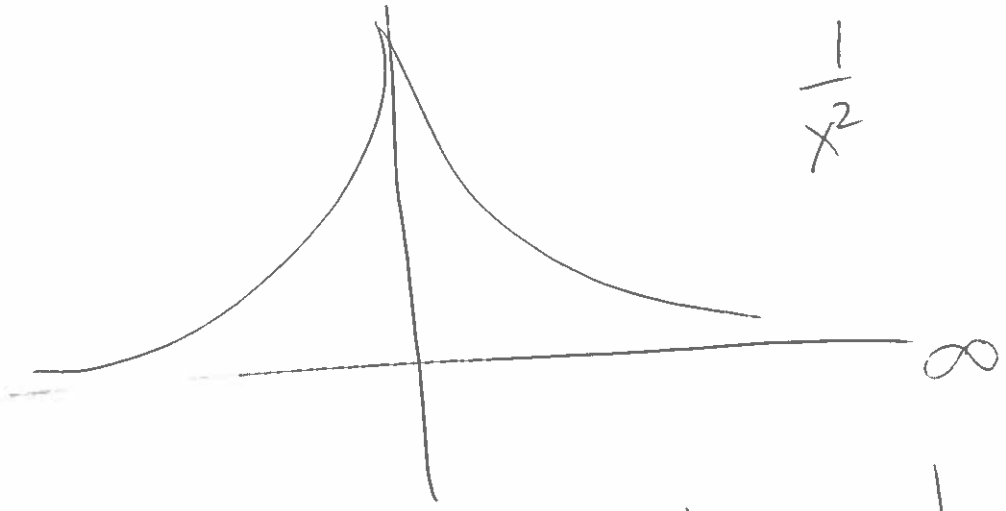
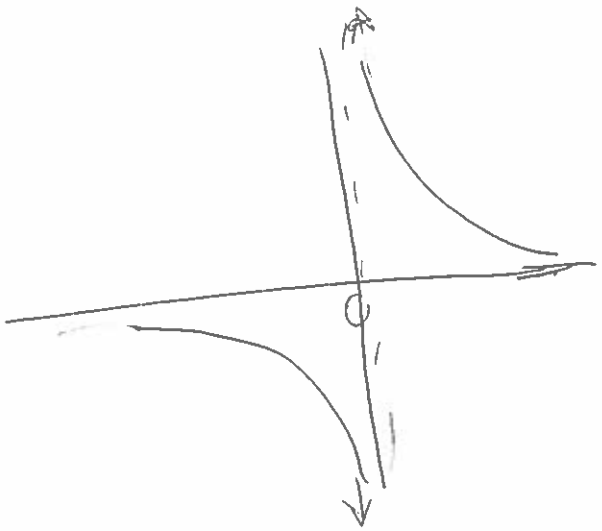


$\frac{1}{x^2}$

$$\lim_{x \to 0} \frac{1}{x^2} = \infty$$

Right END BEHAVIOR $\lim_{x \to \infty} \frac{1}{x^2} = 0$

Left END BEHAVIOR $\lim_{x \to -\infty} \frac{1}{x^2} = 0$

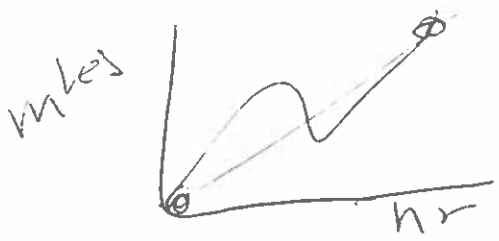


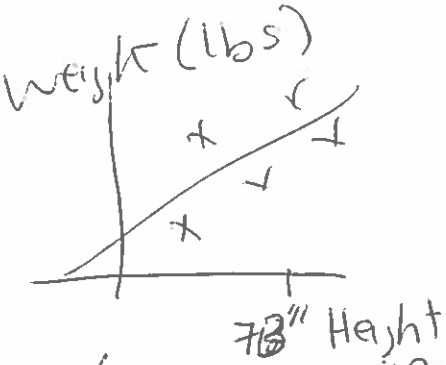
$$\lim_{x \to 0} \frac{1}{x} = \text{DNE}$$

Rate of Change "Per"

"Per"

$\frac{\text{mile}}{\text{hr.}}$ $\frac{\text{lbs}}{\text{in}}$ $\frac{\text{Yunits}}{\text{Xunits}}$





Average Rate of Change (Two Points)

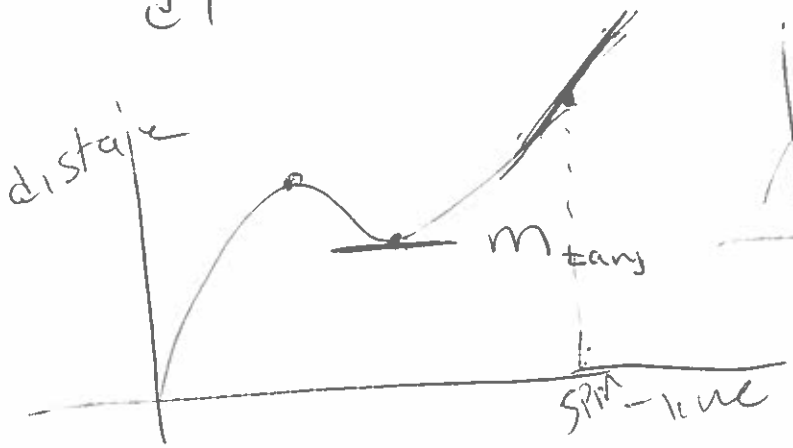
$$m_{sec} = \frac{\Delta y}{\Delta x}$$

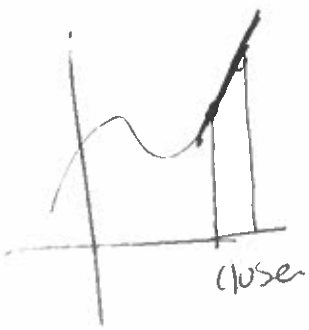
$\frac{1000 \text{ miles}}{20 \text{ hrs}} = 50 \text{ mph}$

Instantaneous Rate of Change (1 Point)

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

80 mph at 5:00 pm





Approaching from right (F)

Right Sided Limit

$$\lim f(x) \Rightarrow$$

$$x \Rightarrow a^{+}$$

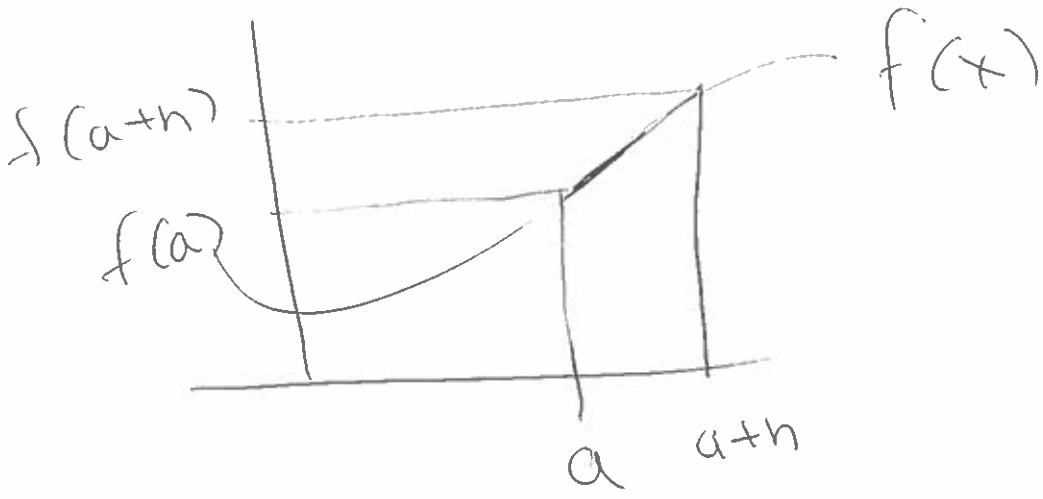
Left Side Limit

$$\lim f(x) \Rightarrow$$

$$x \Rightarrow a^{-}$$

$$\lim$$

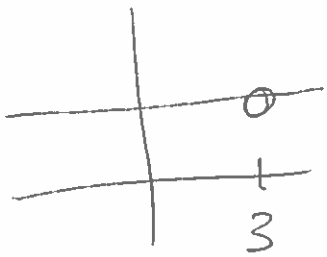
Instantaneous Rate of Change



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

We'd Like $h = 0$

Consider $y = \frac{x-3}{x-3}$



hole

Limit

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

" limit as x goes to a of $f(x)$

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

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

1st This Plus

$$\lim_{x \to 1} \frac{x^2-4}{x-2} = \frac{1-4}{1-2} = 3$$

2nd This

$$\lim_{x \to 2} \frac{x^2-4}{x-2} = \frac{0}{0}$$

$\frac{0}{0}$

#factoring?

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

$$\lim_{x \to 2} x+2 = 4$$

3rd This

Graph

$$\lim_{x \to 0} \frac{\sin(x)}{x}$$ looks like 1

4th This

Table

-.1	-.01	-.0001	0	.0001	.01	.1

$\overline{.9} = 1$

GROUP NAME: $ Cha-Ching $

Date: 1/29

Student Names (First and Last)

Speaker/Presenter: Tatiana Calderon

Writer/Prep: Sheila Mae Gan

Leader/Collaborator:

Independant Variable (x-axis): years

Dependant Variable (y-axis): revenue of club in millions

Conclusion (in words):

In 2008 the instantaneous rate of change was 2.22 ~~million~~ revenue per year and then in 2010 it rose to almost 4 million per year

Supporting Work:

X - closest #'s

10.000
9.999

$$\frac{X - Y'}{X - X} = \frac{10.000 - Y'}{10.000 - 9.999}$$

① $(y'(10.000) - y_1(9.999)) / (10.000 - 9.999)$

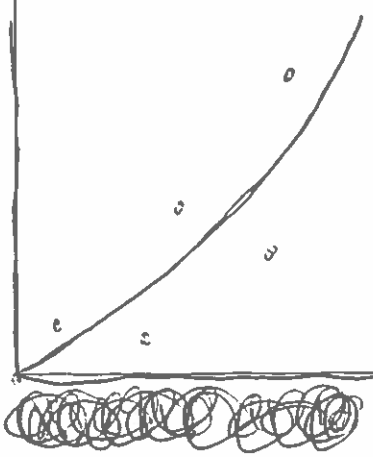
② $(y'(8000) - y_1(9.999)) / (8000 - 9.999) = 3.942$

~~2.222~~ 2.228

2nd | TRACE: 6

① X = 10 = 3.942

② X = 8 = 2.228



GROUP NAME: Math Tirates

Date: 01/29/14

Everyday use calculation

Independant Variable (x-axis): Bandwitth in GB

Dependant Variable (y-axis): Time (min)

Student Names (First and Last)

Speaker/Presenter: Sharon Isoe

Writer/Prep: Onur Turkan

Leader/Collaborator: George Cumb.

Conclusion (in words): — Downloading Breaking Bad on Netflize.

Supporting Work:

L1	L2
40	60
60	50
80	40
120	20
160	10

$-ax^2+bx+c$

a .0015

b -.735...

c 87.83

R^2 = .996...

Rate of Change

$\frac{(Y_1(160) - Y_1(40))}{(160 - 40)}$

$= -40.34...$

The instatenos rate of change of your download speed decreases by -.428 min/GB bandwid

Instant Rate of Change = between 120↔80

$\frac{dy}{dx}$ 118 = -.37... dy/dx $x = -.428...$

90 = -.459...

GROUP NAME: Functional Paradigm

Date: 01/29/14

Student Names (First and Last)

Speaker/Presenter: Nick Holmgren

Writer/Prep: Karol Zarski

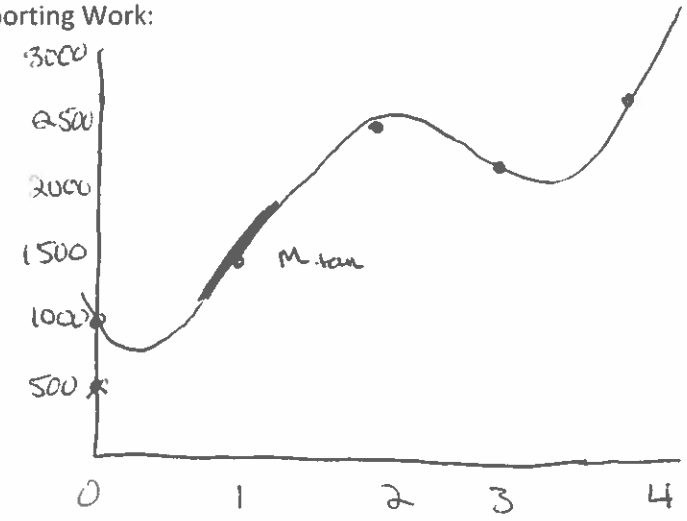
Leader/Collaborator: Nader ~~Sherif~~ Sherif Abdelfa

Independant Variable (x-axis): Time

Dependant Variable (y-axis): Disk U

Conclusion (in words): At the time of 1 hour, the instintanious change in disk usage per hour was ~~1340.60735~~ approximately 1341.66661 mB per hour.

Supporting Work:



$$\frac{(Y_1(1) - Y_1(2))}{1-2} = 1000$$

$$\frac{(Y_1(1) - Y_1(1.5))}{1-1.5} = 1262.5$$

$$\frac{(Y_1(1) - Y_1(.99))}{1-.99} = 1340.60735$$

~~At the time of 1 hour, the instintanious disk usage per hour was 1340.60735 mB per hour.~~ change in

$$dy/dx = 1341.66661 \text{ mB/h}$$

The instintanious rate of change in disk usage at 1 hour per hour is 1341.66661 mB per hour.

GROUP NAME: POLAR BEARS

Date: 1/29/11

Independant Variable (x-axis): year

Dependant Variable (y-axis): Death (Due to AIDS)

Student Names (First and Last)

Speaker/Presenter: Natalie Castillo

Writer/Prep: Kausa [illegible]

Leader/Collaborator: Frewiwot Bekele

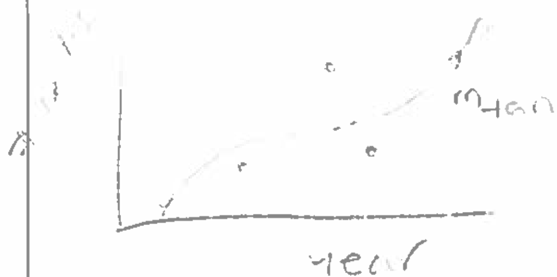
Conclusion (in words):

.329 deaths due to AIDS per year occur between 2012.99 and 2013 (Instant. Rate in 013 = .329 millions / yr) 329 thousand

Supporting Work:

Instantaneous Rate

x	y
2009	2 [illegible]
2010	2.3 m[illegible]
.	[illegible]
20[illegible]	[illegible]
[illegible]	[illegible]



1. $y_1(2013) - y_1(2011)$ / $(2013 - 2011)$ = .107[illegible] million death per yr

2. $(2013) - [illegible]$ / $(2013 - 2012)$ = .18571 million deaths per yr

3. $y_1(2013) - y_1(2012.99)$ / $(2013 - 2012.99)$ = .329 million deaths per yr

1. 2013 - 2011 = .10715

2. 2013 - 2012 = .18571

3. 2013 - 2012.99 = .329

GROUP NAME: Illuminati

Date: 1/29/19

Student Names (First and Last)

Speaker/Presenter: Ryan Piotrowski

Writer/Prep: Bishop Burr

Leader/Collaborator: Danyan Zhou

Independant Variable (x-axis): year

Dependant Variable (y-axis): gas prices

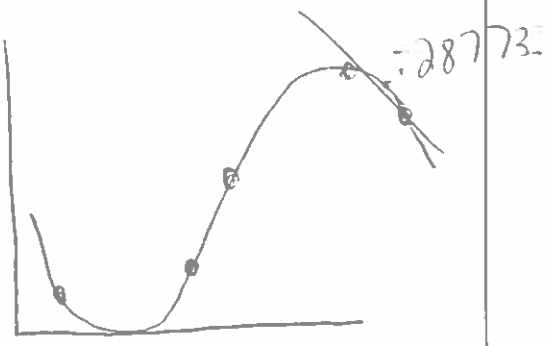
Conclusion (in words):

The instantaneous rate of change of gas prices in 2012 is -.287733 $/.

Supporting Work:

x	y
95	1
105	2.5
112	3.9
114	3.3

2012



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

$$(y_1(114) - y_1(112))/(114-112) = -.287733\ \$/\text{gal}$$

$$x = 114 \quad \Delta y/\Delta x = -.4457402$$

$$\Delta y/\Delta x = -.4457402$$

$$\Delta x = 114$$

GROUP NAME: Money makers

Date: 1/29/14

Student Names (First and Last)

Speaker/Presenter: Bryan Sapon

Writer/Prep: Edna Onyilike

Leader/Collaborator: Mona K.

Independant Variable (x-axis): Year

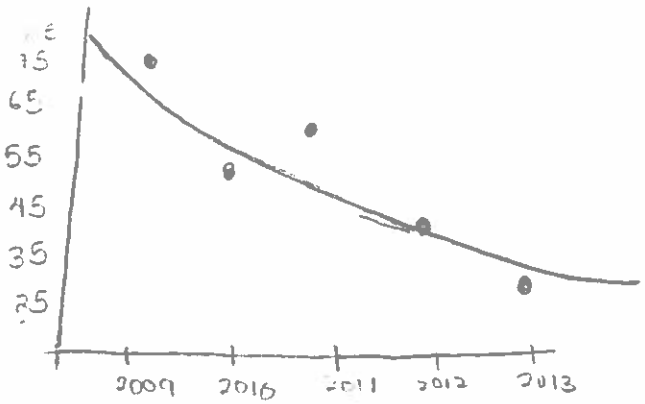
Dependant Variable (y-axis): crime rate

Conclusion (in words):

The instantaneous rate of change ~~2012 to 2013~~ in 2013 is -.05%/year

Supporting Work:

x	y
2009	75%
2010	52%
2011	59%
2012	44%
2013	39%



((Y1(2012) - Y1(2013))/(2012 - 2013)

= -.05

To find

CALC = [2nd] [trace]

((Y1(2011) - Y1(2012))/(2011 -

GROUP NAME: Best Friends

Date: 1/29/2014

Student Names (First and Last)

Speaker/Presenter: Vinnie Allred

Writer/Prep: Lauren Dolan

Leader/Collaborator: Elliott Rae

Independant Variable (x-axis): Years

Dependant Variable (y-axis): Units

Conclusion (in words):

IN 2010, THE INSTANTANEOUS RATE OF CHANGE IS 30000 CARS SOLD Per Year

Supporting Work:

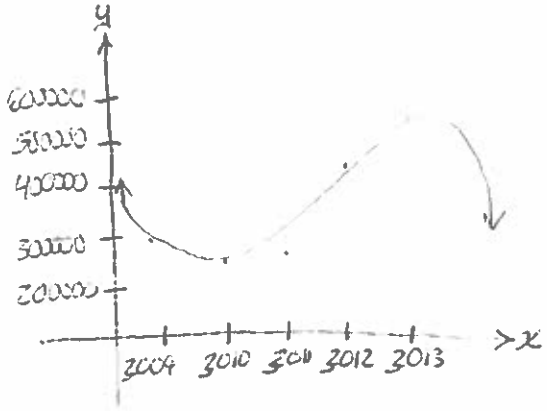
YEAR	SALES
2009	290292
2010	274555
2011	294064
2012	457480
2013	592192

$\lim_{x \to 2010} f(x) = \frac{f(2010.001) - f(2009.999)}{2010.001 - 2009.999}$

$= 30000$

$\lim_{x \to 2010^-} f(x) = f(2009.999) = 243134$

$\lim_{x \to 2010^+} f(x) = f(2010.001) = 248244$



CUBIC

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

a: -10329.16667

b: 62346920

c: -1.25442E11

d: 8.41296662E13

$y = -10329.16667x^3 + 62346920x^2 - 1.25442E11x + 8.41296662E13$

GROUP NAME: We mean business

Date: 1/29/14

Student Names (First and Last)

Speaker/Presenter: Yasmin Silveria

Writer/Prep: Simarpreet Kalra

Leader/Collaborator: Christina Trujillo

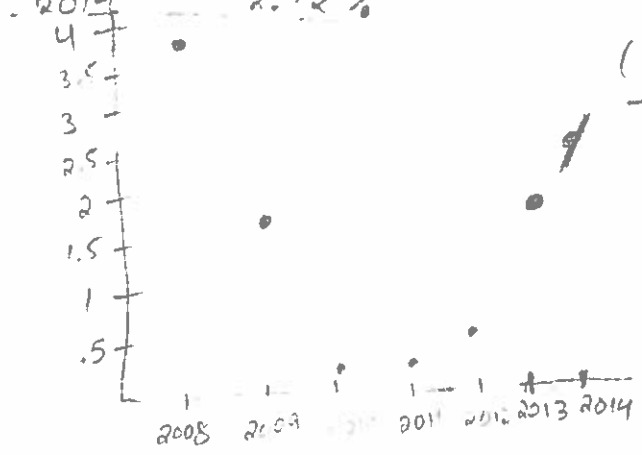
Independant Variable (x-axis): years

Dependant Variable (y-axis): interest rates of CD

Conclusion (in words): The instantaneous rate of change in 2014 is 2.739% per year

Supporting Work:

Year	Rate
2008	3.71%
2009	.53%
2010	.29%
2011	.38%
2012	.58%
2013	1.87%
2014	2.72%



To find $\frac{dy}{dx}$

'Calc

6:

$\frac{dy}{dx} = 2.739 \quad x = 2014$

$\frac{(y_1(2012) - y_1(2015))}{(2012 - 2015)} = 2.304$

$\frac{(y_1(2013.9) - y_1(2014))}{(2013.9 - 2014)} = 2.696$