

L'Hopital's Rule (Finding Limits)

$$\text{IF } \lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \frac{0}{0} \text{ or } \frac{\infty}{\infty}$$

$$\text{Then } \lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$$

$$\text{Ex } \lim_{x \rightarrow 0} \frac{\sin(x)}{x} = \frac{\sin(0)}{0} = \frac{0}{0} \text{ use } \textcircled{\text{L'H\ddot{O}R}}$$

$$= \lim_{x \rightarrow 0} \frac{\cos(x)}{1} = \frac{\cos(0)}{1} = 1$$

$$\lim_{x \rightarrow \infty} \frac{4x^2 - 5x + 10}{x^2 + 7x + 10} = \frac{\infty}{\infty} \text{ use } \textcircled{\text{L'H\ddot{O}R}}$$

$$\lim_{x \rightarrow \infty} \frac{8x - 5}{2x + 7} = \frac{\infty}{\infty} \text{ use } \textcircled{\text{L'H\ddot{O}R}}$$
$$= \lim_{x \rightarrow \infty} \frac{8}{2} = 4$$

$$\underline{\infty} \cdot \underline{0} = \infty \cdot \frac{40}{\infty} = \frac{8}{8}$$

$$\text{Ex } \lim_{x \rightarrow \infty} x \cdot e^{-x} = \infty \cdot 0$$

$$\lim_{x \rightarrow \infty} \frac{x}{e^x} = \frac{\infty}{\infty} \text{ use L'H.R.}$$

$$\lim_{x \rightarrow \infty} \frac{1}{e^x} - \frac{1}{\infty} = 0$$

$$\boxed{\frac{\infty}{\infty} \quad \frac{0}{0} \quad 0 \cdot \infty \quad \frac{\infty}{\infty}}$$

$$\text{Ex } \lim_{x \rightarrow \infty} \left(1 + \frac{R}{x}\right)^x \quad R = \neq 1$$

$$\begin{aligned} \text{Ex } &= e^{\ln \left(1 + \frac{R}{x}\right)^x} \\ &= \lim_{x \rightarrow \infty} \ln \left(1 + \frac{R}{x}\right)^x = e \\ &= \lim_{x \rightarrow \infty} \ln \left(1 + \frac{R}{x}\right)^x \quad \text{Property of Logs} \\ &= \lim_{x \rightarrow \infty} x \cdot \ln \left(1 + \frac{R}{x}\right) \\ &= \lim_{x \rightarrow \infty} \frac{\ln \left(1 + \frac{R}{x}\right)}{\frac{1}{x}} \quad \text{L'H.R.} \\ &= \lim_{x \rightarrow \infty} \frac{\frac{1}{1 + \frac{R}{x}} \cdot \frac{-R}{x^2}}{\frac{-1}{x^2}} \quad \text{Chain Rule} \\ &= e^R \end{aligned}$$

$$\lim_{x \rightarrow \infty} \sqrt{1+x^2} - x = \infty - \infty$$

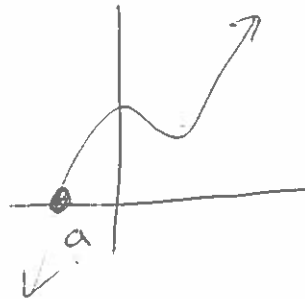
$$\lim_{x \rightarrow \infty} \frac{\sqrt{1+x^2} - x}{1} \cdot \frac{\sqrt{1+x^2} + x}{\sqrt{1+x^2} + x} \quad \frac{\sqrt{1+x^2} - x}{\sqrt{1+x^2} + x}$$

$$\lim_{x \rightarrow \infty} \frac{1}{\sqrt{1+x^2} + x} = \frac{1}{\infty} = 0$$

1. Do Cubic Regression

$Y_1 = \text{cubic Regression}$

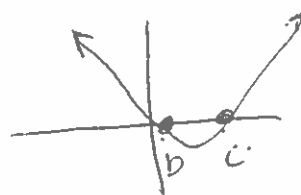
Find Zeros



2.

$Y_2 = \text{nderiv.}(Y_1, X, X)$

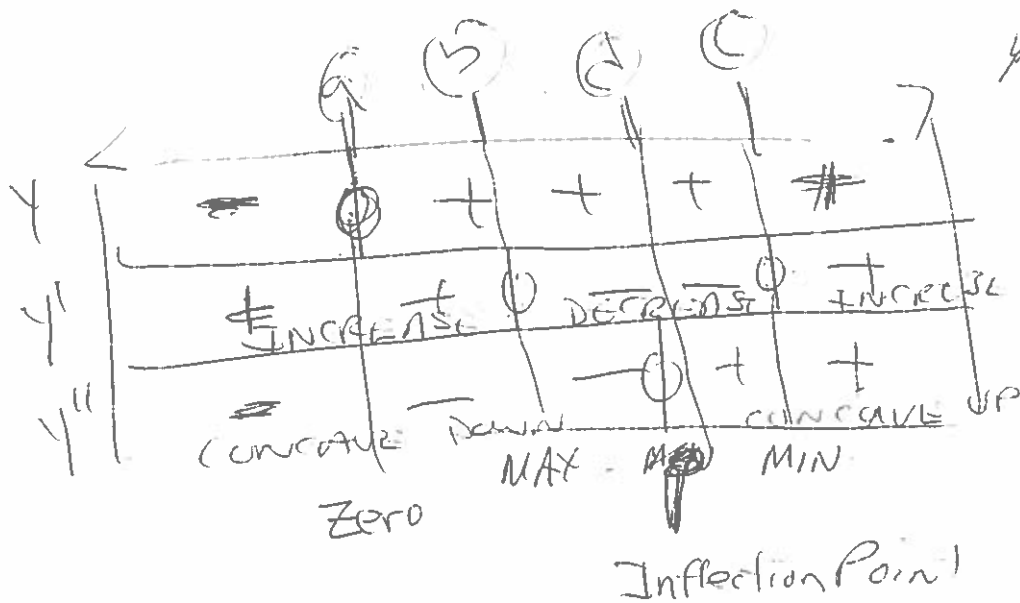
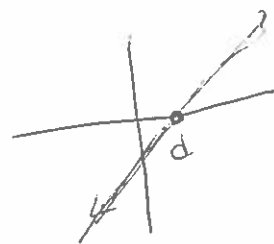
Find Zeros



3

$Y_3 = \text{nderiv.}(Y_2, X, X)$

Find Zeros



GROUP NAME: The 1000's	Student Names (First and Last)
Logo:	Speaker/Presenter: I Plow Summit
Date: _____	Writer/Prep: P. E. J.
Topics:	QC/Leader: _____

Instructions: finding zeros for y^1, y^2, y^3

quadratic

$y^2 = 2x$
A 2x

$y^2 = 2x$
B 2x
C 170.3

$y^2 = 2x$
170.3

A	B	C	D	E	F
1	1	+	1	+	0
1	0	+	0	-	1
1	+	1	+	1	1

Increasing of ... 2014

<p>GROUP NAME: _____</p> <p>Logo: _____</p>	<p>Student Names (First and Last) _____</p> <p>Speaker/Presenter: <u>DC</u></p>
<p>Date: <u>12/12</u></p> <p>Topics: _____</p>	<p>Writer/Prep: <u>Quincy</u></p> <p>QC/Leader: <u>Jarrel</u></p>

Instructions: DO SOME COG !!!

	A	D	B	F	E	C
Y_1	+ ⊙ -	- ⊙ +	+	+	+	⊙ -
Y_2	-	- ⊙ +	+	+	⊙ -	-
Y_3	+	+	+	+	⊙ -	-

decreasing core up in the year 2013.

<p>GROUP NAME: <u>10 of 1000</u></p> <p>Logo:</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Dani</u> ✓</p>
<p>Date: <u>10/19/19</u></p> <p>Topics:</p>	<p>Writer/Prep: <u>Micala</u> ✓</p> <p>QC/Leader: _____ + Raul</p>

Instructions:

How to find
the area of a
rectangle



How to find
the area of a
triangle



How to find
the area of a
circle



In the year 2012, the
number of extinct species is
increasing and concern up

GROUP NAME: IRISH MATH BOMBS

Logo:



Student Names (First and Last)

Speaker/Presenter: Bobby O'Conner ✓

Date: _____

Writer/Prep: Conner Krusman ✓

Topics:

QC/Leader: Billie Douglas Smith ✓

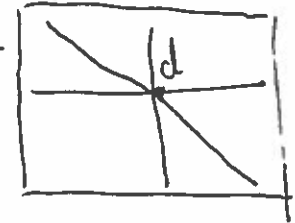
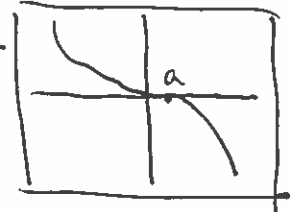
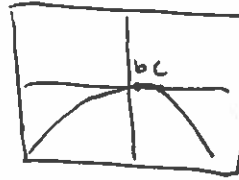
Instructions:

Cubic Regression: y (zeros), y' (zeros), y'' (zeros)

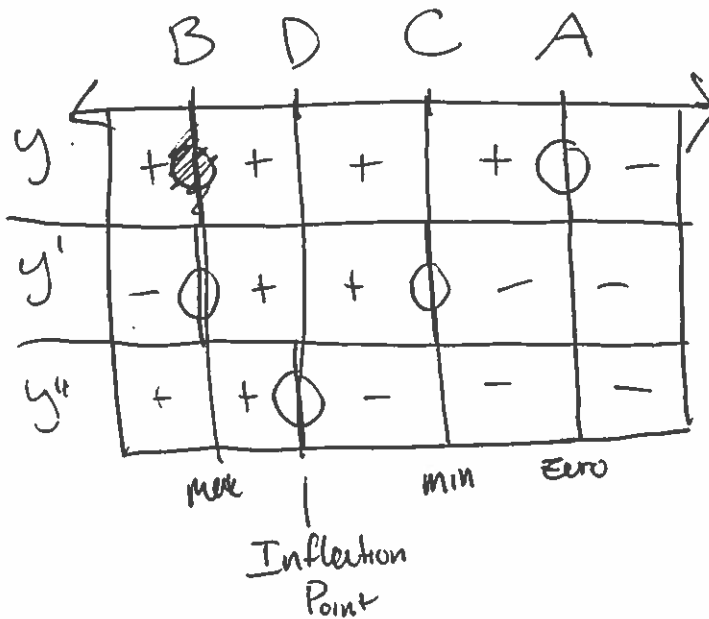
y (zeros): $x = 21.5$

y' (zeros): $x = \{1.23, 12.77\}$

y'' (zeros): $x = 6.99$



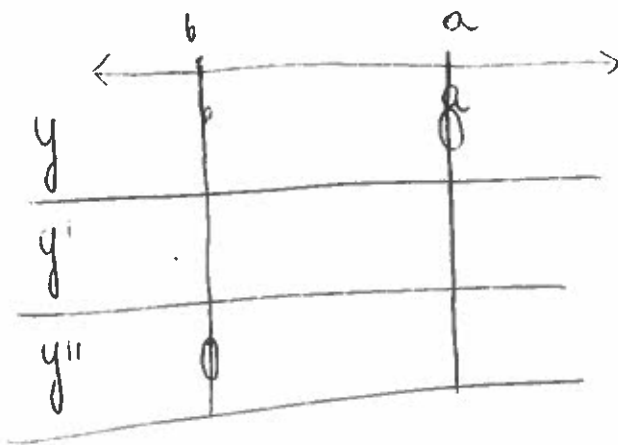
Number Line:




- A = 21.5
- B = 1.23
- C = 12.77
- D = 6.99

<p>GROUP NAME:</p> <p>Logo:</p>	<p>Student Names (First and Last)</p> <p>Speaker/Presenter: <u>Steven H</u></p>
<p>Date: _____</p> <p>Topics:</p>	<p>Writer/Prep: _____</p> <p>QC/Leader: _____</p>

Instructions:



$a = 6.7303236$
 $b = 2.2142857$

GROUP NAME: <u>athletes</u> Logo:  Date: _____ Topics: _____	Student Names (First and Last) Speaker/Presenter: <u>Aidan C</u> ✓ Writer/Prep: <u>Logan A</u> ✓ QC/Leader: <u>Logan / Aidan</u>
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Instructions:

finding zero in the derivatives

		x_1	x_2	x_3
$f(x)$	y_1	-1,125	2,523	12,75
$f'(x)$	y_2	.559	8,67	/
$f''(x)$	y_3	4,614	/	/

		d	f	e	c		
$f(x) y_1$	+	0	-	0	+	+	+
	-	-	0	+	+	0	-
	+	+	+	0	-	-	

In 2013 maintenance costs are -10,25
 since the car was sold in June 2012

GROUP NAME: <u>CSC</u>	Student Names (First and Last)
Logo:	Speaker/Presenter: <u>Corneal</u>
Date: <u>10/16/13</u>	Writer/Prep: <u>Courtney</u>
Topics:	QC/Leader: <u>Stephen</u>

Instructions: finding cubic | APPLE
 $y_1 \rightarrow y_3$ and zeros | STOCK
PRICES

1. Cubic Regression

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

$$a = -8.58883$$

$$b = 265.410$$

$$c = -2614.6707$$

$$d = 8511.7364$$

zero @ 15.05
 STOCK

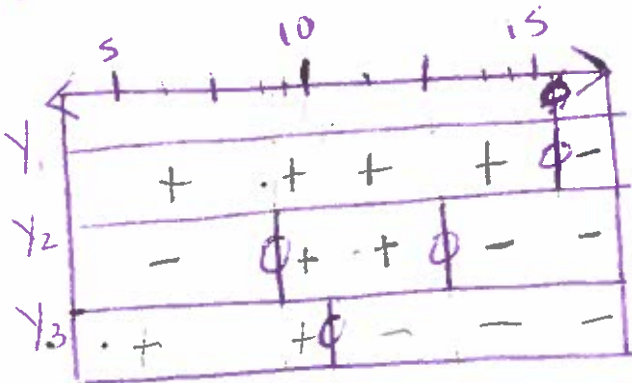


$$y_1 = -8.58x^3 + 265.41x^2 - 2614.67x + 8511.73$$

zero @ 8.15, 12.45

$$y_2 = nDeriv(y_1, x, x) \leftarrow \text{zero @ } 10.30$$

$$y_3 = nDeriv(y_2, x, x)$$



GROUP NAME: Time Is Money



Logo:

Student Names (First and Last)

Speaker/Presenter: Angelika Mazurek

Writer/Prep: Shyam Singh (Shiv)

QC/Leader: Eugenio Pelaez

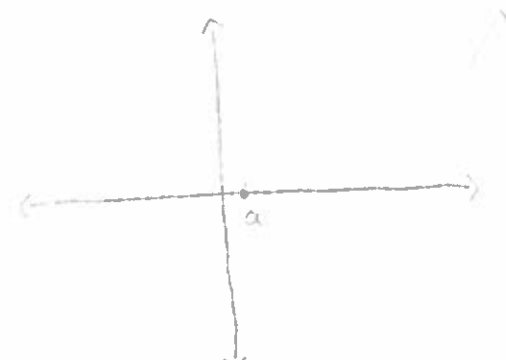
Date: 10/16/13

Topics:

Instructions:

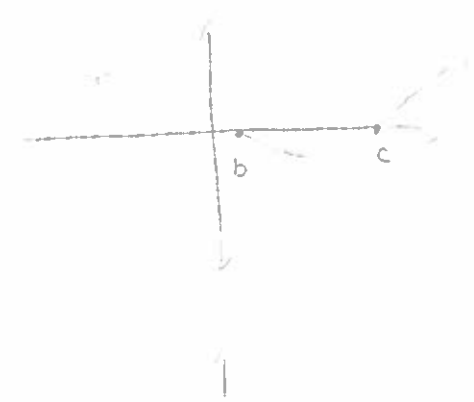
iPhone 4S Sales [?]

① [STAT] [CALC]
 6: Cubic Reg <enter>
 Y1 = [Vars] : [Statistical]
 (2) -> [Cubic Reg]



<GRAPH>

[2nd] [Calc] 2 zero
 (a) $x = -0.43978756$



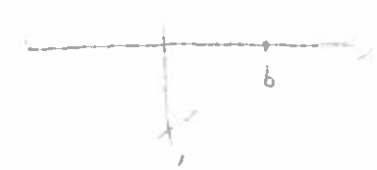
② $Y_2 = \text{nderiv}(Y_1, x, x)$
 <GRAPH>

[2nd] Calc 2 zero

(b) $x = 1.9475871$

[2nd] Calc 2 zero

(c) $x = 4.1319582$



③ $Y_3 = \text{nderiv}(Y_2, x, x)$

[2nd] Calc 2 zero

(d) $x = 3.0397728$

	(a)	(b)	(c)	(d)	(e)
Y	-	+	+	+	+
Y'	+	+	0	-	-
Y''	-	-	-	0	+

iPhone 4S sales are positive, they are also increasing and (a) comes down.