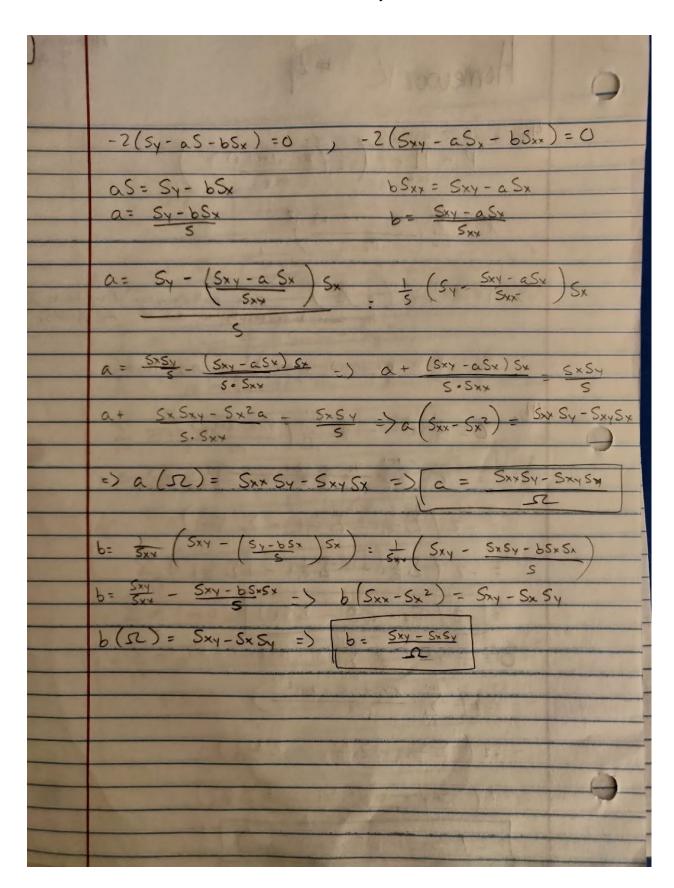
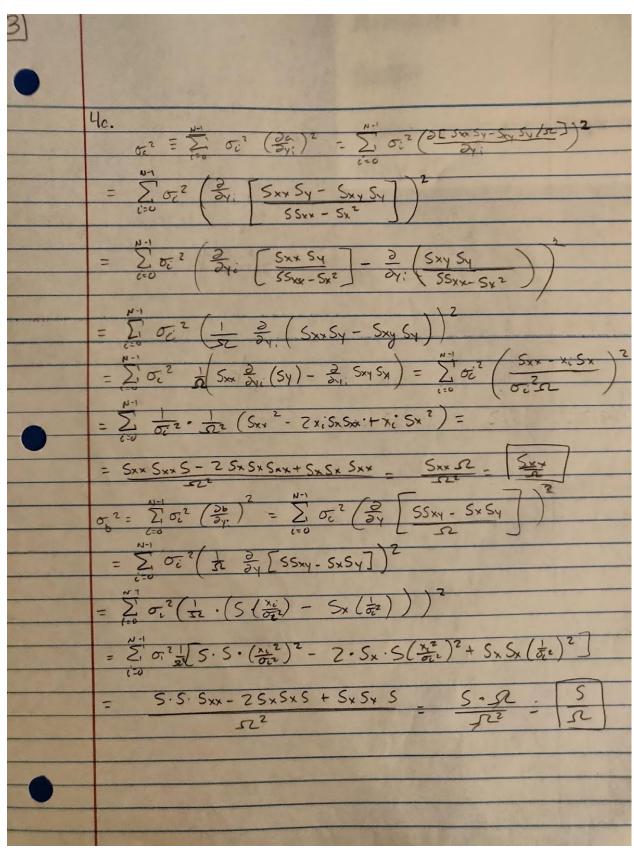
	Himaan
	Sethi
Homeworl2 #4	
11011600110	
4a. P = T exp (- 1/2 (yi- y(x:a,b))2)	
P & exp (- = (11) (1))	
$\chi^2 = \sum_{i=0}^{n-1} \left(v_{i-1} \cdot v_i(x; i, i) \right)^2$	
100 (00)	
	0 1
=> P & exp (- 2 x2) since multiply ication of	f exponents of -
the same base results in sum of	the powers.
So, P is maximized when χ^2 is minimized.	A-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
4b. A- 222 2 1/V: - (a+bx.) 2	
4b. 0= 2 x2 = 3 = (yi - (a+6xi))2	
	-
$=-2\left(\sum_{i=0}^{N-1}\frac{y_i-a-bx_i}{\sigma_i^2}\right)$	4814
= -2 (\(\frac{\gamma_{12}}{\sigma_{12}} - \(\frac{\sigma_{12}}{\sigma_{12}} - \(\frac{\sigma_{12}}{\sigma_{12}} \)	10110 0 0
	3)
= -2 ([= 2 - a [= 2 - b [= 2]	
	-11
= -2 (Sy - aS - bSx) = 0	
p-1	DAY BEE
$0 = \frac{2}{36} \chi^{2} = \frac{2}{36} \sum_{i=0}^{N+1} \left(\frac{Y_{i}^{i} - (a+bx_{i})}{\sigma_{i}} \right)^{2}$	100
1 N-1 X:Y: -ax! - bx: 2	4000
$= -2\left(\sum_{i=0}^{N-1} \frac{x_i y_i - a x_i' - b x_i^2}{\sigma_i^2}\right)$	
	A PROPERTY.
$= -2 \left(\sum \frac{x_1 v_1}{\sigma_1^2} - \sum \frac{a x_1}{\sigma_1^2} - \sum \frac{b x_1^2}{\sigma_1^2} \right)$	1999
	A MARIA
2 (Sxy - a \(\frac{\fir}{\fir}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}}	A MARIE
=)-2 (Sxy - aSx - bSxx)	





4.d/e

You will need to view the 10 graphs one at a time, in order (sorry). I have pasted the output into this document as well.

Blue = True Data
Orange = Best fit line

###DATA0###

#####LINFIT

a: -0.0031605977250549647 b: 1.051843023270421

siga: 4.09432984719998e-05 sigb: 7.952557545411861e-05 chi2: 41.536288233299416 q: 0.0005404324027341963

#####

#####General Linfit

a: [-0.00405687 0.99548935 0.13427558]

sig: [0.0937076 0.253443 -0.0909083 -0.166434 -0.0381431 0.20491 0.130804 0.0887457 -0.0429324 -0.00859234 -0.0208498 0.0137064 0.0489929 0.205131 0.0429683 -0.260178 -0.196854 -0.0482093

0.165664 0.0814919] chi2: 16.89154464728326 q: 0.5531272849976303

#####

###DATA1###

#####LINFIT

a: 0.00953181388556922 b: 1.0740330155108173

siga: 3.4929292013424885e-05 sigb: 0.00014792688975562594 chi2: 24.980744863030473 q: 0.15831010348882107

#####

#####General Linfit

a: [0.00933038 0.99684178 0.13569248]

chi2: 15.292644038569957 q: 0.6619388366317642

#####

###DATA2###

#####LINFIT

a: 0.018573325003274705 b: 1.0342771491918485 siga: 3.030220722867111e-05 sigb: 6.288152626929635e-05 chi2: 27.813438443920116

q: 0.07771154349275367

#####

####General Linfit

a: [0.00727229 0.97695261 0.12789543]

-0.225609 -0.272143]

chi2: 15.356819948877016 q: 0.6576873515461921

#####

###DATA3###

#####LINFIT

a: 0.005266135952123236b: 1.0266465228776975

siga: 2.618718324459102e-05 sigb: 1.2004594627002148e-05

chi2: 24.63472970823219 q: 0.17128616640248745

#####

#####General Linfit

a: [-0.00230146 1.00906066 0.07822127]

sig: [-0.313958 0.242194 0.0689157 -0.57637 -0.15612 -0.31869 -0.145559 -0.0489576 0.149756 0.0152981 -0.00533004 -0.0461422

-0.145559 -0.0469576 0.149756 0.0152961 -0.00555004 -0.0461422

-0.0581547 -0.0342307 0.169297 0.0353678 -0.157182 0.00680665

-0.4512 0.338566]

chi2: 18.028183974349385 q: 0.4749776325420444

#####

###DATA4###

#####LINFIT

a: -0.006755284998213365

b: 1.0505186275336869

siga: 4.4012959776661396e-06 sigb: 6.684786611615563e-05

chi2: 66.4685042141113

q: 4.360827679896626e-10

#####

#####General Linfit

a: [0.00182058 0.98572013 0.13779897]

sig: [0.0461196 0.0714196 -0.123673 -0.150672 0.184139 -0.0354771 0.0554571 0.127051 -0.0419698 -0.00193617 0.00523097 -0.0450947

-0.222376 0.423417]

chi2: 15.696391474454115

q: 0.6349738963650517

#####

The general linfit seems to do substantially better than the linear regression. The q values in the linear regression are generally much smaller than the q values of the general linfit. Additionally, the q values are much less consistent with the linear regression ranging from 4.360827679896626e-10 (unacceptable) to 0.17128616640248745 (acceptable). The general linfit has much higher q values that are also much more consistent (around 0.5-0.6).