

6 Trig Functions

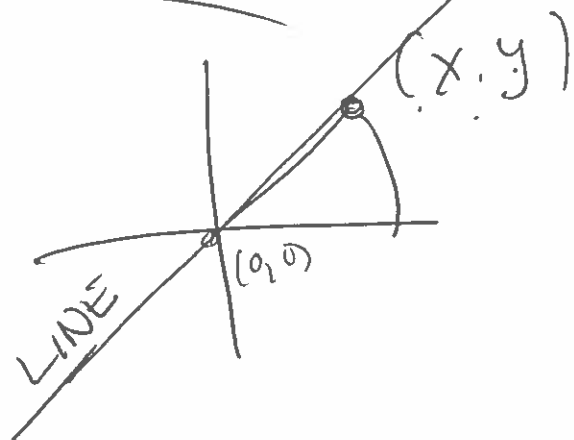
146
d14

$$\cos(\theta) = x$$

$$\sin(\theta) = y$$

$$\tan(\theta) = y/x$$

"tangent"



Reciprocal Function

$$\sec(\theta) = 1/x = 1/\cos\theta$$

$$\csc(\theta) = 1/y = 1/\sin\theta$$

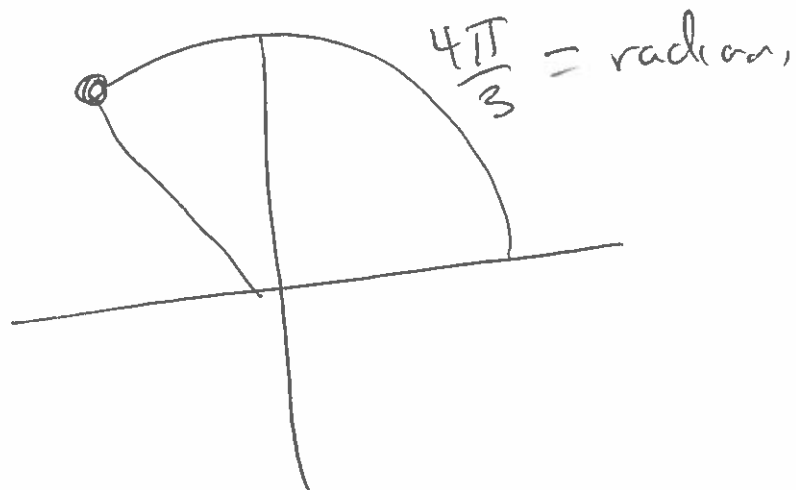
$$\cot(\theta) = x/y = 1/\tan\theta$$

$$W(45^\circ) = (\cos 45^\circ, \sin 45^\circ)$$

$$\begin{pmatrix} \frac{1}{\sqrt{2}} & \frac{\sqrt{2}}{2} \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \end{pmatrix}$$

$$\begin{pmatrix} \frac{\sqrt{2}}{2} & 0 \\ 0 & \frac{\sqrt{2}}{2} \end{pmatrix}$$

$\Theta =$	0 0°	$\pi/6$ 30°	$\pi/4$ 45°	$\pi/3$ 60°	$\pi/2$ 90°
$\cos \Theta$	$\frac{\sqrt{4}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	$\frac{\sqrt{0}}{2}$
$\sin \Theta$	$\frac{\sqrt{0}}{2}$	$\frac{\sqrt{1}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}$



Converting $\pi = 180^\circ$

$$\frac{13\pi}{2} \cdot \frac{90}{180} = 1170^\circ$$

• \downarrow

$$\begin{array}{r} -360 \\ -360 \\ -360 \\ \hline 90^\circ \end{array}$$

$$\frac{\pi}{2} = \frac{\pi}{180^\circ} \cdot 90^\circ$$

$$W(\theta) = \left(\underset{x}{\cos \theta}, \underset{y}{\sin \theta} \right)$$

"x"
"y"
= cosine of θ = $\cos \theta$
= sine of θ

$$\underline{r_{\text{atalay}}} = \boxed{2^{\text{nd}}} \boxed{0}$$

diagnostic ON
<enter><enter>

DONE

$$r^2 = .9645$$

96% correlation

$$r^2 = .99$$

$$r^2 = 1$$

$$r^2 =$$

GROUP NAME: Pracale Invaders

Student Names (First and Last)

Date: 3/13/14

Speaker/Presenter: Dorian Thomas

Independent Variable (x-axis): years

Writer/Prep: Alicia Continisio

Dependant Variable (y-axis): population (million)

Leader/Collaborator: Zolboo Brascau

Conclusion (in words): Quartic regression works the best.

Supporting Work:

Quadreg

$r^2 = .924...$, 92% correlation

Lin Reg

$r^2 = .934...$, 92% correlation

Cubic Reg

$r^2 = .95$, 95% correlation

Quartic Reg

$r^2 = 100\%$ correlation

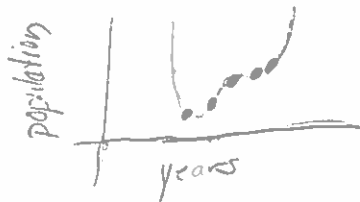
5 n reg

$r^2 = .924...$, 92% correlation

Exp reg

$r^2 = .917...$, 92% correlation

Quartic Regression



L1	L2
2004	8
2007	9
2009	13
2012	14
2013	19

GROUP NAME: <u>Money Bags</u>	Student Names (First and Last)
Date: <u>3/13/14</u>	Speaker/Presenter: <u>Melissa Scarpati</u>
Independent Variable (x-axis): <u>month</u>	Writer/Prep: <u>Angelica Ippolito</u>
Dependant Variable (y-axis): <u>sales</u>	Leader/Collaborator: <u>Kevin Enriquez</u>

Conclusion (in words):

The cubic regression is the best regression for the sales of Snicker Bars throughout the year.

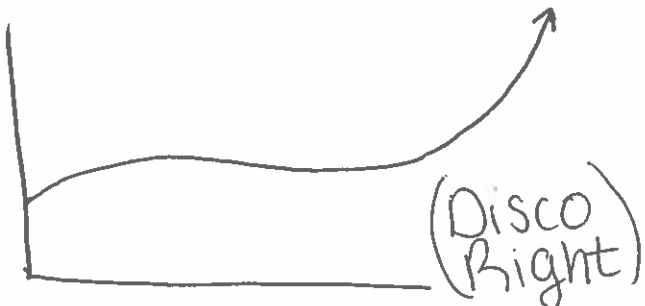
Supporting Work:

(millions \rightarrow y)

L1	L2
1	1
2	10
3	6
4	12
5	7
6	4
7	2
8	2
9	5
10	20
11	15
12	8

Cubic Regression

$R^2 = .1929$ ~~19.29%~~ 19.29%



Power Reg	.16	16%
LinReg	.166	16.6%
QuadReg	.17	17%
Cubic Reg	.19	19%
LnReg	.116	11.6%

GROUP NAME:	Student Names (First and Last)
Date: _____	Speaker/Presenter: <u>Paul</u>
Independent Variable (x-axis): <u>mph</u>	Writer/Prep: <u>Byron</u>
Dependant Variable (y-axis): <u>mpg</u>	Leader/Collaborator: <u>Ricky</u>

Conclusion (in words): Cubic regression has

Supporting Work:

Data table

L1	L2
25	30
45	28
50	25
65	21
70	19

step 1

2nd 0.
Catalog

Diagnostic On:

step 2 - calculate regression



4
5
6
9
0
A
C

linkey
 $r^2 = .965$
 $r = .982$

~~linkey~~
~~21~~

CubicKey
 $r^2 = .992$

LnKey
 $r^2 = .929$
 $r = .964$

ExpKey
 $r^2 = .988$
 $r = .994$

PwrKey
 $r^2 = .977$
 $r = .989$



GROUP NAME: We Love Math

Date: 3-13-14

Student Names (First and Last)

Speaker/Presenter: _____

Independent Variable (x-axis): Time (years)

Dependant Variable (y-axis): GDP of Poland (Billions USD)

Writer/Prep: Craig Sharrifhus

Leader/Collaborator: Zach

Conclusion (in words): A quartic regression fits the data best.

Supporting Work:

X	Y
1990	82.2
1991	84.5
1992	83.7
1993	92.3
1994	95
1995	108.4
1996	139.1
1997	156.7
1998	157.2
1999	172.9
2000	167.8
2001	171.3

Linear - 95.89%

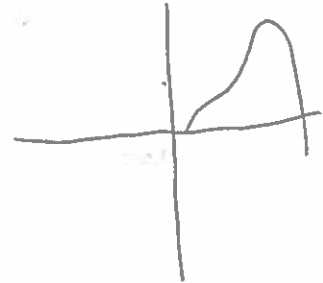
Quadratic - 91.97%

Cubic - 97.54%

★ Quartic - 97.61%

Exponential - 94.96%

Natural Log - 91.95%



<p>GROUP NAME:</p> <p>Date: _____</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Gwin Leonardi</u></p> <p>Writer/Prep: <u>Benjamin Infosino</u></p> <p>Leader/Collaborator: <u>Christian Guerra</u></p>
<p>Independent Variable (x-axis): <u>height (in)</u></p> <p>Dependant Variable (y-axis): <u>weight (lbs.)</u></p>	

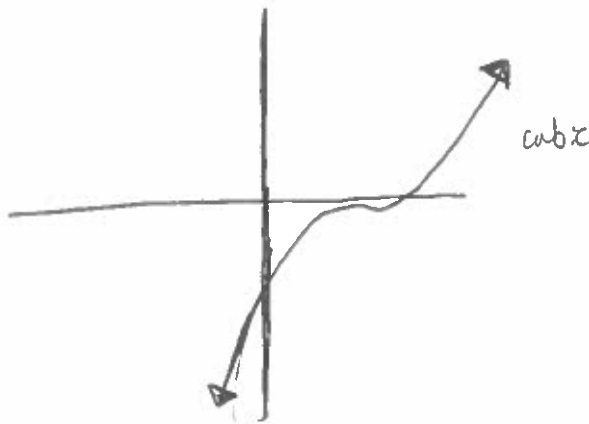
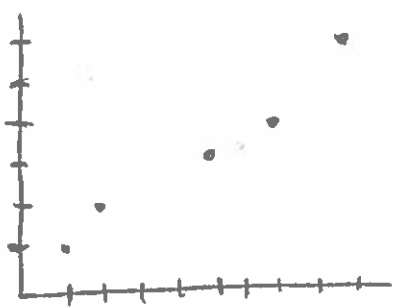
Conclusion (in words):

cubic regression is the most accurate

Supporting Work:

x	y
64	125
65	140
68	160
70	180
72	220

r^2
linear: 95.4%
quadratic: 98.4%
<u>cubic: 99.9%</u>
quartic: 100% ← doesn't count
ln: 97.4%
exp: 97.6%
sin:

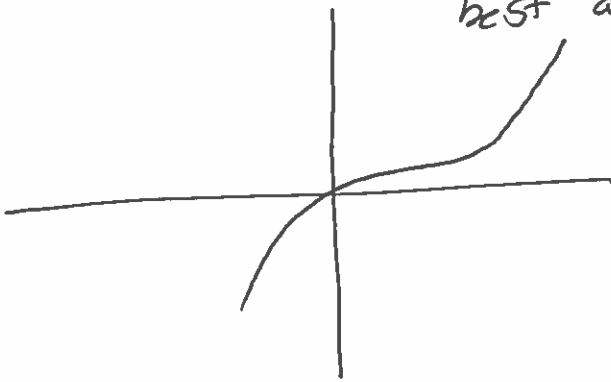
<p>GROUP NAME: <u>we love science</u></p> <p>Date: <u>3-13-14</u></p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>LOUIE KELKIEH</u></p>
<p>Independent Variable (x-axis): <u>time (min)</u></p> <p>Dependant Variable (y-axis): <u># cupcakes</u></p>	<p>Writer/Prep: <u>Marta Truszkowski</u></p> <p>Leader/Collaborator: <u>yvette Aguilar</u></p>

Conclusion (in words): Our best regressions are cubic and Quart ~~100%~~ and are worst is Exp reg 91%

Supporting Work:

x	y
24	24
35	48
47	72
67	96
78	120

Cubic regression is best at 100%



LinReg $r^2 = 99\%$
 Quad Reg $r^2 = 99\%$
 Cubic Reg $r^2 = 100\%$
 Quart Reg $r^2 = 100\%$
 Lin Reg $r^2 = 99\%$
 Ln Reg $r^2 = 98\%$
 Exp Reg = 91%
 Pwr Reg = 98%

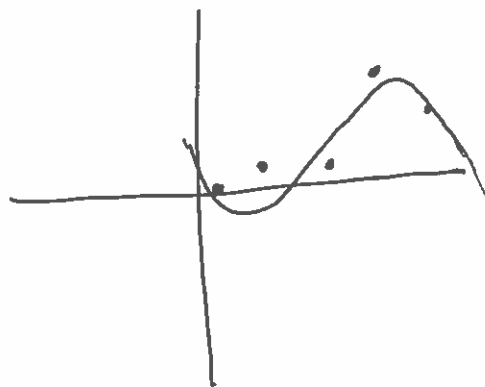
GROUP NAME: <u>This Group, Best Group</u>	Student Names (First and Last)
Date: <u>3/13/14</u>	Speaker/Presenter: <u>Jesse Johnson</u>
Independent Variable (x-axis): <u>Time (Months)</u>	Writer/Prep: <u>Billy Rafferty</u>
Dependant Variable (y-axis): <u>Price of Bitcoins</u>	Leader/Collaborator: <u>Stephen Burns</u>

*Conclusion (in words):
 The Cubic Regression has an 82% correlation to the Data

Supporting Work:

Data		
X	Y	
1	\$4.90	Linear - 65.5%
4	\$308.51	Quad - 65.5%
7	\$332.44	Cubic - 82.2%
10	\$3151.90	Ln Reg - 52.2%
13	\$2116.90	Exp Reg - 79.6%

*Cubic is Best at 82.2%



GROUP NAME: <u>Math Lovers</u> Date: <u>3/16/14</u>	Student Names (First and Last) Speaker/Presenter: <u>Osman Rehman</u> Writer/Prep: <u>Osman Rehman</u> Leader/Collaborator: <u>Osman Rehman</u>
Independant Variable (x-axis): <u>Price of shirts</u> Dependant Variable (y-axis): <u>how many sold</u>	

Conclusion (in words): The cubic Reg has the highest percentage towards the data 99.4%

Supporting Work:

X	Y		
20	35	<u>Quad Reg</u>	<u>Cubic Reg</u>
35	20	$R^2 = .9878$	$R^2 = .994310$
40	15	<u>Ln Reg</u>	<u>Exp Reg</u>
55	12	$R^2 = .96381$	$R^2 = .96643$
70	10	<u>Pwr Reg</u>	
65	1	$R^2 = .988144$	

GROUP NAME: <u>Newbies</u> Date: <u>3/13/14</u>	Student Names (First and Last) Speaker/Presenter: _____ Writer/Prep: <u>Khrystyna</u> <u>Rawguchyk</u> Leader/Collaborator: _____
Independant Variable (x-axis): <u>laptops</u> Dependant Variable (y-axis): <u>Revenue</u>	
Conclusion (in words):	
Supporting Work: $\text{Lin Reg} = .05$ $\text{Quart Reg} = r^2 = .7389$ $\text{Cubic Reg} = r^2 = .8625$ $\text{Quart Reg} = \text{doesnt work}$ $\text{Lin Reg } (a+bx) = r^2 = .2316$ $\text{Ln Reg} = r^2 = .1551$ $\text{Exp Reg} = r^2 = .1158$ $\text{Power Reg} = r^2 = .2524$ Cubic Regression is the best .86%.	

GROUP NAME: Math Layers

Student Names (First and Last)

Date: _____

Speaker/Presenter: Karthik Sureshkumar

Independent Variable (x-axis): price of watch's

Writer/Prep: Clifford Basquin

Dependant Variable (y-axis): # of watch's sell

Leader/Collaborator: Noor Cheema

Conclusion (in words): From all the Regression, Cubic seems to be the most accurate, according to us with, 99% correlated to the data.

Supporting Work:

X	Y
110	80
120	70
150	65
170	50
190	38
190	25

Lin Reg
 $r^2 = .91$
 91%

Quad Reg
 $r^2 = .97$
 97%

Cubic Reg
 $r^2 = .99$
 99%

Quartic Reg
 $r^2 = .99$
 99%

Exp Reg
 $r^2 = .83$
 83%

