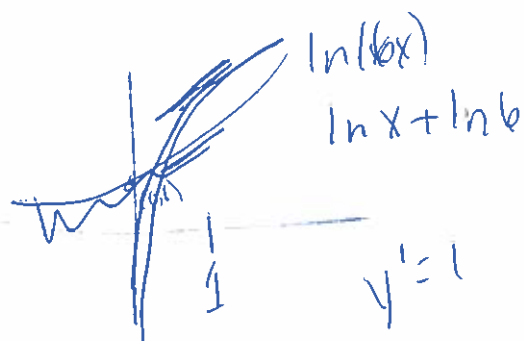
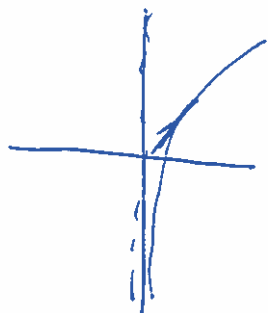
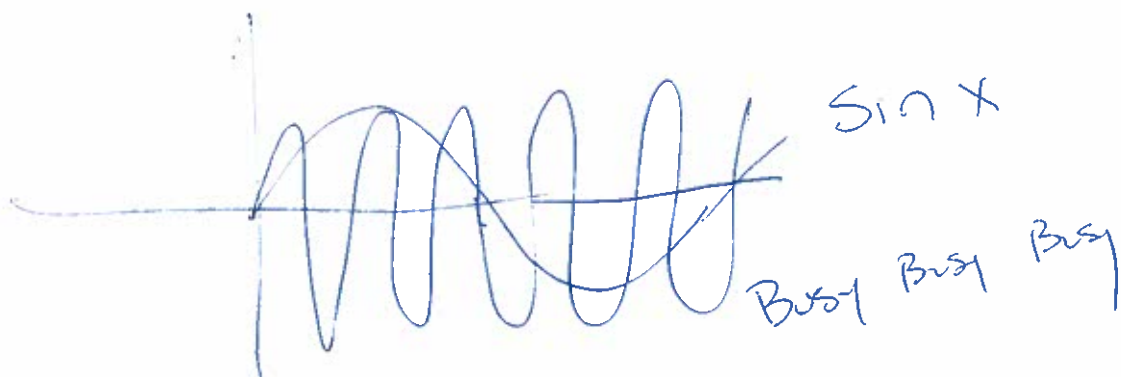


$$\sin(bx)$$



$$y' = 1$$

Newton's Method  
- for finding Zeros

$$f(x) = A \neq B = 0$$

$$A = B.$$

$$Y = A \sin(Bx + C) + D$$

$$X = \frac{\sin^{-1}\left(\frac{Y-D}{A}\right) - C}{B}$$

Year	Lodging
x	y

$$Y_1 = \left( \sin^{-1}\left(\frac{Y-D}{A}\right) - C \right) / B$$

$$Y_2 = \text{ndenv}(Y_1, X, Y)$$

$$\frac{d}{dx} \sin^{-1}(x) = \frac{1}{\sqrt{1-x^2}}$$

# Logarithmic Differentiation

Ex  $y = (\cos x)^x$  ~~\*~~

(log of both sides)  
 $\ln y = \ln (\cos(x))^x$   
("ladder" property)

$$\ln y = x \ln (\cos(x))$$

Implicit Differentiation

$$\frac{d}{dx} \ln y = \frac{d}{dx} [x \cdot \ln(\cos(x))]$$

chain rule                      product.

$$\frac{1}{y} \cdot \frac{dy}{dx} = x \cdot \frac{d}{dx} \ln(\cos x) + \ln(\cos(x)) \quad (1)$$

chain rule

$$\frac{1}{y} \frac{dy}{dx} = x \frac{1}{\cos(x)} \frac{d}{dx} (\cos x) + \ln(\cos x)$$

trig id.

$$\frac{1}{y} \frac{dy}{dx} = -x \tan x + \ln(\cos(x))$$

Algebra

$$\frac{dy}{dx} = y [-x \tan x + \ln(\cos x)]$$

substit

$$= (\cos x)^x [-x \tan x + \ln(\cos x)]$$

Ex  $y = X^x$   $y = X^{x^x}$

$$y = f(x)^{g(x)}$$

$$y = e^x$$

$$x = \ln y$$

$$1 = \frac{1}{y} \frac{dy}{dx}$$

$$e^x = y = \frac{dy}{dx}$$

Log, is ① Log of Both sides  
② Differentiate.

Ex Side Note  $\frac{d}{dx} \ln(bx) = \frac{1}{bx} \cdot b = \frac{1}{x}$

$$\ln(bx) = \ln b + \ln x$$

$$\frac{d}{dx} \ln(bx) = \frac{d}{dx} \ln b + \frac{d}{dx} \ln x$$

①

GROUP NAME: <u>Squirgylas '91' US</u> Date: _____	Student Names (First and Last) _____ Speaker/Presenter: <u>Misha</u>
Independant Variable (x-axis): <u>hours alcohol</u>	Writer/Prep: <u>Kevin I</u>
Dependant Variable (y-axis): <u>alcohol consumption hrs</u>	Leader/Collaborator: <u>Kevin V</u> Trainer: _____
Conclusion (in words): At $x=3$ , <span style="margin-left: 150px;">90 l.</span> <span style="margin-left: 150px;">.02 hrs/l alcohol</span>	

Supporting Work:

1	30
2	65
3	90
4	100
5	110

Sin Reg

$$98.10 \sin(.364x - 1.698) + 101.03$$

$$a = 98.102$$

$$b = .364$$

$$c = -1.698$$

$$d = 101.03$$

GROUP NAME: I ♥ shoes

Date: 3/04/14

Independent Variable (x-axis): shoes

Dependant Variable (y-axis): Salary K.

Student Names (First and Last)

Speaker/Presenter: Valsinclair

Writer/Prep: Dominique C.

Leader/Collaborator: \_\_\_\_\_

Conclusion (in words):

at 50 ~~K~~ <sup>shoes</sup> we are losing ~~1.578~~ <sup>gain</sup> ~~04617~~ <sup>1.578</sup> ~~× 1000 \$~~ / shoe <sup>pairs</sup>

Supporting Work:

Sin Reg.

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

$$a = 29.88831427$$

$$b = .7647909723$$

$$c = 1.63890274$$

$$d = 37.48460528$$

x	y
3	17
6	28
7	39
9	41
10	59
14	70

$$y_1 = (\sin^{-1}((x-d)/a) - c) / B$$

Guess 50 K - -1.578

GROUP NAME: Science  
 Date: 4 MAR 14  
 Independent Variable (x-axis): Time (hrs) PPM  
 Dependant Variable (y-axis): Drug Concentration (PPM)

Student Names (First and Last)  
 Speaker/Presenter: Coleen H. 2011  
 Writer/Prep: Lindy Labing  
 Leader/Collaborator: \_\_\_\_\_

Conclusion (in words): At  $x = 77$  PPM the rate is  $.00379$  ~~PPM/PPM~~  $\frac{PPM}{PPM}$   $\frac{HF}{PPM}$

Supporting Work:

Time (hrs)	Drug Concentration (PPM)
0	100
1	85
2	60
3	55
4	20
5	15

Sin Reg  
 $39 * \sin(7.0x + 1.97) + 65.6$

GROUP NAME: Rusty Ass holes

Student Names (First and Last)

Date: \_\_\_\_\_

Speaker/Presenter: Greg McAvey

Independent Variable (x-axis): years ~~lbs~~ ~~1000~~

Writer/Prep: Keith Meseroll

Dependant Variable (y-axis): lbs / thousands ~~lbs~~ ~~1000~~

Leader/Collaborator: Harrison

Conclusion (in words): At  $x=40$ , it decreases  $2.033$  ~~lbs~~ ~~1000~~ ~~lbs~~ ~~1000~~

Supporting Work:

X	Y
3	17
6	28
7	39
9	41
10	59
14	70

~~lbs~~ ~~1000~~

$$y = 29.88831427 \cdot \sin(0.7647909723x + 1.63890276) + 37.48460528$$

$$y = (\sin^{-1}((x - 37.48460528) / 29.88831427 - 1.63890276)) \div 0.7647909723$$

$$\frac{dy}{dx} = \frac{1}{\sqrt{1 - ((x - 37.4860528) / 29.88831427)^2}} \cdot 29.88831427 \cdot 0.7647909723$$

$$\frac{dy}{dx} (\sin^{-1}((x-d)/a) - c) / B$$

$$\frac{1}{\sqrt{1 - ((x-d)/a)^2}} \cdot \frac{1}{a} \cdot \frac{1}{B}$$



GROUP NAME: E1 Business

Student Names (First and Last)

Date: 3/4/14

Speaker/Presenter: Ryan

Independent Variable (x-axis): World cups goals

Writer/Prep: Brittany

Dependant Variable (y-axis): goals scored

Leader/Collaborator: Andy

Conclusion (in words): <sup>At the time that we reach</sup> 460 goals are scored, we're progressing 0.002 World cups as each goal is scored.

Supporting Work:

y stat calc sinreg @ 1, L1, L2, 2.2

$$y = (4.808 \sin(2.856x + 1.599) + 39.096)$$

2nd sin      vars 5 >>

$$y' = \cos^{-1}((x-d)/a) - c/b$$

X	Y
1	35
2	39
3	31
4	45
5	43