Homework 10 - STAT 231

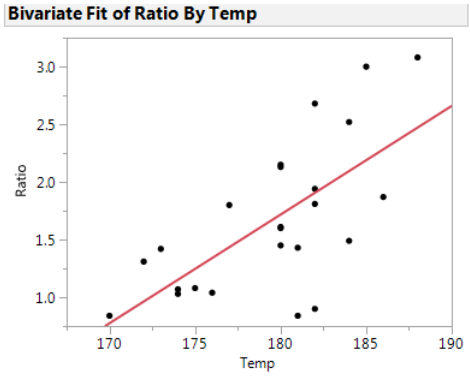
Due in class, Thursday, Nov 21

The following problems are from the Devore textbook. You may use JMP whenever possible, but please print/include any relevant JMP output.

1. Chapter 12: Problem 7
   Note: the true signal is $1800 + 1.3x$ or, in other words, the expected value of Y (28-day strength in psi) for a given x (accelerated strength in psi) is given by the signal $\mu_{y|x} = \beta_0 + \beta_1 x$ for $\beta_0 = 1800$ and $\beta_1 = 1.3$

2. Chapter 12: Problem 8(a)-(b) only.
   Note: If $\epsilon \sim N(0, 350^2)$ (mean 0 & standard deviation 350), then in the population regression model we have $Y = \mu_{y|x} + \epsilon \sim N(\mu_{y|x}, 350^2)$ for a given value of x; that is, Y is normal with mean $\mu_{y|x} = \beta_0 + \beta_1 x$ and standard deviation 350, where $\beta_0 = 1800$ and $\beta_1 = 1.3$. Part(a) is finding the normal probability $P(Y > 5000)$ when given $x = 2000$, and Part(b) is finding the normal probability $P(Y > 5000)$ when given $x = 2500$.

3. Chapter 12: Problem 14
   You can use the output below found from JMP. Part(b) is an estimate $\hat{y}$ of the signal for y when $x = 182$ using the estimated regression line; use (b) to find residuals in (c).



Linear Fit

Ratio = -15.24497 + 0.0942361*Temp

Summary of Fit

RSquare	0.451398
RSquare Adj	0.426461
Root Mean Square Error	0.497245
Mean of Response	1.670417
Observations (or Sum Wgts)	24

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	4.4757441	4.47574	18.1019
Error	22	5.4395517	0.24725	Prob > F
C. Total	23	9.9152958		0.0003*

Parameter Estimates

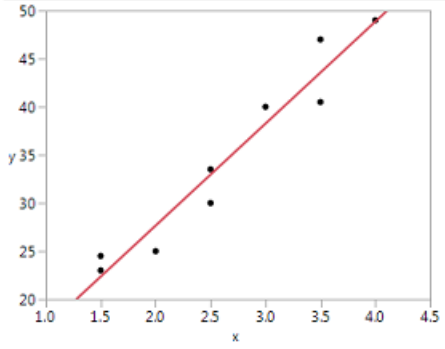
Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	-15.24497	3.977048	-3.83	0.0009*
Temp	0.0942361	0.022149	4.25	0.0003*

4. Chapter 12: Problem 19
   Use JMP

5. Chapter 12: Problem 52(b)-(f) (i.e, skip (a))
   Use the JMP out put on the next page for this problem.

Problem 5 in HW 10 (problem 52 in text book)

Bivariate Fit of y By x



Linear Fit

Linear Fit

y = 6.4487179 + 10.602564*x

Summary of Fit

RSquare	0.941548
RSquare Adj	0.933197
Root Mean Square Error	2.545646
Mean of Response	34.72222
Observations (or Sum Wgts)	9

Analysis of Variance

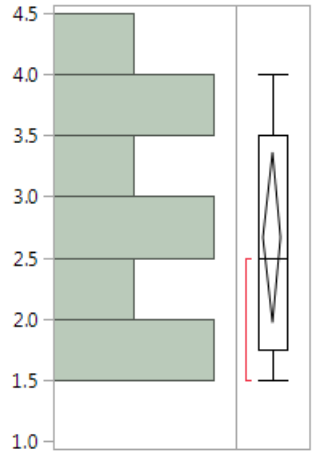
Source	DF	Sum of Squares	Mean Square	F Ratio
Model	1	730.69338	730.693	112.7559
Error	7	45.36218	6.480	Prob > F
C. Total	8	776.05556		<.0001*

Parameter Estimates

Term	Estimate	Std Error	t Ratio	Prob>|t|
Intercept	6.4487179	2.794567	2.31	0.0544
x	10.602564	0.998484	10.62	<.0001*

Distributions

x



Quantiles

100.0%	maximum	4
99.5%		4
97.5%		4
90.0%		4
75.0%	quartile	3.5
50.0%	median	2.5
25.0%	quartile	1.75
10.0%		1.5
2.5%		1.5
0.5%		1.5
0.0%	minimum	1.5

Summary Statistics

Mean	2.6666667
Std Dev	0.9013878
Std Err Mean	0.3004626
Upper 95% Mean	3.3595347
Lower 95% Mean	1.9737987
N	9