

1. Roughly plot data and regression. Label Axis.

Regression used:	
First x (a)	
Last x (b)	

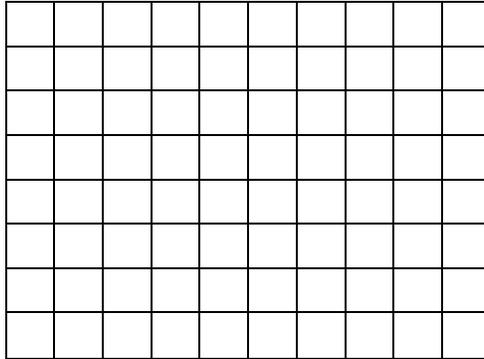
Find the average rate of change between the first and last x-values using regression

$\{Y1(b)-Y1(a)\}/\{b - a\}$	Average Rate of Change	
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2. Roughly split the graph into two regions and perform different regressions on each side.
Plot data and regressions. Label Axis.

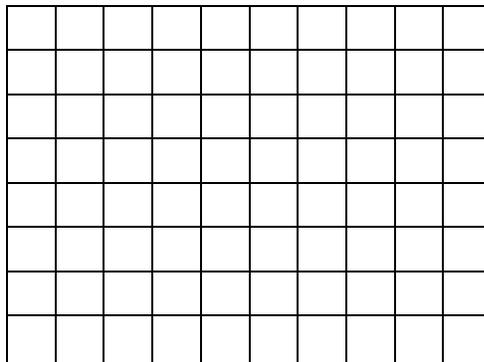
left regression split at a $Y1 = \text{vars } 5: >> 1: \text{RegEq } / (x \leq a)$ right regression $Y2 = \text{vars } 5: >> 1: \text{RegEq } / (x \geq a)$	Left Regression used:	
	Right Regression used:	
	Location of split (a)	
Find $Y1(a)$ $Y2(a)$	$\lim_{x \rightarrow a^-} r(x)$	
	$\lim_{x \rightarrow a^+} r(x)$	

3. Roughly split the graph into two regions and perform different regressions on each side.
Plot data and regressions. Label Axis.



left regression split at a Y1=vars 5: >> 1: RegEq /(x≤a)	Left Regression used:	
	Right Regression used:	
right regression Y2=vars 5: >> 1: RegEq /(x≥a)	$\lim_{x \rightarrow -\infty} r(x)$	
	$\lim_{x \rightarrow +\infty} r(x)$	
Find Y1(-9999) Y2(9999)		

4. For a continuous regression: Given $\epsilon =$ small number Find $\delta > 0$ that satisfies
Roughly adjust the regressions so the graph is continuous.
Plot data and graph the regressions. Label Axis.



a=

a=split location

Y1=regression 1 /(x ≤ a) Y2=2nd regression /(x ≥ a)+adjust for continuity _____ Y3 = L - ϵ (.01) _____ Y4 = L + ϵ (.01) _____ Calc 5:intersect y1 and y3(or4) = x1 _____ Calc 5:intersect y2 and y4(or3) = x2 _____ $\delta = \text{minimum}(a-x1 , a-x2)$	$\lim_{x \rightarrow a} r(x) = L$	
	Given $\epsilon =$	(.01 as default)
	Find $\delta =$	

7. Find the derivatives of different regressions using rules at $x = x_1$

Exponential $y_6 = a \cdot b^x$	$y' = a \cdot b^x \cdot \ln(b)$	$y'(x_1) =$
Ln Regression $y_7 = a \ln x + b$	$y' = a/x$	$y'(x_1) =$

Compare to $y_8 = \text{nderv}(y_6, x, x)$ at $x = x_2, x_3, x_4$

$x_2 =$	$y_8'(x_2) =$
$x_3 =$	$y_8'(x_3) =$
$x_4 =$	$y_8'(x_4) =$

8. Find the second derivatives of different regressions using rules at $x = x_1$

Linear Regression $y_1 = ax + b$	$y'' = 0$	$y''(x_1) =$
Quadratic Regression $y_2 = ax^2 + bx + c$	$y'' = 2a$	$y''(x_1) =$
Cubic Regression $y_3 = ax^3 + bx^2 + cx + d$	$y'' = 6ax + 2b$	$y''(x_1) =$
Quartic Regression $y_4 = ax^4 + bx^3 + cx^2 + dx + e$	$y'' = 12ax^2 + 6bx + 2c$	$y''(x_1) =$

$x_2 =$	$y_4''(x_2) =$
$x_3 =$	$y_4''(x_3) =$
$x_4 =$	$y_4''(x_4) =$

9. Make a transformation of your x-values and your y-values

New x-values (units)	Old x-values (units)	$Y_1 =$
Old x-values (units)	Old y-values (units)	$Y_2(\text{regression}) =$
Old y-values (units)	New y-values (units)	$Y_3 =$

Example: cm to inches $y_1 = x/2.54$ Inches to lbs $y_2 = \ln \text{reg}$ Lbs to kg $y_3 = x/2.2$ $Y_4'(A) =$ $\text{nderv}(y_3, x, (\text{y}_2, x, (\text{y}_1, x, A))) * \text{nderv}(y_2, x, (\text{y}_1, x, A)) * \text{nderv}(y_1, x, A)$	Regression used:	
	New x-value(A)	
	$Y_4'(A)$	
	units	

10. Find the derivatives of sine regression using rules at $x = x_1$

Sine Regression $y_2 = a \sin(bx+c)+d$	$y' = a \cos(bx+c) * b$	$y'(x_1) =$
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Find the second derivatives of sine regression using rules at $x = x_1$

Sine Regression $y_2 = a \sin(bx+c)+d$	$y'' = -a \sin(bx+c) * b^2$	$y''(x_1) =$
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11. Use the mean value theorem on the two end points OF a regression and identify a point on the graph with a similar slope?

$Y_1 = \text{regEq}$ $Y_2 = \text{nderiv}(y_1, x, x)$ $Y_3 = \text{"average rate of change"}$ Calc 5:intersect	Regression used:	
	Ave Rate of change:	
	Point(s) of intersection:	

12. Was the zero found by using Newton's Method for by using $x=0$ or $x=1$ as an initial guess?

$Y_1 = \text{cubicregression}$
 $0 \text{ sto } x$
 $x - y_1 / \text{nderiv}(y_1, x, x) \text{ sto } x$

iteration _____

iteration _____

iteration _____

zero: _____

13. Error: Find the error in your x-values: (.5 times last Significant figure: _____ dx

What regression used: _____

$y_1 =$ regression equation (

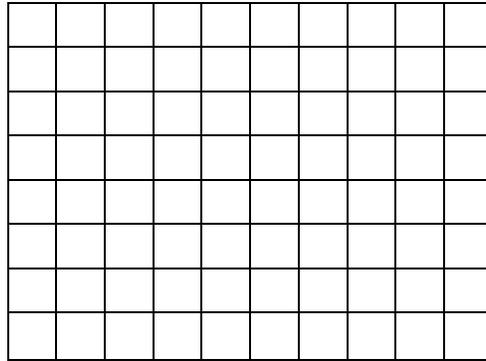
$y_2 = \text{nderiv}(y_1, x, x) * dx$

$y_3 = y_2 / y_1 * 100$

$a =$ _____ value

At a , the value is $y_1(a)$, error is $y_2(a)$ with percent error $y_3(a)$

14 Graph the cubic or quartic regression, identify all critical points, concavity, and inflection points.



X:									
Y'									
Increasing or Decreasing									
Y''									
Concavity? Up or Down									

15.

Find $y'=0$ to identify critical values a_1, a_2

Critical Points	
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Find $y''(a_1)$ and $y''(a_2)$ to determine max/min

Y'' at critical Points	
Max or Min	

16. Find $y''=0$ to identify inflection points Did the student take the second derivative and identify concavity for the zero of the cubic regression? $Y''=0$ at $-b/(6a)$: _____

Inflection Points	
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17. Was the area under the best regression and between the first and last values found using calculator?

Calc 7: lower _____ Upper: _____

Regression $f(x)$: _____

Calc 7: $\int f(x)dx =$ _____

18. Were the units identified for the area under the curve?

Units (y) * Units (x) = _____

Was the average value given?

Area (from 15) divided by (last x-first x): _____

19. Was the area under the best regression and between the first and last values approximated using left and right endpoint rectangles?

X:									
Y:									

Sum of 8 or so rectangles left endpoints: _____

Sum(seq(y1,x,lower, upper - Δx, Δx))* Δx

20. Find A(n) for the linear regression.

Find the exact area by finding the limit as n goes to infinity

ANSWER: _____

21. Given the quartic or cubic regression, use the fundamental theorem of calculus to find the area under the curve from a to b.

Y1 = ∫ regression(x) dx

Y2 = regression (x)

Evaluate y1(b) - y1(a): _____

Compare to calc7: ∫ f(x) dx

lower limit a

upper limit b

∫ f(x) dx = _____