

Composit

$$(f \circ g)(x) = f(g(x))$$

CHAIN

RULE

OUTER.

INNER

$$\star \frac{d}{dx} (f \circ g)(x) =$$

$$f'(g(x)) \cdot g'(x)$$

$$\text{Ex } \frac{d}{dx} \ln(x^2 + 2x) = \frac{1}{x^2 + 2x} \cdot \frac{d}{dx} (x^2 + 2x)$$

$$= \frac{1}{x^2 + 2x} \cdot 2x + 2$$

$$\text{Ex } \frac{d}{dx} \frac{-8}{x+9} = \frac{d}{dx} -8(x+9)^{-1}$$

$$= -8 \cdot \frac{d}{dx} (x+9)^{-1} \quad \leftarrow \text{Use Power rule}$$

$$= -8 \cdot -1(x+9)^{-2} \cdot \frac{d}{dx} (x+9)$$

$$= 8(x+9)^{-2} = \frac{8}{(x+9)^2}$$

$$\text{Ex } \frac{d}{dx} e^{x^2} = \frac{d}{dx} e^{\wedge (x^2)}$$

$$= e^{x^2} \cdot \frac{d}{dx} x^2 = e^{x^2} \cdot 2x$$

$$\begin{aligned}
 \underline{\text{Ex}} \quad \frac{d}{dx} (2x^3 - 7)^{100} &= 100 (2x^3 - 7)^{99} \cdot \frac{d}{dx} (2x^3 - 7) \\
 &= 100 (2x^3 - 7)^{99} (6x^2)
 \end{aligned}$$

MORE DERIVATIVES

$$\star \frac{d}{dx} \sin x = \cos x$$

$$\star \frac{d}{dx} \cos x = -\sin x$$

$$\frac{d}{dx} \tan x = \sec^2 x$$

$$\frac{d}{dx} \sec x = \sec x \tan x$$

$$\begin{aligned}
 \underline{\text{Ex}} \quad \frac{d}{dx} \sec(e^x) &= \sec(e^x) \tan(e^x) \frac{d}{dx} e^x \\
 &= \sec(e^x) \tan(e^x) \cdot e^x
 \end{aligned}$$

$$\begin{aligned}
 \underline{\text{Ex}} \quad \frac{d}{dx} \sin(2x+3) &= \cos(2x+3) \frac{d}{dx} (2x+3) \\
 &= \cos(2x+3) \cdot 2 \\
 &= 2 \cos(2x+3)
 \end{aligned}$$

Sine Regression

$$y = a \sin(bx + c) + d$$

a, b, c, d, \dots Numbers
x, y, z, \dots Variables

$$y' = a \cos(bx + c) \cdot \frac{d}{dx}(bx + c) + 0$$

$$= a \cos(bx + c) \cdot b$$

STAT \rightarrow Calc \rightarrow SinReg 1, L1, L2, 10
 (Int List Y Period)
~~iterations~~

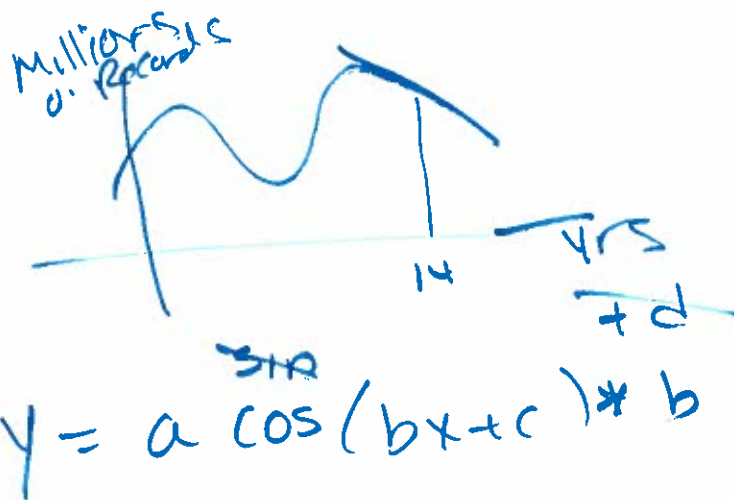


Table	y_2
14	-8.5

"Lady G" is losing albums at -8.5 million per year

GROUP NAME: Functional Paradigm

Date: 2/19/2014

Student Names (First and Last)

Speaker/Presenter: _____

Writer/Prep: Karol Zariski

Independent Variable (x-axis): time (hours)

Leader/Collaborator: Nader Shenouda

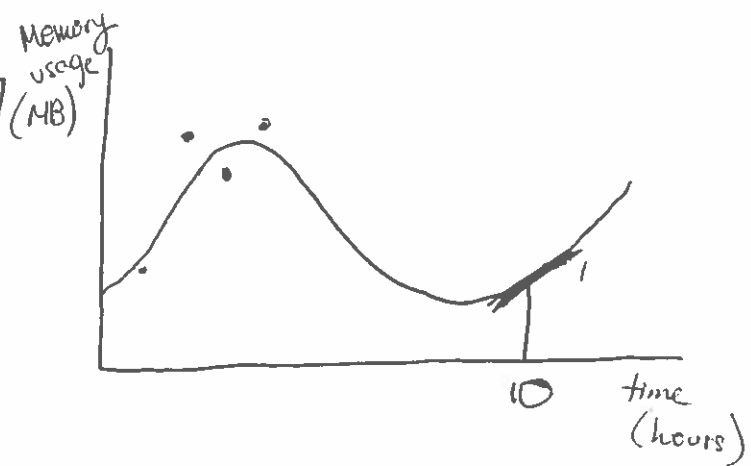
Dependent Variable (y-axis): memory usage (MB)

Conclusion (in words):

At 10 hours, memory usage will be increasing at 552.35 MB per hour.

Supporting Work:

Hours	y_1	y_2
8	533.04	-152
9	583.19	247.43
10	496.78	552.35



At 10 hours, memory usage will be increasing at 552.35 MB per hour

GROUP NAME: Money Makers
 Date: 2/19/2014
 Independent Variable (x-axis): time (Years)
 Dependant Variable (y-axis): crime rate %

Student Names (First and Last)
 Speaker/Presenter: Bryan S
 Writer/Prep: Edna Onyiah
 Leader/Collaborator: Monica K

Conclusion (in words): to
 According to the Sine Regression the crime rate is expected to increase at 9.43% or .0943/year in the year 2015

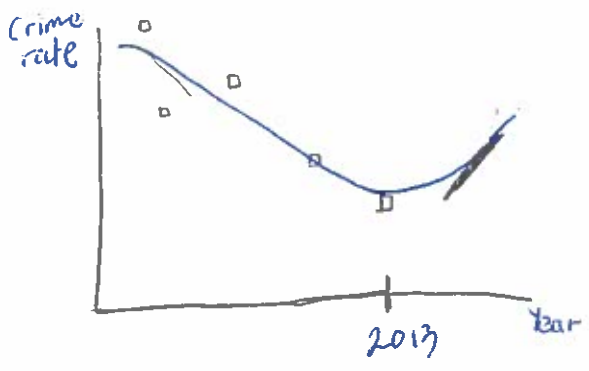
Supporting Work:

Sine Regression
 $a \cdot \cos(bx + c) + b$

STAT 7 Cat C (range 1, 2, 10)

$$y_1 = .16499232574595 \cdot \cos(.62831853071796x + 2.8493635363774) + .57321755 = .0943$$

$$\frac{d}{dx} y_2 = .16499232574595 \cdot \sin(.62831853071796x + 2.8493635363774) \cdot b$$



X	y	dy/dx
13	.40826	-.00227
14	.44189	.06276
15	.52564	.71927

GROUP NAME: 7Eth 183

Student Names (First and Last)

Date: 02/19/2014

Speaker/Presenter: Vanna

Independent Variable (x-axis): YEAR

Writer/Prep: LAUREN DORO

Dependant Variable (y-axis): NUMBER OF CARS SOLD

Leader/Collaborator: Ellet Bae

Conclusion (in words): sine reg
 THE TANGENT LINE IS PREDICTING THAT THE SALES OF ELECTRIC CARS WILL DECREASE BY 210,000. in 2013

Supporting Work:

X	Y	$y_{\text{sin reg}}$	$y'_{\text{sin reg}}$
YEAR	CARS		
2009	290292	363234	-2.1E5
2010	274555	216914	-37134
2011	239364	307439	193031
2012	427180	507031	17760
2013	572192	533945	-1E5
2014		350222	-2.1E5

$$y = a \sin(bx + c) + d$$

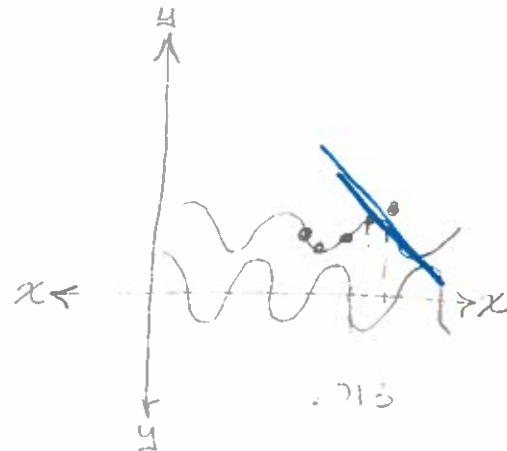
$$y' = a \cos(bx + c) \cdot b$$

$$a = 170314.8844$$

$$b = 1.272131334$$

$$c = -1.470607369$$

$$d = 55109.1247$$



GROUP NAME: <u>Ti rates</u>	Student Names (First and Last)
Date: <u>02/19/2014</u>	Speaker/Presenter: <u>Charis Isae</u>
Independent Variable (x-axis): <u>years</u>	Writer/Prep: <u>Purav / Srujan</u>
Dependant Variable (y-axis): <u>sales millions</u>	Leader/Collaborator: <u>Inur Turkay</u>

Conclusion (in words):

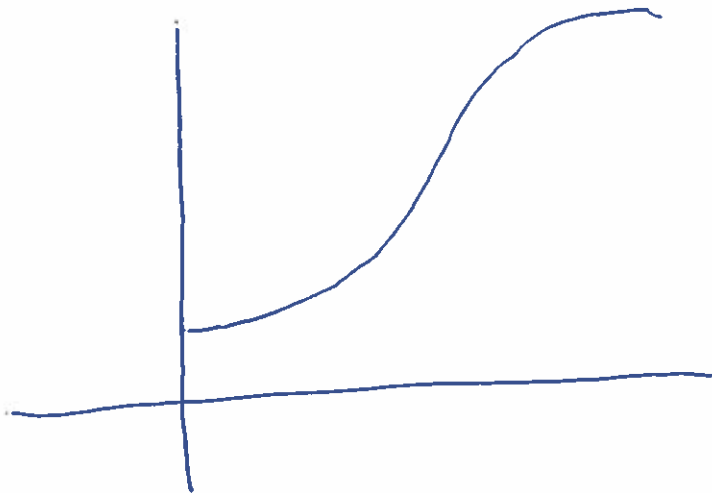
In 2014 ~~all cars~~ cars \$24.2 million
 Pink Sale rate drop by 13.5 mil

Supporting Work:

Year Year	Solar Car
8	11
9	19
10	35
11	41
12	47

Sih. Regression

x	y ₁	y ₂
8	11.359	11.359 26.676
9	19.403	19.403 37.581
10	32.8	32.8 39.604
14	24.2	24.2 31.561
15	13.383	13.227



GROUP NAME: Redeemers

Date: 2/19/13

Student Names (First and Last)

Speaker/Presenter: Ryan Piotrowski

Writer/Prep: Bishdeep Baur

Independent Variable (x-axis): years

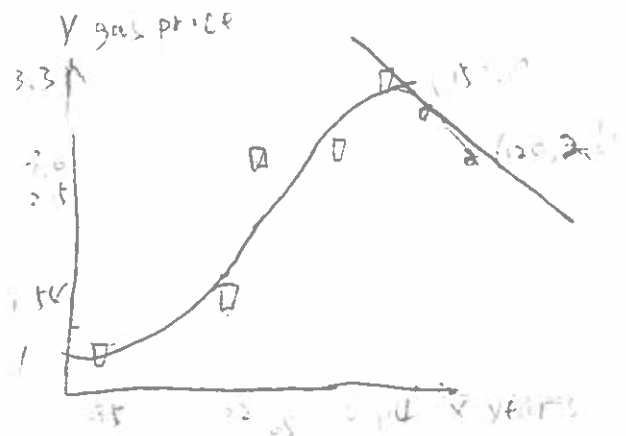
Leader/Collaborator: Danyan Zhou

Dependent Variable (y-axis): gas prices

Conclusion (in words): Gas prices in 2015 are 3.16 and it will decrease by the rate of $-.04$ k per year.

Supporting Work:

$\frac{38}{115}$ calc C: $\frac{38}{115} = .33$
 $b = .165$ ↑



$$111 - 95 = 16 \times 2$$

X	Y
95	1
102	1.5
105	2.15
112	3.0
114	3.3

X	Y ₁	Y ₂
115	3.167	-.0461
120	2.6135	-.1632
150	3.1714	.0147
114	3.166	-.0161

GROUP NAME: Cha-Ching

Date: 2/19/14

Student Names (First and Last)

Speaker/Presenter: Tatiana Calderon

Independent Variable (x-axis): year

Writer/Prep: Sheila Mae Gan

Dependant Variable (y-axis): revenue

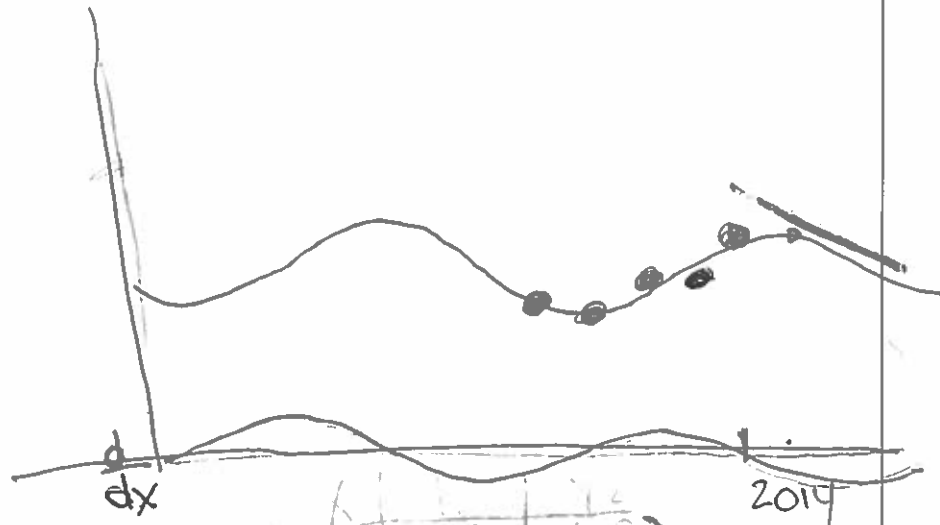
Leader/Collaborator: _____

Conclusion (in words):

In 2014 the sales ~~dropped~~ dropped 3.95 million/year

Supporting Work:

L_1	L_2
13	25
17	37
11	20
10	7
1	16



h	$f(x+h)$	$f'(x)$
1	20.3	-6.92
11	32.4	-2.98

the sales dropped
3.95 million

sin Reg

$$a = 8883.12 = 8883.12$$

$$b = 2.10 = 2.10$$

$$c = 2.10 = 2.10$$

$$d = 14.95 = 14.95$$

GROUP NAME: W.D. New District

Student Names (First and Last)

Date: 2/17/14

Speaker/Presenter: Yacine Silver

Independent Variable (x-axis): Years

Writer/Prep: Simon Valra

Dependent Variable (y-axis): Interest Rate

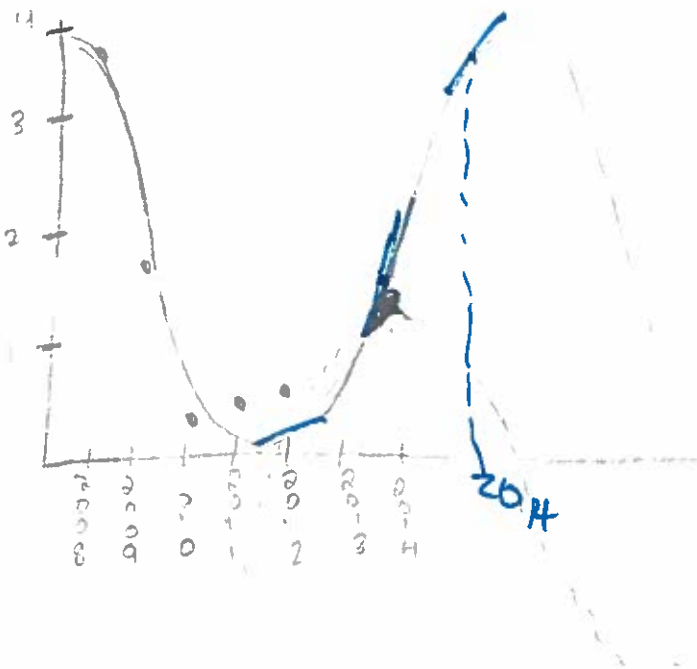
Leader/Collaborator: Christina Trujillo

Conclusion (in words):

The interest rates for the CD increasing by 1.032% per year in 2014,

Supporting Work:

Sine Regression



x	y
2010	1.4
2013	.72
2014	.032

GROUP NAME:

DOLARZ BEKERE

Student Names (First and Last)

Date: _____

Speaker/Presenter: Frikiwat Bekere

Independent Variable (x-axis): Year

Writer/Prep: Kansalya Maimuna

Dependant Variable (y-axis): # deaths (million) per year

Leader/Collaborator: _____

Conclusion (in words):

In 2014 the deaths due to AIDS will decrease by 1781 million per year the rate of

Supporting Work:

Table
 2014 2.4626

year	
2009	2.1
2010	2.3
2011	2.6
2012	2.4
2013	2.7

Table
 x y
 2014 2.4626 -1781



$$y_1 = .2437425921451 \times \sin(.78539816339715) + 1.94164912153904 + 2.3731762738$$

$$y_2 = .24372157 \times \sin(.78539816339715) + 1.9404912153904 + .78539816339715$$