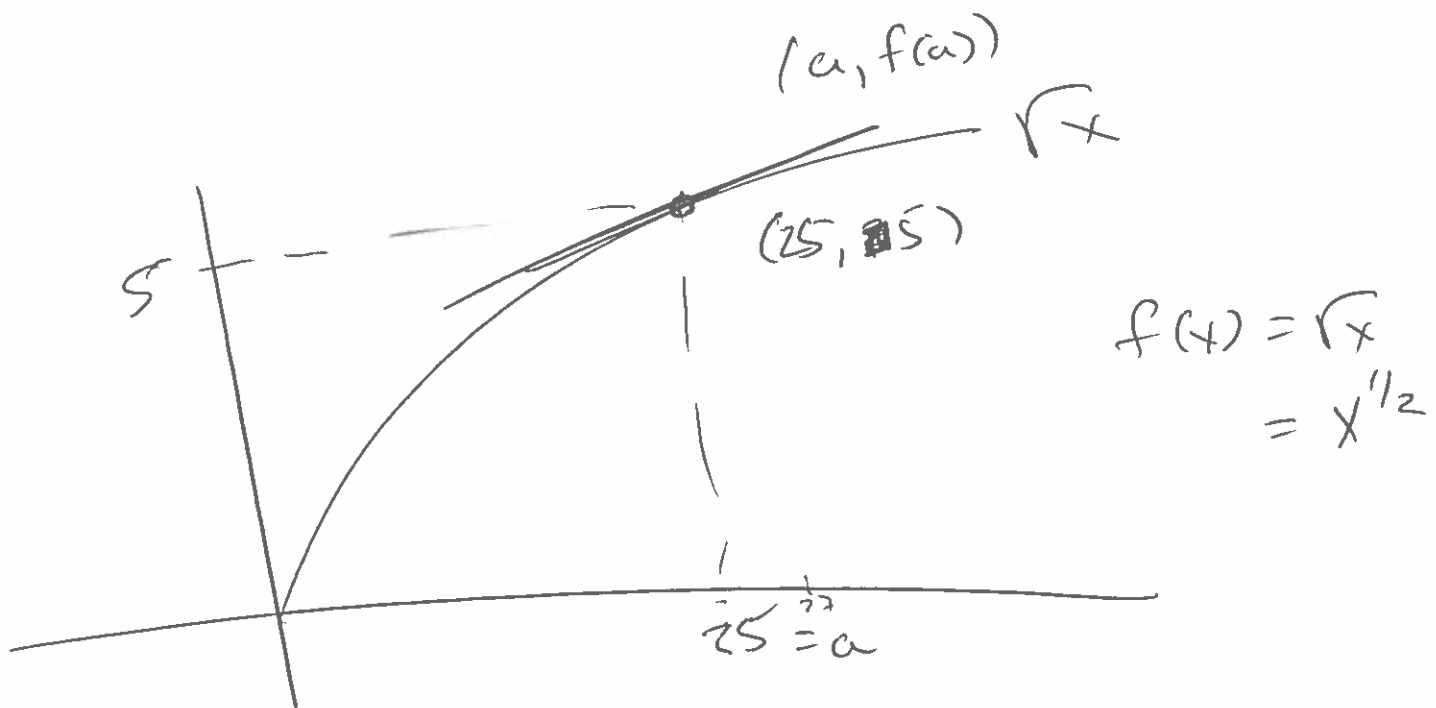


Linearization of a Function

Skill Find The Equation of a Tangent Line to a curve.

Ex Curve $f(x) = \sqrt{x}$
Find tangent line to the curve $x=25$
POINT



Slope of Tangent Line = $f'(a)$

$$f'(25) = \frac{1}{2}(25)^{-1/2} = \frac{1}{2} \cdot \frac{1}{5} = \frac{1}{10}$$

$$y - y_1 = m(x - x_1)$$

EQ
of
Tangent
Line

$$y - 5 = \frac{1}{10}(x - 25)$$

$$y = 5 + \frac{1}{10}(x - 25)$$

Want

$$f(x) = 5 + \frac{1}{10}(x - 25)$$

$$\sqrt{25} \approx f(25) = 5$$

$$\sqrt{27} \approx f(27) = 5 + \frac{1}{10}(27 - 25)$$

5.2

If you "center" the function
near what you want.

Ex $\ln(1.1)$ center $a = 1$

$\sin\left(\frac{\pi}{7}\right)$ center $a = \frac{\pi}{6}$

$\sqrt[3]{85}$

center $a = 64$

Not so good

Sin $[H^+]$

$[H^+]$ close to zero

$a=0$

$f(x) = \sin x$
 $f'(x) = \cos x$

$(0,0) = \text{Point}$
 $f'(0) = 1 = \text{slope}$

$\sin y = x$

$\sin [H^+] \approx [H^+]$

Newton's Method

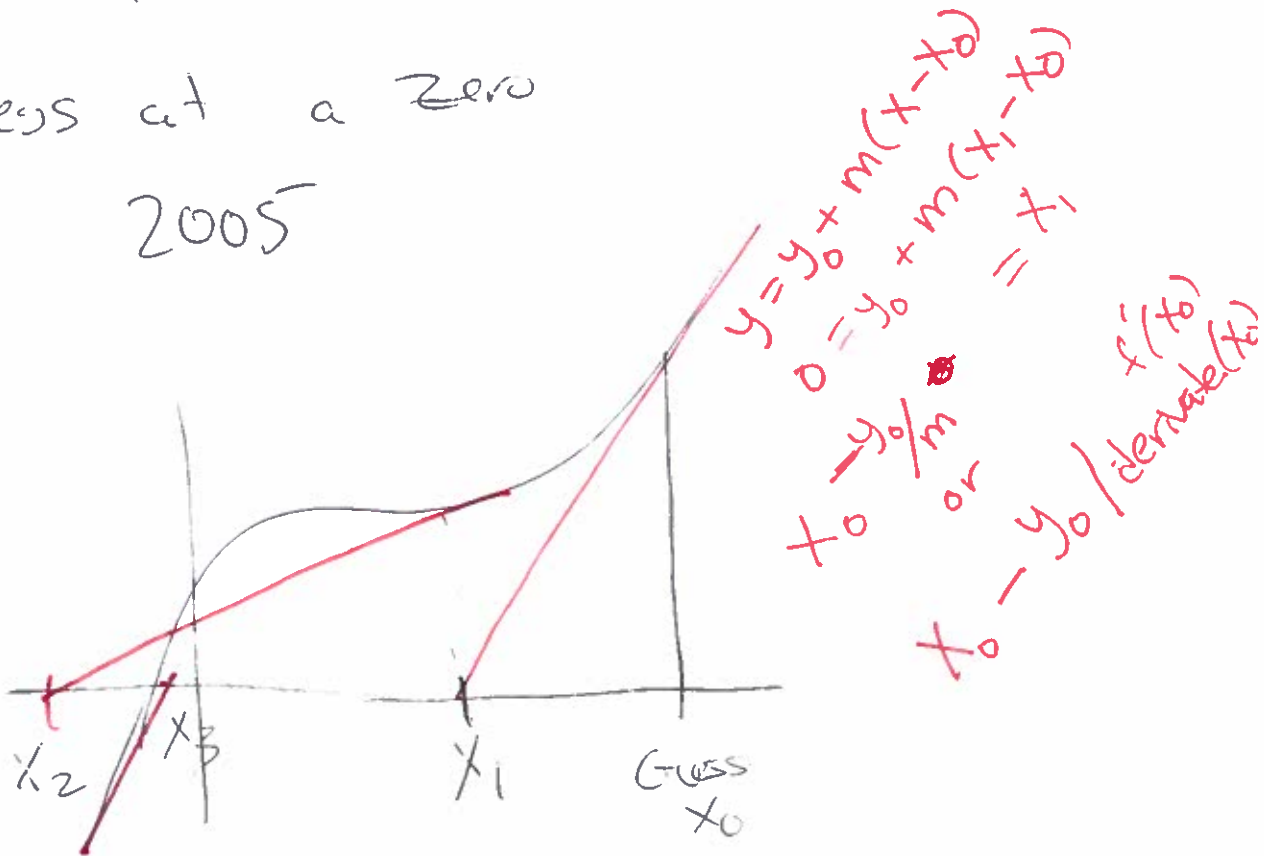
For Finding Zeros

Start with a function

$y_1 =$ regression equation (Cubic)

Guess at a zero

2005



"Lady G. started making money
in 2005 (end) using cubic
regression"

Chain
Rule

$$h(x) = f(g(x))$$

$$h'(x) = \frac{d}{dx}(f(g(x)))$$

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

$$= f'(2) \cdot (-3)$$

$$= 3 \cdot -3$$

$$= -9$$

f(x)

GROUP NAME: W & M & M Business
 Date: 3/3/14

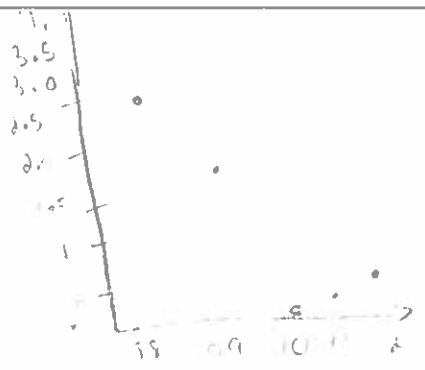
Student Names (First and Last)
 Speaker/Presenter: Christina Trujillo
 Writer/Prep: YASMIN SILVERIA
 Leader/Collaborator: _____

Independent Variable (x-axis): Years
 Dependant Variable (y-axis): Interest Rate

Conclusion (in words): The interest rate is going to be zero at 2015. (beginning)

Supporting Work:

Year X	Rate Y
2008	3.11
2009	1.52
2010	1.02
2011	1.58
2012	1.58



2017 → X

$$X - \frac{Y_1}{n} \text{Deriv}(Y_1, X, X) \rightarrow X$$

$$= 2015.09$$

2015 : a = 2017

GROUP NAME: TV News

Date: 03/03/2014

WE LOVE NICHE ALFASSENDE!

Independent Variable (x-axis): YEARS

Dependant Variable (y-axis): sales in \$

Student Names (First and Last)

Speaker/Presenter: Shah Isse

Writer/Prep: Pulcin Polcel

Leader/Collaborator: Onur Turkan

Conclusion (in words):

→ ~~Pink~~ Car sales will eventually sell at ~~\$1.83\$0~~
in year 2001

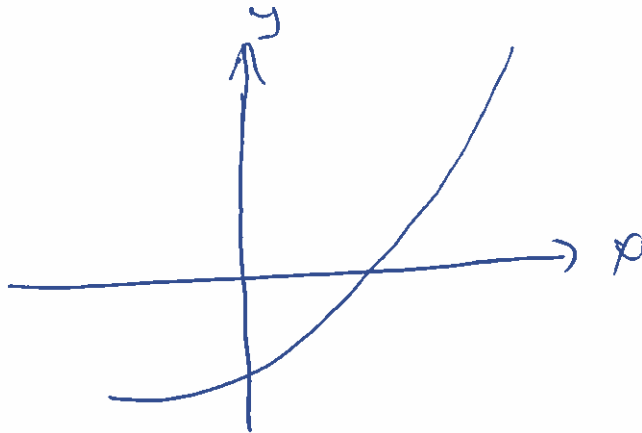
Supporting Work:

$$ax^3$$

zero at $1.83 \dots$

$$0x^3 + .071x^2 + 0.0714 - 2.2$$

x	y
8	11
9	13
10	16
11	18
12	21



$$x - y_1 \text{ (nDeriv}(y_1, x, x) \rightarrow x$$

in 2001 car sales will be 0

GROUP NAME: Functional Paradigm

Student Names (First and Last)

Date: 03/03/2014

Speaker/Presenter: Nader Shenouda

Independent Variable (x-axis): time in hours

Writer/Prep: Karel Zarcki

Dependant Variable (y-axis): memory usage in MB

Leader/Collaborator: _____

Conclusion (in words):

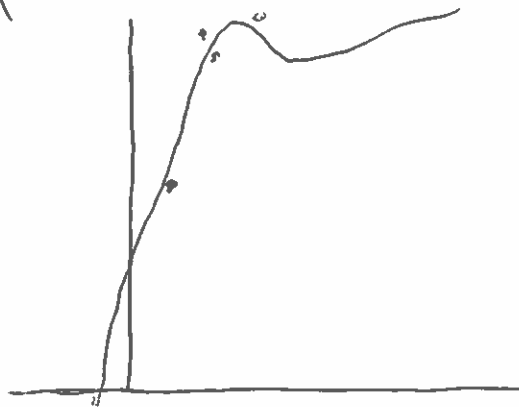
53 min before the computer was first turned on, the memory was not being used, according to the Cubic Reg

Supporting Work:

$$X - Y_i / n \text{ Deriv}(Y_i, X_i, X) \rightarrow X$$

zero = -0.8922544748

x	y
0	1000
1	1500
2	2500
3	2250
4	2600



Guess = 10 hours

GROUP NAME: Cha-Ching

Student Names (First and Last)

Date: 3/3/14

Speaker/Presenter: Trey Murrill

Independant Variable (x-axis): Years Revenue of Club

Writer/Prep: Sheila Mae Gan

Dependant Variable (y-axis): Revenue

Leader/Collaborator: _____

Conclusion (in words):

~~Our club will not make~~ ~~money in year 2023~~ Our club will not make money in year 2023

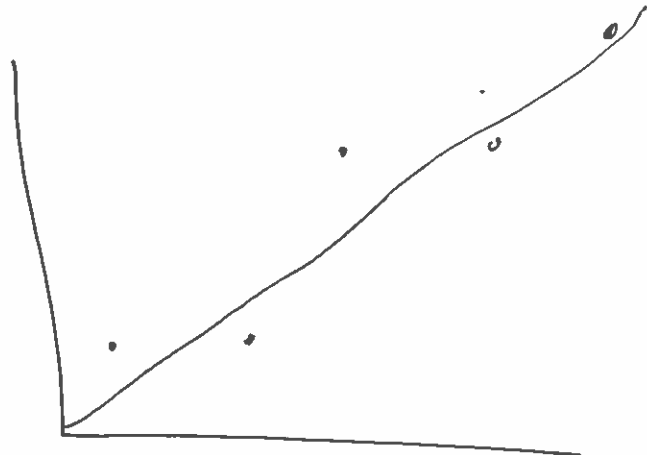
Supporting Work:

L1	L2
13	35
12	27
11	26
10	17
9	16

* Guess at a zero

2005
 $\frac{\text{Math}}{n \text{ Deriv}} : 8 = \text{Vars} \rightarrow \text{function} = Y_1$

$$X - Y_1 / n \text{ Deriv} (Y_1, X, X) \rightarrow X = 23.09849838$$



GROUP NAME: Money Makers

Date: 3/3/2014

Student Names (First and Last)

Speaker/Presenter: Bryan S.

Writer/Prep: Linda Onyiake

Leader/Collaborator: Monica K.

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

Dependant Variable (y-axis): Crime rate in % of it

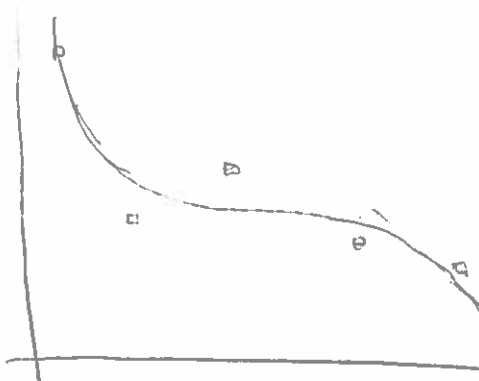
Conclusion (in words):

In 2014, any day now, the crime rate will be at zero(0) according to the cubic regression

Supporting Work:

$$X = 71.0 \text{ Dec } (71, X, Y) \rightarrow X = -4.5033 \times 10^{-11} X^3 + 14.1991511 X^2 + \dots$$

X	Y
2009	0.75
2010	0.62
2011	0.50
2012	0.44
2013	0.32



GROUP NAME: <u>polarz Beatz</u>	Student Names (First and Last)
Date: _____	Speaker/Presenter: <u>Kamalya Munnari</u>
Independent Variable (x-axis): <u>year</u>	Writer/Prep: <u>Frehwat Bekere</u>
Dependant Variable (y-axis): <u># deaths in millions</u>	Leader/Collaborator: _____

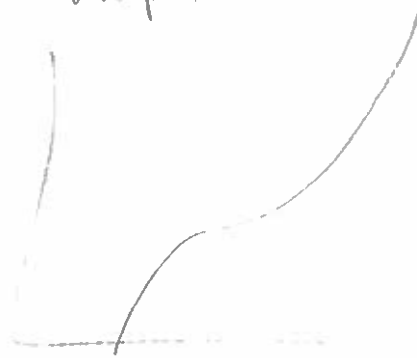
Conclusion (in words):

No one died of HIV in the year of 2007

Supporting Work:

x	y
2007	0
2010	2.3
2011	3.6
2012	2.4
2013	2.7

Graph



(using reg. $.03333x^3 + -2011214x^2 + 409798.3x + -271... .8$)

2007 $\rightarrow x$ math. 8

$x - y_1 / n \text{ dens } (y_1, x, x)$

$- 2002.034098$

$x \cdot y_1 / n \text{ dens } (y_1, x, x) \rightarrow x$

enter into calc. $\dots 2007.045249$

I get 2007

GROUP NAME:

Student Names (First and Last)

Date: MARCH 3, 2014

Speaker/Presenter: VENNIE

Independent Variable (x-axis): YEAR

Writer/Prep: LAUREN

Dependant Variable (y-axis): ELECTRIC CAR SALES

Leader/Collaborator: _____

Conclusion (in words):

AT THE END OF 2016, ELECTRIC CAR SALES WILL BE 0 ACCORDING TO THE CUBIC REGRESSION.

Supporting Work:

X	Y
2009	290292
2010	274555
2011	284064
2012	487480
2013	592192

CUBIC REGRESSION

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

$$a = -10329.16667$$

$$b = 62346920$$

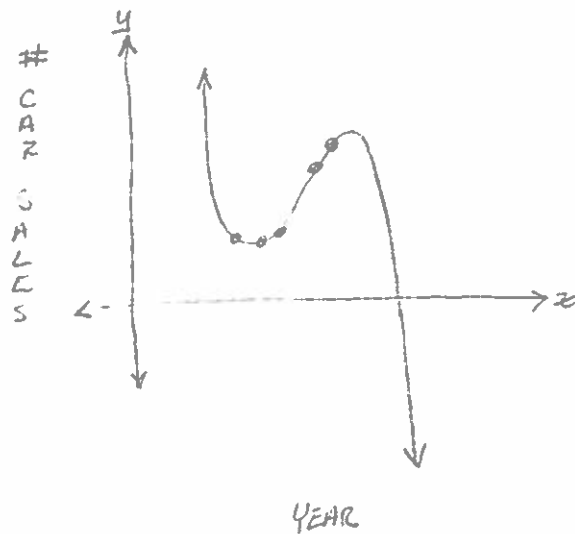
$$c = -1.25442E11$$

$$d = 8.4129662E13$$

$$(X-Y) \text{ / DERIVATIVE } (Y, X, X) \rightarrow X$$

2016.85

GUESS: 2050



GROUP NAME:

Student Names (First and Last)

Date: 3/3/14

Speaker/Presenter: _____

Independent Variable (x-axis): yr.

Writer/Prep: Bishop Dier

Dependant Variable (y-axis): yr. price

Leader/Collaborator: Danyan Zaid

Conclusion (in words):

In diff yr price is ...

Supporting Work:

<u>yr</u>	<u>price</u>
95	1
100	1.54
105	2.5
112	3.9
117	5.3

$$x = \frac{y - y_1}{m} + x_1$$

$$105 \rightarrow x = 117.12$$

$$117 \rightarrow 0$$

