Review of Rules for Derivatives

CONSTANTS
a, b, c, π, e

variables
$x, y, z, t, w, \theta, \xi, \eta$

$\frac{d}{dx} a = 0$ $\quad \frac{d}{dx} y = \frac{dy}{dx}$

Power Rule $\frac{d}{dx} x^n = n x^{n-1}$ Ex $\frac{d}{dt} t^5 = 5t^4$

$\frac{d}{dx} ax^2 + bx + c \Rightarrow 2ax + b$

Ex $\frac{d}{dx} 5x^2 - 7x + 2x^{-3}$

$10x - 7 - 6x^{-4}$

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

Ex $(x^2 + 5x)(2x^5 - 7x)$

$(2x+5)(2x^5 - 7x) + (10x^4 - 7)(x^2 + 5x)$

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

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

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

$\frac{d}{dx} \sin x = \cos x$

$\frac{d}{dx} \cos x = -\sin x$

$\frac{d}{dx} \tan x = \sec^2 x$

$\frac{d}{dx} \sec x = \sec x \tan x$

$\frac{d}{dx}\, a \sin(bx+c) + d$

1 outside, 1 inside

Chain Rule

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

$$\| $$

$$f(g(x))$$

$$(f \circ g)'(x) \text{ or } \frac{d}{dx}(f \circ g)(x)$$

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

Ex $\frac{d}{dx}\sin(2x-3) = \cos(2x-3) \cdot \frac{d}{dx}(2x-3)$

$= \cos(2x-3) \cdot 2$

$= 2\cos(2x-3)$

Ex $\frac{d}{dx} e^{x^2} = e^{x^2} \cdot \frac{d}{dx} x^2$

$e^{x^2}(x^2) = 2x e^{x^2}$

Ex $\frac{d}{dx} \sin^2(x) = \frac{d}{dx} \sin x \cdot \sin x$

$\frac{d}{dx}(\sin(x))^2$

$2(\sin(x)) \cdot \frac{d}{dx} \sin(x)$

$2 \sin x \cdot \cos x$

Ex $\frac{d}{dx} \sin(e^{x^2})$

$\cos(e^{x^2}) \cdot \frac{d}{dx} e^{x^2}$

$\cos(e^{x^2}) e^{x^2} \cdot \frac{d}{dx} x^2$

$\cos(e^{x^2}) e^{x^2} \cdot 2x$

(Sidney [redacted], L1, L2, 10 Period

$$\frac{d}{dx} a \sin(bx + c) + d$$

$$a \cdot \cos(bx + c) \cdot \frac{d}{dx}(bx + c)$$

$$a \cos(bx + c) \cdot b$$

Lady GG losing
8.528 millio. follows
a year according
to sin regressi

PROF. PORTER MATH CLASSWORK S14

GROUP NAME: [illegible] Date: 2-18-14	Student Names (First and Last) Speaker/Presenter: Kai[illegible] Writer/Prep: [illegible] Leader/Collaborator: Cathryn
Independant Variable (x-axis): Dependant Variable (y-axis):	

Conclusion (in words):
2016 the rate of steroids in food in babies is increasing continuously at a 12.749 parts per year which is awful? The [illegible] are killing babies and won't stop!

Supporting Work:

Y1

Sin reg 4, [illegible] 12

[illegible]

50.07277508

0.5235987756

3.1[illegible]98

14[illegible].8[illegible]

derivative

[illegible] (bx + c) • b

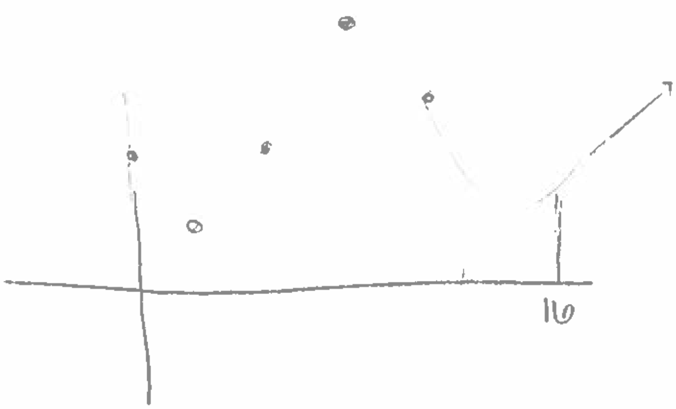
Y2

50.07277508 cos

(0.5235987756 x + 3.1258[illegible])

• (0.5235987756)

[illegible]	
.01	100
2	100
6	14[illegible]
11	200
16	[illegible]



2016/16 = [illegible].14 12.74[illegible]

* In the future [illegible] getting [illegible]

* [illegible]

We [illegible] stop them!

GROUP NAME: W [illegible]

Date: 2/1[illegible]

Independant Variable (x-axis): Time in [illegible]

Dependant Variable (y-axis): Ste[illegible] Levels [illegible]

Student Names (First and Last)

Speaker/Presenter: Michael

Writer/Prep: Charles

Leader/Collaborator: C[illegible]

Conclusion (in words):
In the [illegible] 2016 the ste[illegible] level will be d[illegible] 6.4 [illegible]

Supporting Work:

SinReg 1, L1, L2, 12

y = a * sin(bx + c) + d

a = 26.47[illegible]

b = 0.57[illegible]

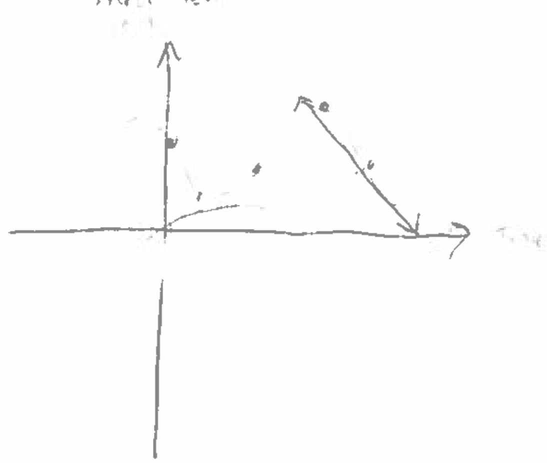
[illegible]

d = 141.6[illegible]

Derivative

a cos(bx + c) [illegible]

50.0777[illegible] * cos(0.573[illegible]56983x + 3.125[illegible]) * (0.5735[illegible])



Data

L1	L2
0	12[illegible]
3	10[illegible]
6	14[illegible]
9	20[illegible]
12	[illegible]

Table

X	Y1	Y2
16	[illegible]	-6.4

GROUP NAME:

Date: 2/18

Student Names (First and Last)

Speaker/Presenter: Jason

Writer/Prep: Dallen

Leader/Collaborator: Daniella

Independant Variable (x-axis): Years

Dependant Variable (y-axis): Money

Conclusion (in words):
In 2015 tuition rates for international students is increasing by $43.49 per year.

Supporting Work:

$\frac{d}{dx}\ a\sin(bx+c)+d$

$\frac{d}{dx}\ 144.818\sin(.628x+-2.069\ldots)+3433043$

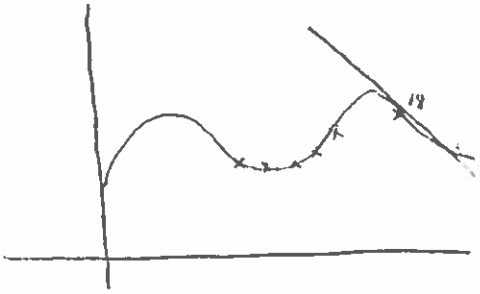
$144.818\cos(.628\ldots x+-2.069\ldots)*(.628\ldots)$

GROUP NAME: Porter's Minions Date: Feb 18, 2014	Student Names (First and Last) Speaker/Presenter: Kevo
Independant Variable (x-axis): years Dependant Variable (y-axis): amount international students pay	Writer/Prep: Jenn Leader/Collaborator: Daniella

Conclusion (in words): Pro

According to the sin regression in 2018, international students will pay $- 85 45 dollars less than in 2017

Supporting Work:



$\frac{d}{dx}$ $a \sin(bx + c) + d$

$\frac{d}{dx}$ $144.818 \sin(.628x + -2.069...) + 3433.043$

$144.818 \cos(.628...x + -2.069...) * (.628...)$

GROUP NAME: Fluffy Ponies

Date: 2/18/14

Student Names (First and Last)

Speaker/Presenter: Milton

Writer/Prep: Courtney

Leader/Collaborator: Tyler

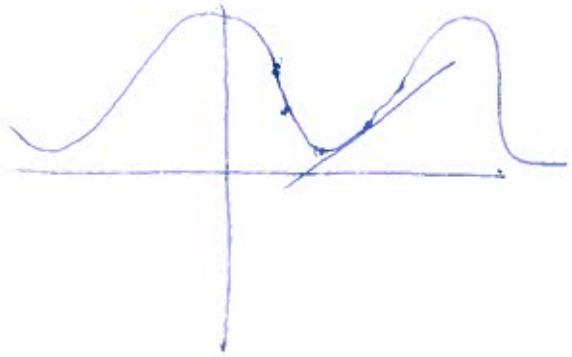
Independant Variable (x-axis): Income

Dependant Variable (y-axis): crime rate

Conclusion (in words):

At $70K, the chance of committing a crime is increasing by .288% per thousand dollars per year.

Supporting Work:



$$\frac{dI}{dx} = .3285\ldots \sin(.03615\ldots x + 2.3812\ldots) + .4623\ldots$$

$$= .3285\ldots \cos(.03615x + 2.3812) * .03615\ldots$$

70 | .00284414

GROUP NAME: [illegible]

Date: _____

Student Names (First and Last)

Speaker/Presenter: Ahmed and June

Writer/Prep: June and Ahmed

Leader/Collaborator: _____

Independant Variable (x-axis): Income

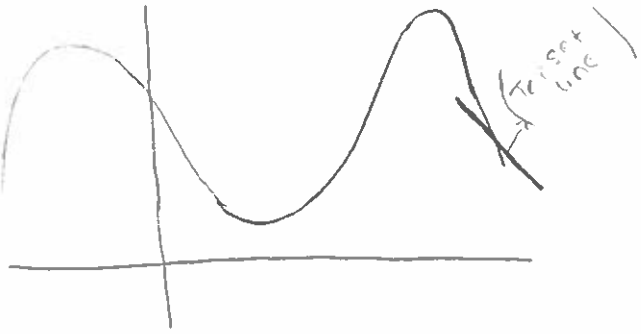
Dependant Variable (y-axis): Crime rate

Conclusion (in words):

At [illegible] the rate (meaning crime goes down by)

-1.15% per thousands Per Year

Supporting Work:



$y = a * \sin(bx + c) + d$

$a = .328509[illegible]$

$b = .0361483297$

$c = 2.3[illegible]$

$d = .4162[illegible]$

$dy/dx = -.0[illegible]$

$y = .328...*\sin(.0367...x + 2.3...) + d$

$\frac{dy}{dx} = .328...*\cos(.036?...x + 2.3...)*.0367...$