TODAY:

1 Implicit Differention

Implied	Explicit
"Heads are gonna roll"	"I'm cutting your head off"

$2x = y - 1$

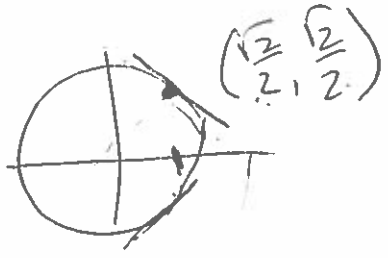
$f(x) = 2x + 1$

$f'(x) = 2$

$\frac{d}{dx}(2x) = \frac{d}{dx}(y-1)$

$2 = \frac{dy}{dx}$

Ex $y^2 + x^2 = 1$ Circle.



$\frac{d}{dx}(y^2 + x^2) = \frac{d}{dx}1$

$2y \cdot \frac{dy}{dx} + 2x = 0$

$\frac{2yy'}{2y} = \frac{-2x}{2y}$

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

$y'(x,y) = \frac{-\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = -1$

Ex $y^2 + \sin y - 2xy = 7$

$$\frac{d}{dx} y^2 + \frac{d}{dx}\sin y - 2\frac{d}{dx}(x \cdot y)$$

$$2y\frac{dy}{dx} + \cos y \cdot \frac{dy}{dx} - 2\left[x\frac{dy}{dx} + y\right] = 0$$

$$2y\frac{dy}{dx} + \cos y \frac{dy}{dx} - 2x\frac{dy}{dx} = 2y$$

$$\frac{dy}{dx}(2y + \cos y - 2x) = 2y$$

$$\frac{dy}{dx} = \frac{2y}{2y + \cos y - 2x}$$

Hyperbolic Trig Functions

Hyperbolic cosine
$\cosh(x) = \frac{e^x + e^{-x}}{2}$

Hyperbolic sine
$\sinh(x) = \frac{e^x - e^{-x}}{2}$

Hyperbolic tangent
$\tanh = \frac{e^x - e^{-x}}{e^x + e^{-x}}$

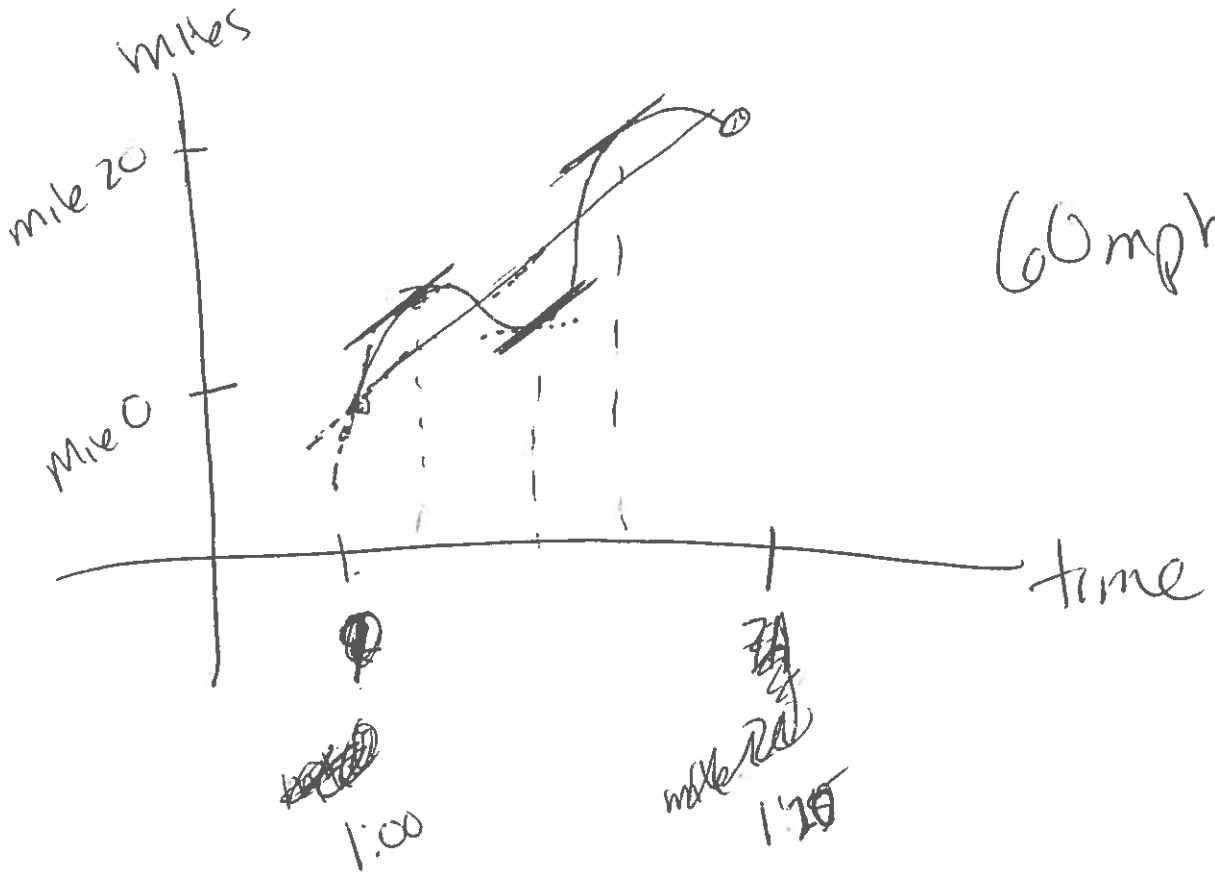
sech
csch
coth

$\frac{d}{dx}\cosh(x) = \sinh(x)$

$\frac{d}{dx}\sinh(x) = \cosh(x)$

$\frac{d}{dx}\tanh(x) = \frac{d}{dx}\frac{\sinh(x)}{\cosh(x)}$

$\cosh^2(x) - \sinh^2(x) = 1$



60mph

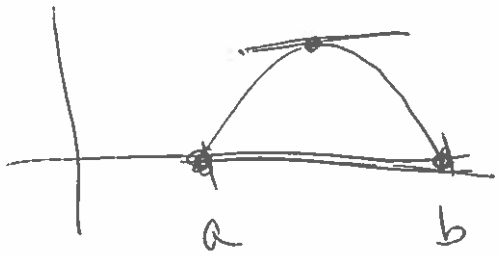
$$\text{Average Rate} = \frac{\Delta y}{\Delta x} = \frac{20 \text{ miles}}{20 \text{ min}} = \frac{1 \text{ mi}}{1 \text{ min}}$$

Mean Value Theorem

Average Rate of change (between a & b)

= instantaneous rate of change at some point on interval between a & b.

Rolles Theorem



MVT.

except $f(a) = f(b)$

$\frac{\Delta y}{\Delta x}$ $\frac{f(b)-f(a)}{b-a} = 0$

Then $a < c < b$

$f'(c) = 0$

Intermediate Value Theorem

If $f(a) \leq C \leq f(b)$

and $f(x)$ is continuous

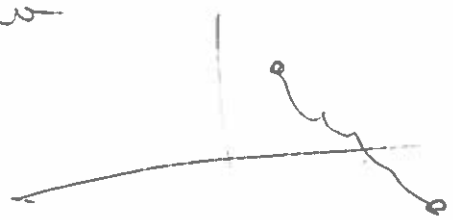
Then there is another point "d"

$f(d) = C$

If $f(x)$ is continuous

$f(a)$ is $\oplus$

$f(b)$ is $\ominus$



Then is a zero between $a \geq b$? yes by IVT.

GROUP NAME: WTF? (PRO-BABIES)

Date: 2/25

Student Names (First and Last)

Speaker/Presenter: Jenna

Writer/Prep: Kathleen

Leader/Collaborator: Cathryn

Independant Variable (x-axis): years

Dependant Variable (y-axis): steroid level in food in Babies (ppm)

Conclusion (in words):

The average rate of change is the same as the instantaneous rate of change at 2 different points. / years 2002 to 2010 is when the steroid level in food in babies is increasing at 3.68 ppm and 8.3 ppm respectively.

Supporting Work:

L_1	L_2
.01	122
3	100
6	143
9	200
12	170

Picking two x's

$x = 2$

$x = 10$

CubicReg

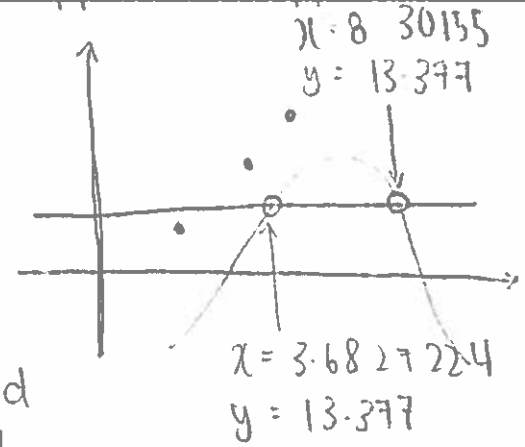
$y_1 = ax^3 + bx^2 + cx + d$

$a = -.47010357 09$

$b = 8.45077384 09$

$c = -29.739447 21$

$d = 123.01013337$



At $x = 2$, $y = 93.574$

At $x = 10$, $y = 200.59$

Ave rate of change $= \frac{200.59 - 93.574}{8} = \frac{107.016}{8}$ (y_2)

$y_3 = nDeriv(y_1, x, x)$

(1) Y_1 = regression equation.
↑ Turn This off.

(2) Calculate Average Rate of Change between a & b:

$$Y_2 = (Y_1(b) - Y_1(a))/(b-a)$$

(3) $Y_3 = nderiv(Y_1, X, X)$

(4) calc 5: Intersection
<enter> <enter> <enter>

(5) "X = $\frac{c}{\quad}$" is when the rate at "c" is equal to The average rate of Y_2 over The region b to a"

GROUP NAME: WHO

Date: 2/25/14

Student Names (First and Last)

Speaker/Presenter: Mich[illegible]

Writer/Prep: Ch[illegible]

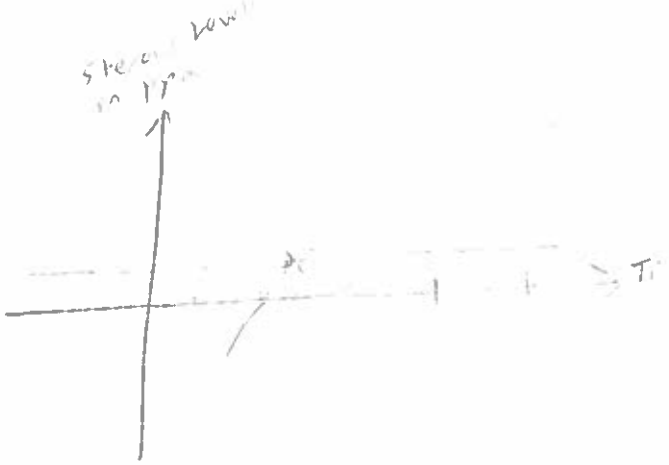
Independant Variable (x-axis): T_1

Dependant Variable (y-axis): Steady [illegible]

Leader/Collaborator: Ca[illegible]

Conclusion (in words):

Supporting Work:



GROUP NAME: The Kenkorian Team

Date: 2/25/14

Student Names (First and Last)

Speaker/Presenter: Ahmed and June

Writer/Prep: June / Ahmed

Leader/Collaborator: _____

Independant Variable (x-axis): income

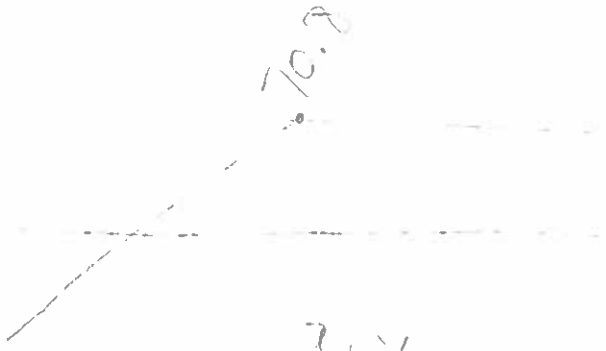
Dependant Variable (y-axis): Crime rate

Conclusion (in words):

Between 70k and [illegible] increase rate change for crime rate is .0025 which is represented at ~~70.8235~~ 70.82

Supporting Work:

$Y_1 = 4.1666\ldots E^{-1X^2}$ $1.101\ldots E^{-1X^2}$ + .0195.. + .812..



X	Y
50	.13
30	.5

$Y_2 = .0025$ [illegible]

Intersection $X = 70.82$

$Y = .0025$

GROUP NAME: Porter's minions

Date: Feb 25, 2017

Student Names (First and Last)

Speaker/Presenter: Kero

Writer/Prep: Jenn

Leader/Collaborator: Dalton

Independant Variable (x-axis): years

Dependant Variable (y-axis): price of tuition

Conclusion (in words):

$x = -17.48...$ (1983) is when the rate of ~~change~~ -17.48 is equal to the average rate of 32.125 over the region b6a

Supporting Work:

$y_1 = 2818.288... * 1.014... \wedge x$ (exponential)

$y_2 = (y_1(-15) - y_1(-20))/(-15 - -20)$

$y_3 = nDeriv(y_1, x, x)$

average rate of change = 32.125

$x = -17.48...$
$y = 32.125$ } intersection

GROUP NAME: Porters minions

Date: 2/25/14

Student Names (First and Last)

Speaker/Presenter: Jason

Writer/Prep: Daniella

Leader/Collaborator: Dallon

Independant Variable (x-axis): years

Dependant Variable (y-axis): price of tution

Conclusion (in words): $X = 42.5$ when the rate at 42.5 is equal to the average rate of 77.86 over the region btwn.

Supporting Work:

$Y_1 = 2818.28... * 1.0148...^X$

$Y_2 = (Y_1(45) - Y_1(40))/(45-40)$

$Y_3 = nDeriv(Y_1, X, X)$

average rate of change: 77.86 $\frac{\$}{\text{per year}}$

$X = 42.5$
$Y = 77.86$ } Intersection

GROUP NAME: fluffy Ponies

Date: 2/25/14

Student Names (First and Last)

Speaker/Presenter: Milton

Writer/Prep: Courtney

Leader/Collaborator: Tyler

Independant Variable (x-axis): income

Dependant Variable (y-axis): crime rate

Conclusion (in words):
Between $20K and $60K, the average rate of change for crime rate is -.0085 which is represented at $42.177...K

Supporting Work:

$Y_1 = .3285... \sin(.0367...X + 2.3812...) + .41623...$

X	Y
20	.47
60	.13

$\frac{.47-.13}{60-20} = \frac{.34}{40} = -.0085$

$Y_2 = -.0085$

$Y_3 = nDeriv(Y_1, X, X)$

intersect: (42.177..., -.0085)