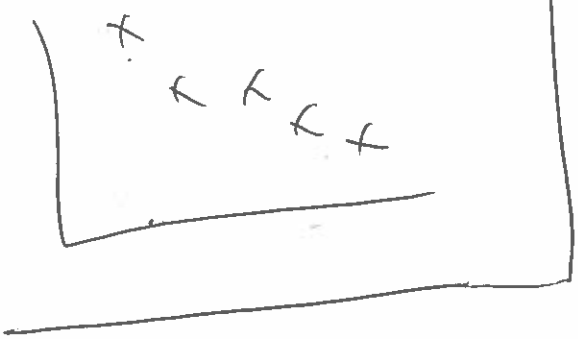
Data

Price	
$90	11
$100	7
$130	5
$150	2
$160	1



1. Enter Data in Calculator

STAT → 1: EDIT

Button — Button — Notes

L1	L2
90	11
100	7
130	5
150	2
160	1

2. Plot

2nd | Y= ⇒ STAT Plot

↑ combination of Both ✓

center>

Zoom 9: ZoomStat

$y = ax^2 + 2x + 7$

$3.2\ldots x^2 + 2x + 5.8\ldots$

3 Find Regression

STAT → > → 5: QuadReg

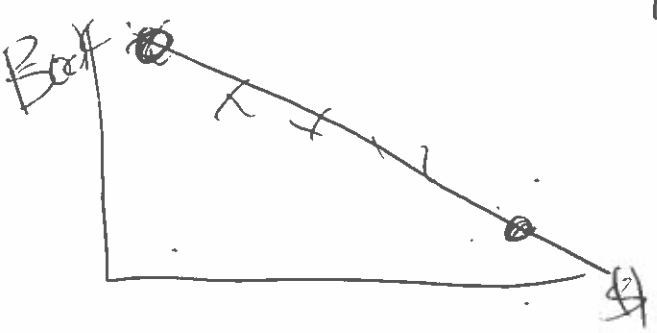
Button

$y = ax^2 + bx + c$

$a = 3.25$

$b = 2$

$c = 5.8385$



4. [Y=] [VARS] 5: (7)(2) 1: RegEq

Graph

Average Rate of Change

$$m = \frac{\Delta Y}{\Delta X}$$

$$\frac{\text{Books}}{\$}$$

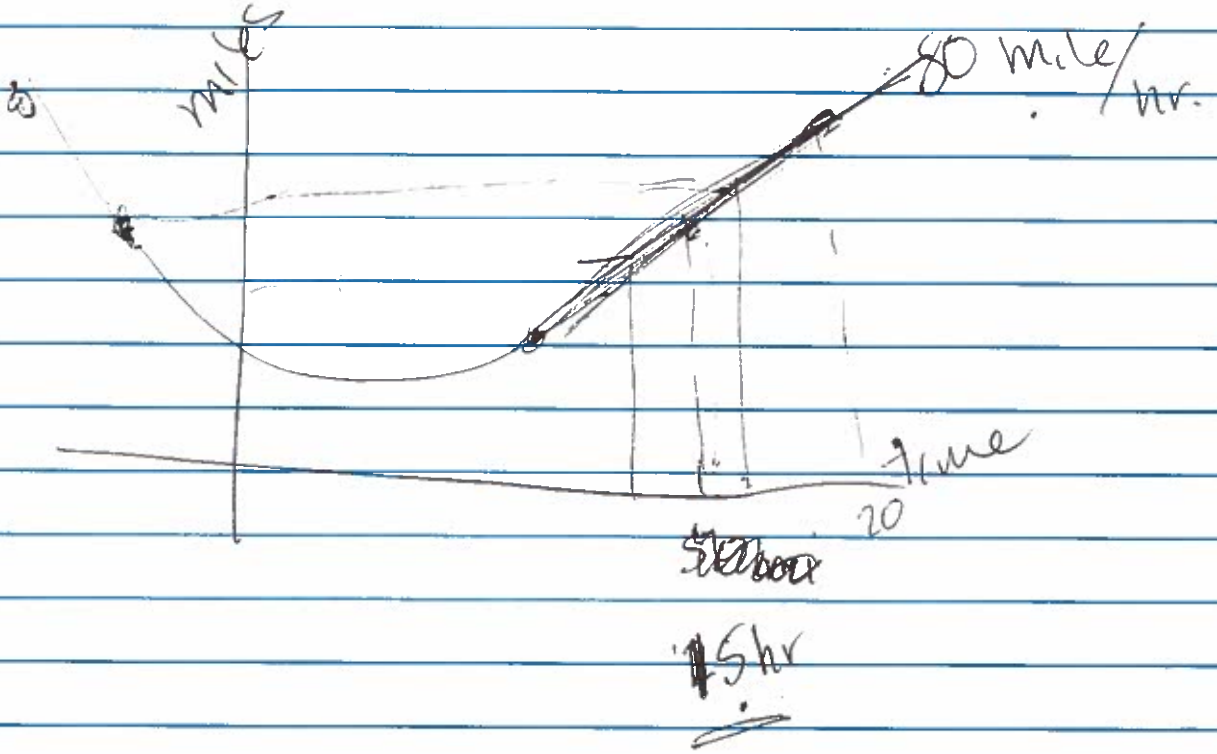
From Date

$$\frac{11-1}{90-160} = \frac{10}{-70} \approx -\frac{1}{7} \frac{\text{book}}{\$}$$

My Ave rate of change is $-1/7$ book per dollar

At #50, The instantaneous

rate of change is approx $-.133$ back



At 15 hrs of Travel,

my "speed" on my speedometer

is 80 mph.

Calculate

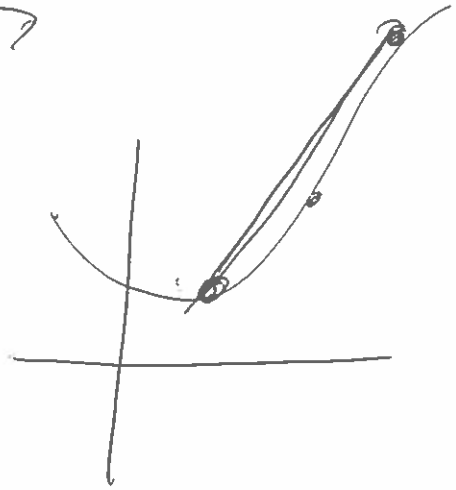
Trace	= Calc

$\frac{dy}{dx}$ at $x = 50$ $\quad dy/dx = -.1333$

Average Rate of Change

Requires 2 points

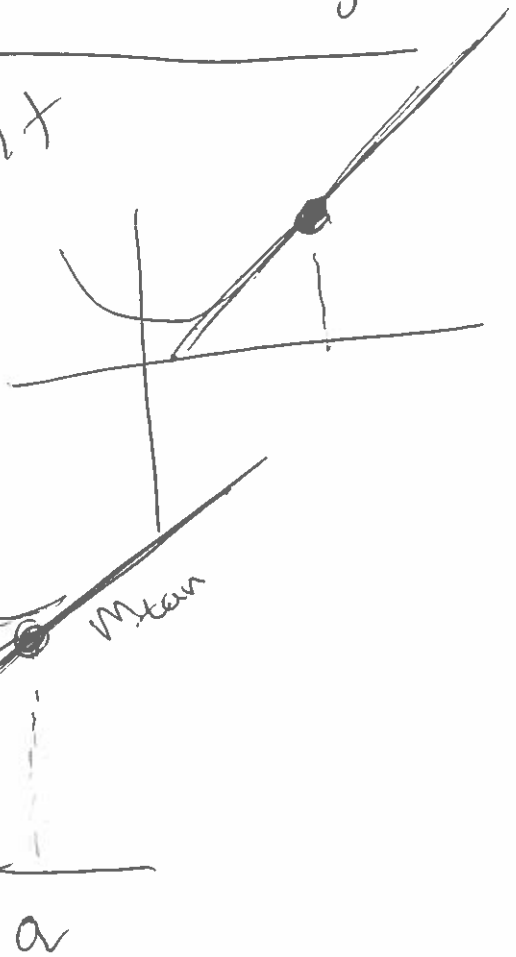
$$m_{sec} = \frac{\Delta y}{\Delta x}$$



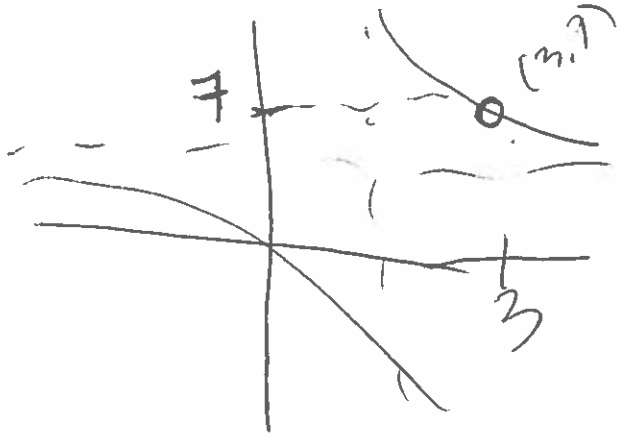
Instantaneous Rate of Change

Requires 1 point

$$m_{tan} = \frac{dy}{dx}$$



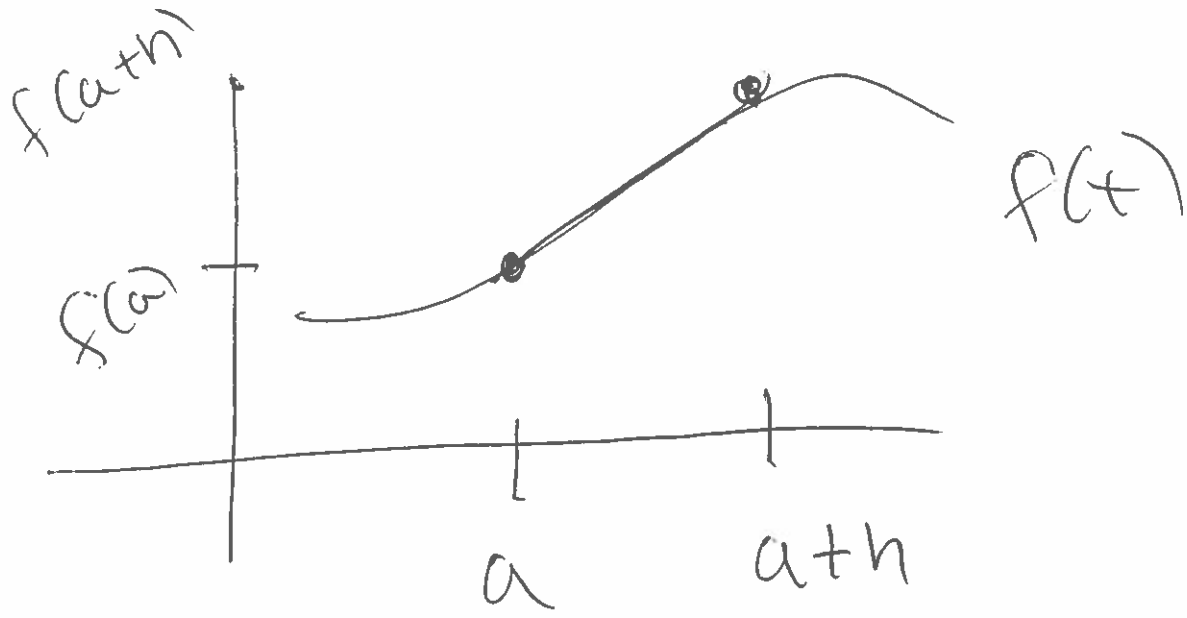
Hole in a Function



$$f(x) = \frac{a(x-3)}{b(x-3)}$$

"limit" $\rightarrow \lim_{x \to 3} \frac{x-3}{x-3} = 1$

"limit as x goes to 3"



$$m_{sec} = \frac{f(a+h) - f(a)}{a+h-a} =$$

$$= \frac{f(a+h) - f(a)}{h}$$

$$m_{tan} = \lim_{h \to 0} \frac{f(a+h) - f(a)}{h}$$

Ex $f(x) = 3x^2 - 7x + 5$

$f(a+h) = 3(a+h)^2 - 7(a+h) + 5$

$= 3a^2 + 6ah + 3h^2 - 7a - 7h + 5$

$f(a) = 3a^2 - 7a + 5$

$f(a+h) - f(a) = 6ah + 3h^2 - 7h$

$$\frac{f(a+h) - f(a)}{h} = \frac{h(6a + 3h - 7)}{h}$$

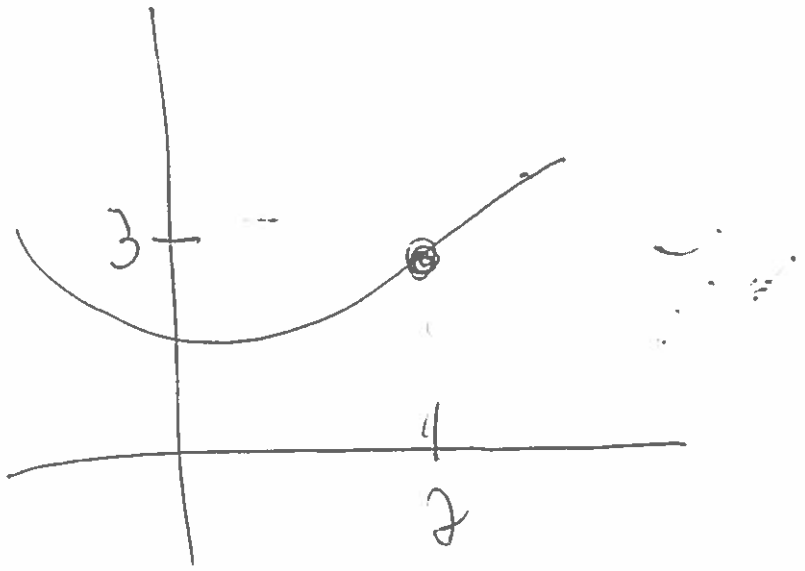
Usual

$$\lim_{x \to a} f(x) = f(a)$$

Ex $\lim_{x \to 2} 3x - 5 = 1$

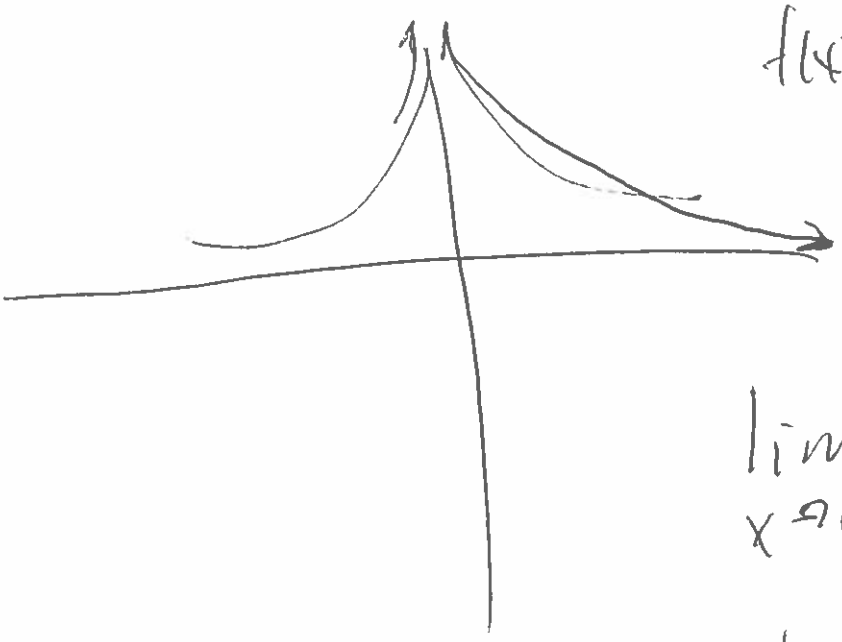
Ex $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2} =$

$$\lim_{x \to 2} \frac{(x-2)(x+2)}{(x-2)} = 4$$



$$\lim_{x \to 2} f(x) = 3$$

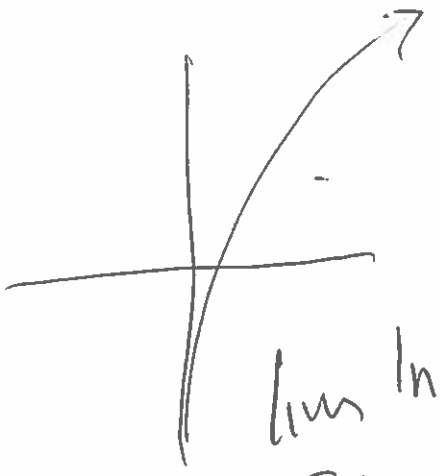
Ex $\lim_{x \to 0} \frac{\sin(x)}{x} = ?$



$f(x) = \frac{1}{x^2}$

$\lim_{x \to 0} f(x) = \infty$

Right End Behavior $\lim_{x \to \infty} f(x) = 0$



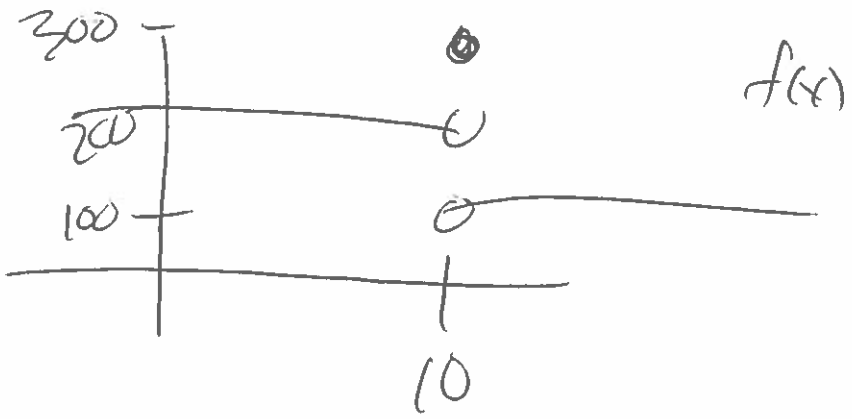
$\lim_{x \to \infty} \ln(x) = \infty$

Left End Behavior $\lim_{x \to -\infty} f(x) = 0$

$\lim_{x \to -\infty} \ln(x) = \text{UND.}$

$\lim_{x \to 0^-} \ln(x) = \text{UND}$

$\lim_{x \to 0^+} \ln(x) = -\infty$



$\lim_{x \to 10} f(x)$

$\lim_{x \to 10} f(x) = \text{UNI}$

$\lim_{x \to 10^+} f(x) = 100$

$\lim_{x \to 10^-} f(x) = 200$

$f(10) = 300$

GROUP NAME: Fluffy Ponies
Date: 1/23/14

Student Names (First and Last)
Speaker/Presenter: Milton / June
Writer/Prep: Courtney
Leader/Collaborator: Tyler

Independant Variable (x-axis): average income
Dependant Variable (y-axis): chance of committing a crime

Conclusion (in words):
The average rate of change (20→60) = -1.5% for every 1K
The average rate of change (60→100) = .65% for every 1K

Supporting Work:

L_1	L_2
20	.417
40	.24
60	.13
80	.18
100	.39

↓

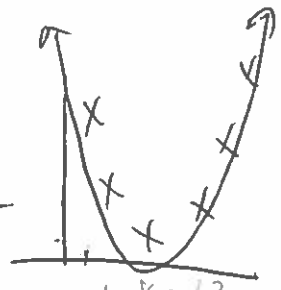
stat 1: edit

y= vars 5: 00 1:

↑ to enter equation in y=

2. 2nd y= → stat plot <enter>

zoom 9: zoomstat



3. Find regression

stat → 5: quadreg

$y = ax^2 + bx + c$

$a = 1.857142\ldots$

$b = -.0233857\ldots$

$c = .868$

$y = 1.86\ldots \times 10^{-4} x^2 - .023\ldots x + .868$

$m = \frac{\Delta y}{\Delta x} = \frac{.13 - .39}{60 - 100} = \frac{-.26}{-40} = .0065 = .65\%$

$m = \frac{\Delta y}{\Delta x} = \frac{.417 - .13}{20 - 60} = \frac{.6}{-40} = -.015 = -1.5\%$

GROUP NAME: World Health Organization

Date: 1/23

Student Names (First and Last)

Speaker/Presenter: Michael, Charles

Writer/Prep: Jenna, Kathleen

Leader/Collaborator: Cathryn

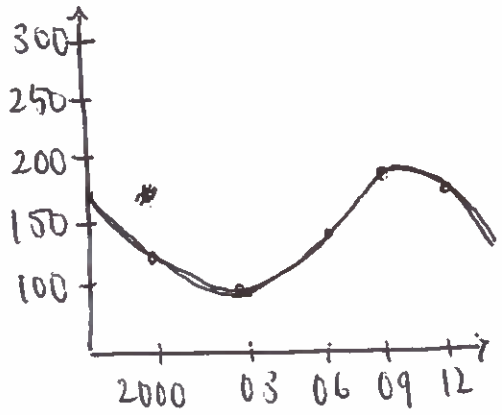
Independant Variable (x-axis): Years

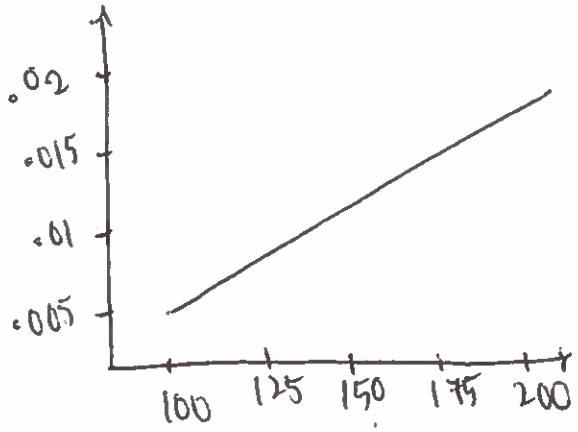
Dependant Variable (y-axis): Drug Level PPM

Conclusion (in words):
From 2003 to 2009 there was on average rate of change increasing 16.6 ppm per year.

The average rate of change has an increase of 1.4758×10^{-4} percent of population of autistic people per parts per million increase of drug levels

Supporting Work:





Time	Steroid lvl. thru food (in Babies) — ppm
2000	122
2003	100
2006	143
2009	200
2012	170

Drug lvl.	Autism
100	1 out of 133 1 out of 220
122	1 out of 220 1 out of 133
143	1 out of 100 1 out of 100
170	1 out of 50 1 out of 78
200	1 out of 78 1 out of 50

Cubic reg. $= ax^3 + bx^2 + cx + d$

$a = -.469135802\overline{5}$

$b = 2823.243386$

$c = -566337.503$

$d = 378686003$

$R^2 = .9942284606$

Lin Reg $y = ax + b$

$a = 1.4758654$

$b = .0107182684$

$r^2 = .96904307$

GROUP NAME: Porter's Minions

Date: 11/23/14

Student Names (First and Last)

Speaker/Presenter: [illegible]

Writer/Prep: [illegible]

Leader/Collaborator: [illegible]

Independant Variable (x-axis): years

Dependant Variable (y-axis): L2 internet use / L3 radio

Conclusion (in words):

L1 : L3 My average rate of change is [illegible] per year

L1 : L2 My average rate of change is [illegible] per year

Supporting Work:

L1 year	L2 internet use	L3 radio
05	3300	1700
	3320	1720
	3400	1800
09	[illegible]	[illegible]

average rate of change

(y(b) − y(a)) / (b − a)

L3

[illegible] 5)) / 4

50

L1 : L2

(, ( )) =

L1 & L3

a = 50

b 1415

r^2 = .64

L1 & L2

$y = ax + b$

a 50

b 305

r = .[illegible]

GROUP NAME: Fluffy Pon c

Date: 11/28/17

Student Names (First and Last)

Speaker/Presenter: Ahmed / June

Writer/Prep: Courtney

Leader/Collaborator: Tyler / Milton

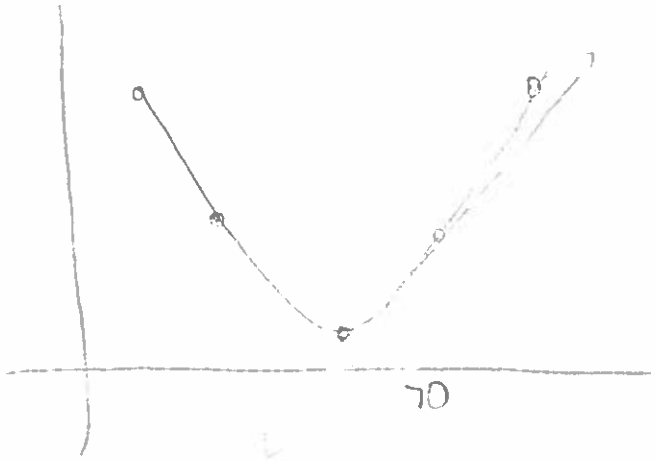
Independant Variable (x-axis): Average income

Dependant Variable (y-axis): Change of commute

Conclusion (in words):

The instantaneous rate of change = .26% per 1K at 70K

Supporting Work:



L_1	L_2
20	.47
40	.21
60	.3
80	.16
100	.31

$L_1(80) - L_1(\quad) = .1735$

$L_1(\quad) - L_1(\quad) = .1020\ldots$

$L_1\left(\frac{100) - L_1(\quad)}{\quad}\right) = .0012\ldots$

Find by calculator:

enter value: 70

GROUP NAME: World Health Organization

Date: 1/22/14

Student Names (First and Last) Michael Vehrk, Charles Chau, Kathleen Hernandez,
Speaker/Presenter: _____

Writer/Prep: Jenna Grabfelder

Leader/Collaborator: Cathryn Tolle

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

Dependant Variable (y-axis): Steriod levels in Blood Stream

Conclusion (in words):

Instantaneous Rate of change. in 2006 the instantaneous rate of change is 16.67 ppm/year

Supporting Work:

Time (years)	Steroid lvl thru Food in Babies - ppm
00	122
03	100
06	143
09	200
12	170

$IROC = \frac{200 - 100 \text{ ppm}}{6 \text{ yrs}} =$

$= 16.67 \text{ ppm/yr}$

196.91 − 96.909 = 100.00
year 03↑ year 09↑

SinReg

a = 51.508048
b = .4428335089
c = −2.660762882
d = 146.9827947

CubicReg

$y = ax^3 + bx^2 + cx + d$
a = −.4691358025
b = 8.428571429
c = −29.58730159
d = 122.7142857

GROUP NAME: Porter's Minions

Date: 1/28/13

Student Names (First and Last)

Speaker/Presenter: Dawn, Jason

Writer/Prep: Dawn

Leader/Collaborator: Danielle / Kerri

Independant Variable (x-axis): year

Dependant Variable (y-axis): international

Conclusion (in words):

The instantaneous rate of change for 2013 is increasing by $51.12 per year.

Supporting Work:

L1 year	L2 international
10	3300
11	33
12	
13	
14	

$[Y_1(15) - Y_1(13)]/(15-13)$

$= 51.12$

$[Y_1(14.75) - Y_1(13.25)]/(14.75-13.25)$

$= 51.11976$

$[Y_1(14.01) - Y_1(13.99)]/(14.01-13.99)$

$= 51.1181$