

$$\frac{d}{dx} a = 0$$

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

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

Power Rule

$$\frac{d}{dx} x^n = n x^{n-1}$$

Product Rule

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

Quotient Rule

$$\frac{d}{dx} \frac{f(x)}{g(x)} = \frac{g(x) \cdot f'(x) - f(x) g'(x)}{(g(x))^2}$$

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

$$\frac{d}{dx} a^x = a^x \ln a$$

$$\frac{d}{dx} \ln x = \frac{1}{x}$$

$$\frac{d}{dx} \log_b(x) = \frac{1}{x \ln b}$$

Linear $y = ax + b$
 $y'_1 = a$

Quadratic $y = ax^2 + bx + c$

$$y'_2 = 2ax + b$$

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

$$y'_3 = 3ax^2 + 2bx + c$$

Quartic $y = ax^4 + bx^3 + cx^2 + dx + e$

$$y'_4 = 4ax^3 + 3bx^2 + 2cx + d$$

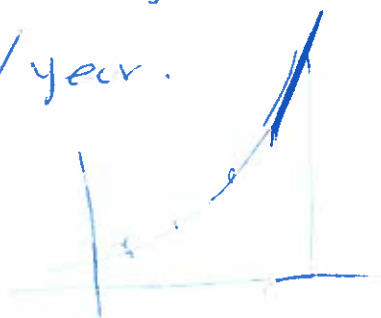
Exponential $y = a * b^x$

$$y'_5 = a * b^x \ln(b)$$

Logarithmic $y = a + \ln(b)$

$$y'_6 = b/x$$

Lady Gaga will grow (according to exponential regression) at \$50 million/year.



Power Regression $a * x^b$

$$y' = a * x^{(b-1)} = b$$

~~$a * x^b$~~

$$a * b * x^{b-1}$$

$$a * x^{(b-1)} = b$$

Linear

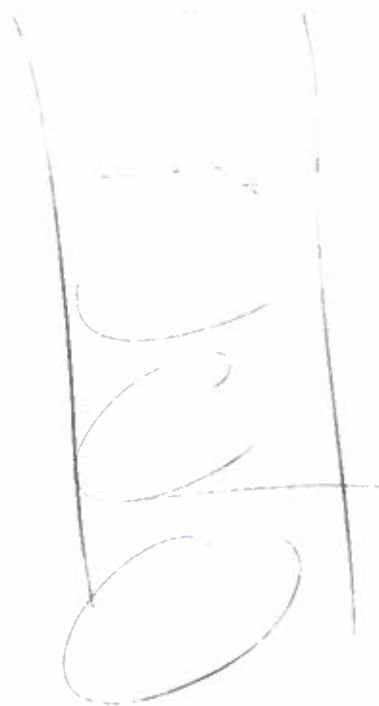
a

Quadratic

$$2ax + b$$

Cubic

$$3ax^2 \dots$$



$$y_2 = \text{nderiv}$$



math 8: nderive (function , ~~X~~ , ~~X~~)
 $\frac{d}{dx}$ $x = \text{~~3~~}$

$$y = \frac{8}{x+5} \quad \text{at } x = 3$$

$$y' = \frac{(x+5) \cdot 0 - 8(1)}{(x+5)^2}$$

$$= \frac{-8}{(x+5)^2} \quad \text{eval } x = 3$$

$$y'(3) = \frac{-8}{8^2} = -\frac{1}{8}$$

Chain Rule

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

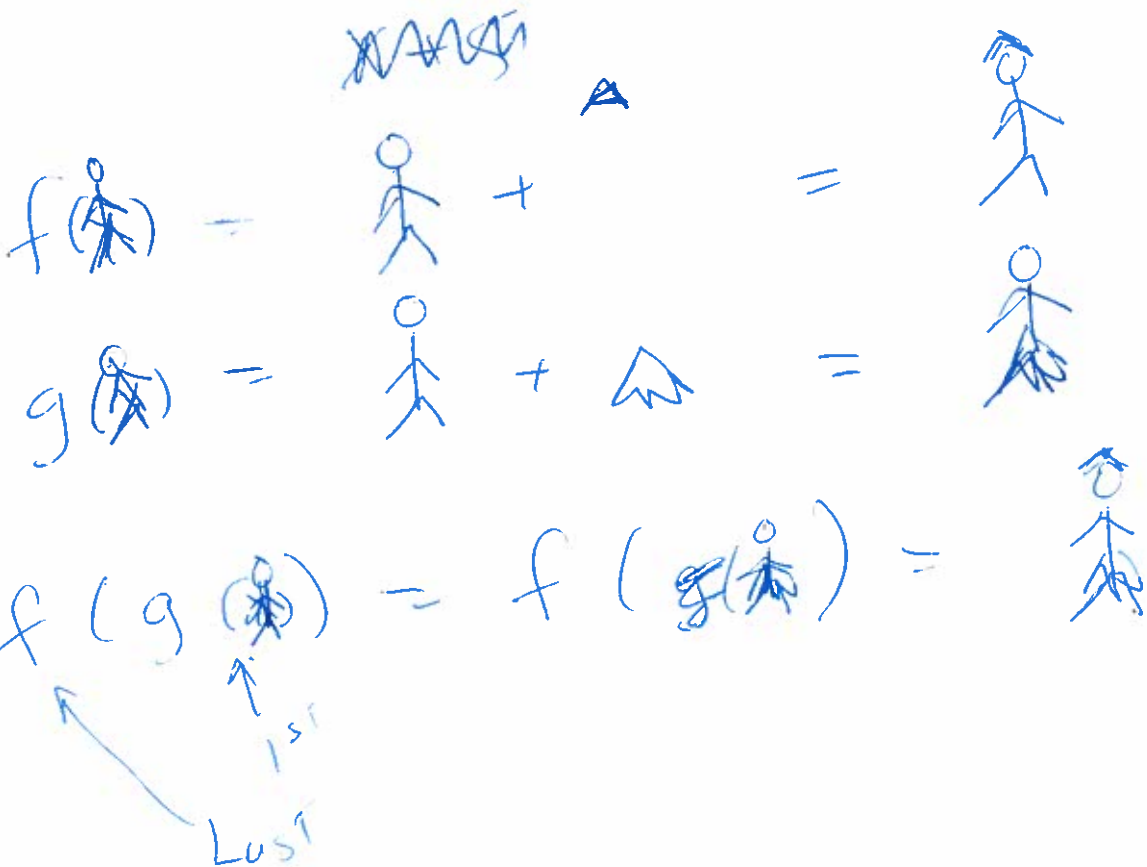
composition

$$(x + 5)^5$$

inside function

outside

Job.



GROUP NAME:

Redeemers ☺

Student Names (First and Last)

Date: 2/11/14

Speaker/Presenter: Ryan Piotrowski

Independent Variable (x-axis): years

Writer/Prep: Bishop Bar

Dependant Variable (y-axis): gas price

Leader/Collaborator: De. ...

Conclusion (in words): gas prices will increase according to my Exp Reg at .065% per year.

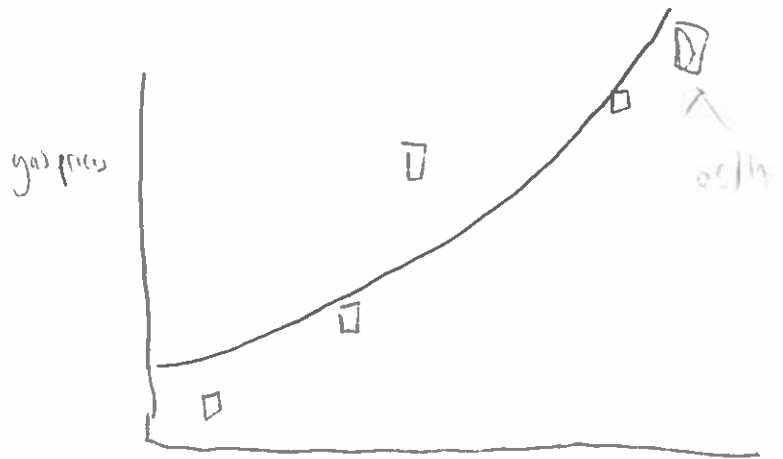
Supporting Work:

Exp Reg

$$y = a * b^{Ax}$$

$$a = .00265809$$

$$b = 1.0651761$$



price $\frac{\Delta P}{\Delta x}$ year

	X	Y	$\frac{\Delta P}{\Delta x}$
Lin Reg	114	3.3018	.12342
Quad Reg	114	3.2965	.22431
Cubic Reg	114	3.1919	-.0375
Quartic Reg	114	3.3	.28252
Exp Reg	114	3.5175	.065

In Power -

GROUP NAME: Functional Paradigm

Student Names (First and Last)

Date: 02/17/2014

Speaker/Presenter: Nick Holmgren

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

Writer/Prep: Karel Zarski

Dependant Variable (y-axis): memory used (MB)

Leader/Collaborator: Nader Shenouca

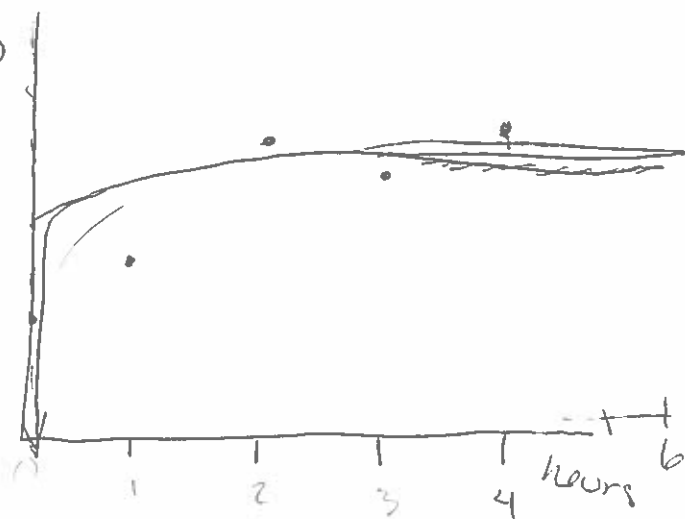
Conclusion (in words): The memory usage ~~per hour~~ ^{will grow} (according to my \log Reg) at 28.321 MB per hour. (at 6 hours)

Supporting Work:

6 hours

Linear	395
Quad	-7134
Cubic	-119
Quartic	32967
Exponential	1085.1
Log	28.321
Power	42.467

MB
USED



$$y = a + b \ln(x)$$

$$y' = \frac{b}{x}$$

TIME

GROUP NAME: <u>Best Friends</u>	Student Names (First and Last)
Date: <u>2/17/14</u>	Speaker/Presenter: <u>Vinnie Adams</u>
Independent Variable (x-axis): <u>Car Sales (electr.c)</u>	Writer/Prep: <u>Elliott Baer</u>
Dependant Variable (y-axis): <u>years</u>	Leader/Collaborator: <u>Liam</u>

Conclusion (in words): In the year 2014, the Quadratic seg predicted that sales of electric cars would reach 124,000,000.

Supporting Work:	<u>Cars Sold</u>
31 Linear $y = ax + b$ $y' = a$	81,673
32 Quadratic $y = ax^2 + bx + c$ $y' = 2ax + b$	1.24,000,000
33 Cubic $y = ax^3 + bx^2 + cx + d$ $y' = 3ax^2 + 2bx + c$	24,249
34 Quartic $y = ax^4 + bx^3 + cx^2 + dx + e$ $y' = 4ax^3 + 3bx^2 + 2cx + d$	-1.5×10^6
35 Exponential $y = a \cdot b^x$ $y' = a \cdot b^x \ln(b)$	133,248
36 Logarithmic $y = a + \ln(b)$ $y' = \frac{b}{x}$	601,621
37 Power $y = a \cdot x^b$ $y' = a \cdot x^{(b-1)} \cdot b$	94,052

GROUP NAME: <u>pol 112 Be 12</u>	Student Names (First and Last)
Date: _____	Speaker/Presenter: <u>Kausay...</u>
Independent Variable (x-axis): <u>year</u>	Writer/Prep: <u>Frenwat Bekele</u>
Dependant Variable (y-axis): <u># of deaths</u>	Leader/Collaborator: _____

Conclusion (in words): The # of deaths for the ~~entire year~~ ^{power reg} is ~~.12 million~~ ^{1.2 E14} deaths for the year 2014.

x	y ₁	y ₂	y ₃	y ₄	y ₅	y ₆	y ₇
14	85.716	29557	39887	-2.1E9	7E-49	18.675	1.2 E14

Supporting Work: ^{.13} 85.716

year	# of deaths (millions)
9	2.1
10	2.3
11	2.6
12	2.4
13	2.7

picked - ~~Linear~~ ^{power reg} (less deaths)
 year 2014 = ~~.12 deaths million~~ ^{1.2 E14}
 Graph = ~~Linear~~ ^{power reg}



1. Linear
 $y_1 = a$
 $y_1 = .13$

2. Quadratic
 $y_2 = 2ax' + b$
 $y_2 = 2 * .02142857142857x^{11} + 86.315114285713$

3. Cubic
 $y_3 = 3ax^2 + 2bx + c$
 $y_3 = 3 * 0.33333333333332x^{12} + 2 * -20.12142857138x + 404498.30238085$

4. Quartic
 $y_4 = 4ax^4 + 3bx^2 + 2cx + d$
 $y_4 = 4 * .06666666666649x^{14} + 3 * -536.2333333192x^{12} + 2 * 1617446.983329x + -2168321602.511$

5. Exponential Reg
 $y_5 = a * b^{x'} * \ln(b)$
 $y_5 = 5.850333308451E^{-48} * 1.056032379372^{x'} * \ln(1.056032)$

6. Power Reg Logarithm
 $y_6 = b/x$
 $y_6 = 261.4449121/x$

power Reg
 $y_7 = a * x^{(b-1)} * b$
 $y_7 = .57433695391258x^{660027093301395-1} * 600270933011395$

GROUP NAME:

Date: 2/17/2014

Student Names (First and Last)

Speaker/Presenter: ~~Edna O. O. O.~~

Independent Variable (x-axis): crime rate r_0

Writer/Prep: Edna O. O. O.

Dependant Variable (y-axis): time $\sqrt{r_5}$

Leader/Collaborator: Monica K.

Conclusion (in words):

The crime rate will increase according to the regression at -2.3% $r = -0.233$ in year (2011)

Supporting Work:

Y_1 Linear $Y = ax + b$ $Y' = a$
 $2011 \approx 5.708$

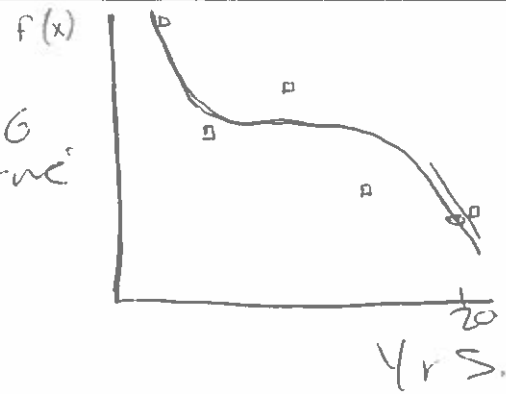
Y_2 Quad reg $Y_2 = ax^2 + bx + c$
 $Y_2' = 2ax + b$

Y_3 Cubic

Y_4 - exponential

Y_5 Power reg $a * x^b = Y' = a * x^{(b-1)} * b$

x	Y_1	Y_2	Y_3	Y_4	Y_5	
10,2011	(11)	-0.08	-0.08	-0.233	-0.0773	-0.0755



linear	-0.08
Quad reg.	-0.08
Cubic	-0.0233
Exponential	0.0773
Power Reg	-0.0755

GROUP NAME:

Student Names (First and Last)

Date: 2/17/14

Speaker/Presenter: Yamin Silverio

Independent Variable (x-axis): YEARS

Writer/Prep: Christine Trujillo

Dependent Variable (y-axis): Interest Rate

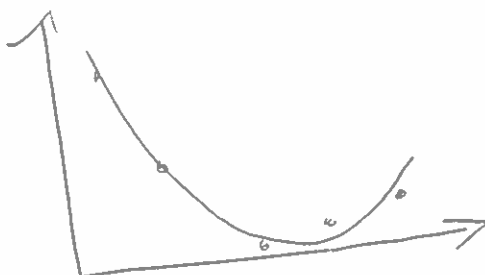
Leader/Collaborator: Sheila Mae Gan

Conclusion (in words): Interest Rate will increase according to Quadratic Regression at 2.739 in 2014

Supporting Work:

X	Y
8	3.71
9	1.53
10	.29
11	.38
12	.56

X	Y ₁	Y ₂	Y ₃	Y ₄	Y ₅	Y ₆
14	-0.741	2.739	-0.3158	-15.14	-0.0541	18.129



1) Linear

$$y' = a$$

$$y' = .741$$

2) Quad

$$y' = 2ax + b$$

$$y' = 2(0.741)x + 9.4$$

3) Cubic

$$y' = 3x^2 + 2ax + c$$

$$y' = 3(3) + 2(0.741)(12) + 2(9) + 29 \dots$$

4) Quartic

$$y' = 4x^3 + 3bx^2 + 2cx + d$$

$$y' = 4(10)^3 + 3(2)(0.61)(12)^2 + 3(2)(0.741)(12) + 232 \dots$$

5) Exponential

$$y = a \times b^{1/x} \times \ln(b)$$

$$y = 134.50 \dots \times 0.6002 \dots^{1/x} \times \ln(0.603 \dots)$$

6) Log

$$y' = b/x$$

$$y' = 18.73 \dots + 7.605 \dots / x$$

7) Power

$$y' = a \times x^{(b-1)} \times b$$

$$y' = 137.716 \dots \times x^{(-5.25 \dots - 1)} \times 5.25 \dots$$