

Simple Linear Regression

STAT 615
(Baron)

```
DATA C;
INFILE pulse;
INPUT row pulse1 pulse2 ran smokes gender height weight activity;
```

```
PROC REG LINEPRINTER;
MODEL weight=height / CLI CLM;
PLOT weight*height='*' PREDICTED.*height = 'O' / OVERLAY;
PLOT RESIDUAL.*height;
```

RUN;

asks for plots
in the same file
as all outputs

CLI - prediction intervals for individual responses
CLM - confidence intervals for mean responses for each x

Plot
 y_i vs x_i
 $\hat{y}_i$ vs x_i
together,
then e_i vs x_i

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	31592	31592	144.38	<.0001
Error	90	19692	218.80247		
Corrected Total	91	51284			

ANOVA components and F-test

Root MSE	14.79197	R-Square	0.6160
Dependent Mean	145.15217	Adj R-Sq	0.6117
Coeff Var	10.19067		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	1	-204.74078	29.15972	-7.02	<.0001
height	1	5.09177	0.42375	12.02	<.0001

p-values for
 $H_0: \beta_0 = 0$
 $H_0: \beta_1 = 0$

The REG Procedure
Model: MODEL1
Dependent Variable: weight

Output Statistics

Obs	Dep Var weight	Predicted Value	Std Error Mean Predict	95% CL Mean	95% CL Predict	Residual
1	140.0000	131.3159	1.9246	127.4922	135.1395	8.6841
2	145.0000	161.8665	2.0768	157.7405	165.9924	-16.8665
3	160.0000	169.5041	2.5467	164.4447	174.5635	-9.5041
4	190.0000	166.9582	2.3815	162.2269	171.6895	23.0418
5	155.0000	146.5912	1.5468	143.5181	149.6642	8.4088
6	165.0000	166.9582	2.3815	162.2269	171.6895	-1.9582
7	150.0000	161.8665	2.0768	157.7405	165.9924	-11.8665
8	190.0000	172.0500	2.7183	166.6496	177.4504	17.9500
9	195.0000	161.8665	2.0768	157.7405	165.9924	33.1335
10	138.0000	156.7747	1.8204	153.1581	160.3912	-18.7747
11	160.0000	172.0500	2.7183	166.6496	177.4504	-12.0500
12	155.0000	161.8665	2.0768	157.7405	165.9924	-6.8665
13	153.0000	151.6829	1.6351	148.4344	154.9314	1.3171
14	145.0000	136.4076	1.7053	133.0198	139.7954	8.5924
15	170.0000	156.7747	1.8204	153.1581	160.3912	13.2253
16	175.0000	161.8665	2.0768	157.7405	165.9924	13.1335
17	175.0000	146.5912	1.5468	143.5181	149.6642	28.4088
18	170.0000	166.9582	2.3815	162.2269	171.6895	3.0418
19	180.0000	172.0500	2.7183	166.6496	177.4504	7.9500
20	135.0000	131.3159	1.9246	127.4922	135.1395	3.6841
21	170.0000	156.7747	1.8204	153.1581	160.3912	13.2253
22	157.0000	151.6829	1.6351	148.4344	154.9314	5.3171
23	130.0000	151.6829	1.6351	148.4344	154.9314	-21.6829
24	185.0000	177.1418	3.0767	171.0294	183.2541	7.8582
25	140.0000	105.8570	3.6156	98.6739	113.0401	34.1430
26	120.0000	131.3159	1.9246	127.4922	135.1395	-11.3159
27	130.0000	141.4994	1.5718	138.3766	144.6221	-11.4994
28	138.0000	141.4994	1.5718	138.3766	144.6221	-3.4994
29	121.0000	116.0405	2.8719	110.3350	121.7461	4.9595
30	125.0000	151.6829	1.6351	148.4344	154.9314	-26.6829
31	116.0000	141.4994	1.5718	138.3766	144.6221	-25.4994
32	145.0000	146.5912	1.5468	143.5181	149.6642	-1.5912
33	150.0000	146.5912	1.5468	143.5181	149.6642	3.4088
34	112.0000	114.7676	2.9618	108.8834	120.6518	-2.7676
35	125.0000	141.4994	1.5718	138.3766	144.6221	-16.4994
36	190.0000	172.0500	2.7183	166.6496	177.4504	17.9500
37	155.0000	156.7747	1.8204	153.1581	160.3912	-1.7747
38	170.0000	146.5912	1.5468	143.5181	149.6642	23.4088
39	155.0000	151.6829	1.6351	148.4344	154.9314	3.3171
40	215.0000	161.8665	2.0768	157.7405	165.9924	53.1335
90	110.0000	110.9488	3.2374	104.5171	117.3804	-0.9488
91	150.0000	136.4076	1.7053	133.0198	139.7954	13.5924
92	108.0000	109.6758	3.3309	103.0584	116.2933	-1.6758

Sum of Residuals 0
Sum of Squared Residuals 19692
Predicted Residual SS (PRESS) 20624

conf. intervals for $E(y|x_i)$

prediction intervals for y_i

$e_i = y_i - \hat{y}_i$

