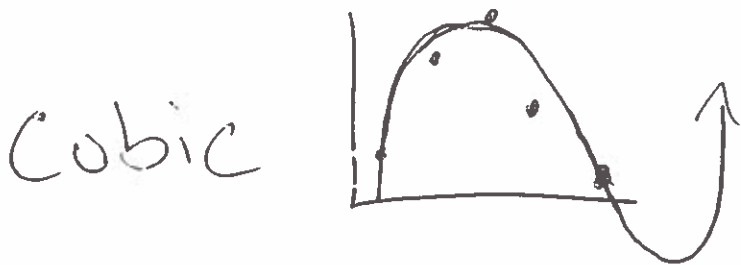
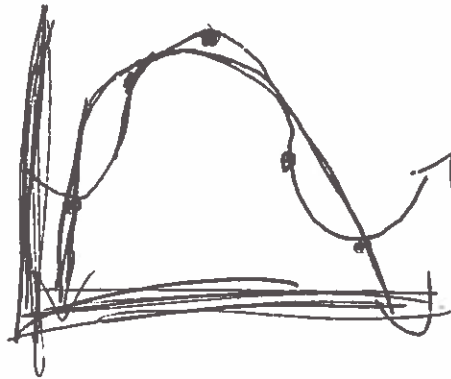
GROUP NAME: Newbies  
 Date: 1/30  
 Independent Variable (x-axis): book price  
 Dependant Variable (y-axis): book sales

Student Names (First and Last)  
 Speaker/Presenter: Bailey Martinez  
 Writer/Prep: Li Amy Lin  
 Leader/Collaborator: Khrystyna Pavlyuchenko

Conclusion (in words):  
 if I charge \$100 my Cubreg predicts I'll sell 768.57.  
 Quartreg predicts I'll sell 700.

Supporting Work:

25	500
50	1000
75	1200
100	700
125	300



Team 3

GROUP NAME:

Date: 130

Independent Variable (x-axis): Height (inches)

Dependant Variable (y-axis): Weight (lbs.)

Student Names (First and Last)

Speaker/Presenter: Kevin Leonardo

Writer/Prep: Benjamin Infante

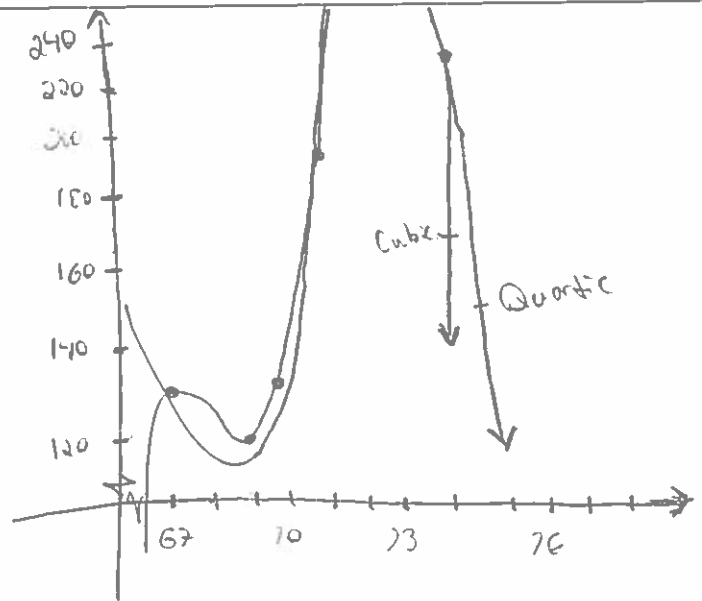
Leader/Collaborator: \_\_\_\_\_

Conclusion (in words):

- Someone that is 70 inches tall will weigh 145 pounds
- Someone that weighs 190 pounds will be 71 inches tall.

Supporting Work:

Height (inches)	Weight (pounds)
70	130
75	225
71	195
69	120
67	125

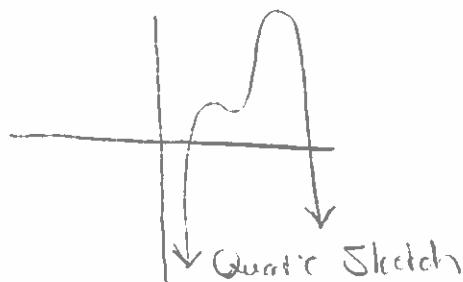


Regressions

Cubic:  $-2.05x^3 + 436.77x^2 - 30909.33x + 728241.08$

Quartic:  $-1.54x^4 + 432.86x^3 - 45349.71x^2 + 2128899.63x$

$-37229981.25$



GROUP NAME:

Student Names (First and Last)

Date: 1/30/14

Speaker/Presenter: Clifford

Independent Variable (x-axis): Cost

Writer/Prep: Christian Guerra

Dependant Variable (y-axis): ~~PO= Demand~~ Customers

Leader/Collaborator: El Ampons

Conclusion (in words): If I charge \$100 my cost is 13.764 and our Quatic predict 13.764  
 I sell 62.18...  
 Cost of Garya

Supporting Work:

11	12
\$15	30
\$25	20
\$50	10
\$6	9
\$120	6

2) plot

Stat Zoom 7

3) STAT > calc 6: cubic

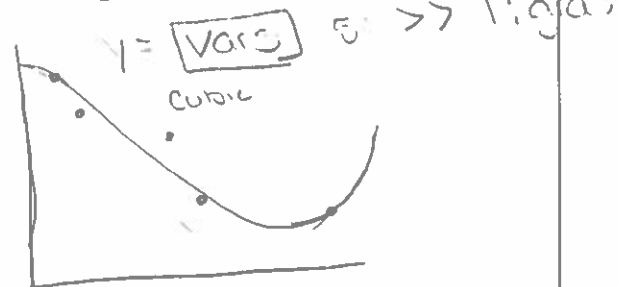
$$y = ax^3 + bx + cx - d$$

$$a = 7.9467$$

$$b = -.0137$$

$$c = .7818$$

4) Graph



3) STAT > calc 7: Quartic

4)  $y =$  Vars  $, E: >> 1$

