HW10
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These are the solutions in blue to at least 60% of the problems for chapter 10 .
Everything that is not in blue is part of my notes.

Problem 10.6

part a

The slope describes a change in y for a change in x, and not the other way around.

part b

The equation should be predicted y variable as opposed to just y variable.

part c

It is not the same width for the mean response for all x variables.

Problem 10.7

part a

The parameters are actually bo, b1, and σ .

part b

The null hypothesis should refer to β1 .

part c

The prediction interval will be wider than the confidence interval for a mean response.

Problem 10.8

	n	Y-predicted	SE_b_1	Confid=95%	~t*
part a	25	1.3+12.10*x	6.31	12.10±13.024	2.0640
part b	25	13.0+6.10*x	6.31	13.10±13.024	2.0640
part c	100	1.3+12.10*x	6.31	14.10±13.380	1.9620

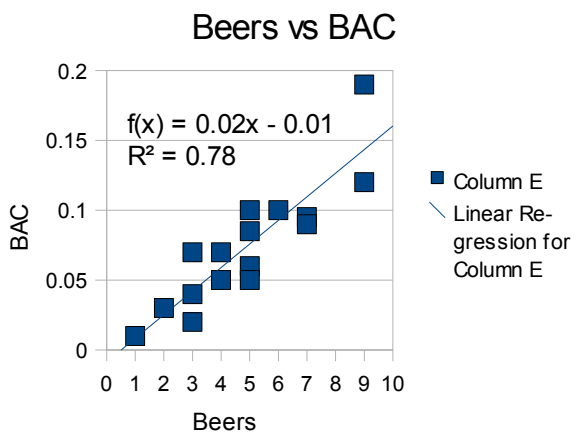
			Interval	
part a	{	25.12	-0.92	}
part b	{	26.12	0.08	}
part c	{	27.48	0.72	}

Problem 10.13

Student	Beers	BAC
1	5	0.1
2	2	0.03
3	9	0.19

4	9	0.12
5	3	0.04
6	7	0.095
7	3	0.07
8	5	0.06
9	3	0.02
10	5	0.05
11	4	0.07
12	6	0.1
13	5	0.085
14	7	0.09
15	1	0.01
16	4	0.05

part a



Problem 10.13

part a The r^2 value here denotes a pretty good relationship of more Beers means higher BAC level.

part b Ho is that drinking more beer does not increase BAC level Ha is that drinking more beer does increase BAC level.
t=r*((1-r*r)^-0.5)*(n-2)^0.5
Using the t statistic t=b1/(SE_b_1)

SE_b_1=s/(sum(x_i-mean_x)^2)

Problem 10.20

part a

βo is 4.6 in this line. This number says that overseas returns will equal 4.6 when the US market is flat.

part b

β1 is 0.67 . This number indicates that as US returns increase, overseas returns increase as well.

part c mean overseas return=4.6+0.67*(US Return) + Noise
The Noise allows the overseas returns to vary when the US returns remain the same.

Problem 10.32

annual budget y= fixed_costs + r*(Sy/Sx)*(number of students) + Noise

part a

The constant term that does not change when x increases, is the fixed_costs.

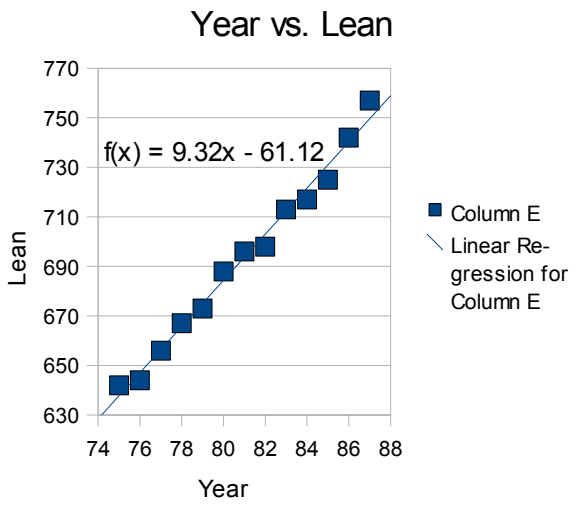
part b The r*(Sy/Sx) parameter changes when there are more students in the school. I expect this number to be greater than zero.

part c The Noise allows for variation when r*(Sy/Sx) is a constant.

Problem 10.39

Year	Lean
75	642
76	644
77	656
78	667
79	673
80	688
81	696
82	698
83	713
84	717
85	725
86	742
87	757

part a



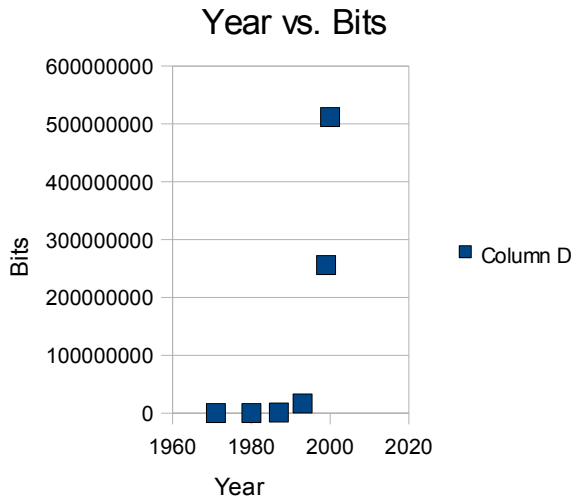
Yes, the trend in lean over time for the tower of Pisa appears to be linear.

part b f(x)=9.32*x-61.12

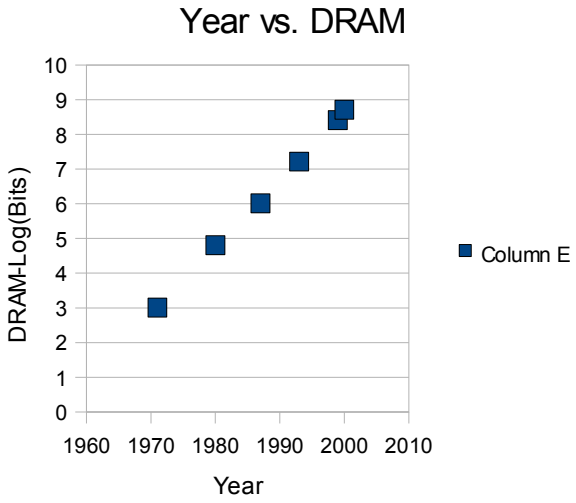
Problem 10.44

Year	Bits	log(Bits)
1971	1024	3.01
1980	64000	4.81
1987	1024000	6.01
1993	16384000	7.21
1999	256000000	8.41
2000	512000000	8.71

part a



part b



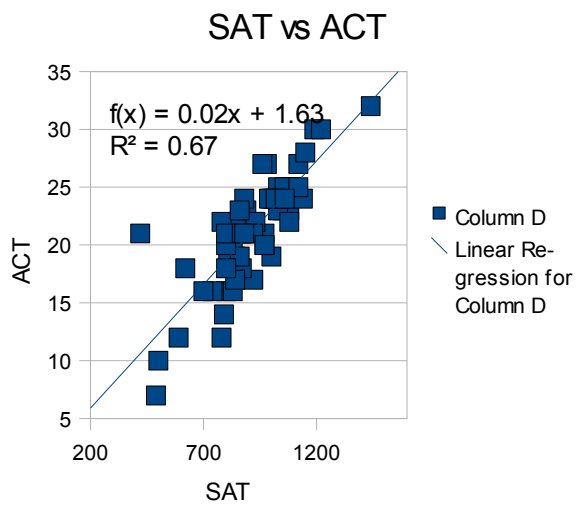
part c

Problem 10.53	Sat	ACT
	1000	24
	1010	24
	920	17
	840	19
	830	19
	1440	32
	490	7
	1050	23
	870	18
	970	21
	920	22
	810	19
	1080	23
	1000	19
	1030	25
	870	21
	880	21
	850	22
	780	22
	830	20
	1190	30
	800	16
	830	16
	890	23
	880	24
	980	27
	1030	23
	1220	30
	1080	22
	970	20
	1090	25
	860	19
	740	16
	500	10
	780	12
	1120	27
	590	12
	990	24
	700	16
	930	22
	860	23
	420	21
	800	20
	1140	24
	920	21
	800	21

Problem 10.53 (continued)

1040	24
840	17
1060	25
870	21
1120	25
800	18
960	27
880	21
1020	24
790	14
620	18
1150	28
970	20
1060	24

part a



The overall pattern is linear. Also there is a central bulge shape to the linearity of this distribution. In addition there may be an outlier at around 400 for SAT and 22 for ACT.

part b The least-squares regression is y= 0.02*x + 1.63 .

t=(r*(n-2)^0.5)/(1-r^2)^0.5, n=60

t = 10.8502 P<0.001

part c The correlation between the two tests is 0.8185

13.024
13.024
12.380