

```
proc reg data=one;
model y = x1 x2 x3 x4 x5 / ss1 ss2 xpx i;
run;
```

Model Crossproducts X'X X'Y Y'Y							
Variable	Intercept	x1	x2	x3	x4	x5	y
Intercept	100	-11.717	15.047	4.728	-9.987	-4.023	0.247
x1	-11.717	102.543523	65.797386	54.050047	51.389018	32.551863	287.863829
x2	15.047	65.797386	116.709195	69.779814	52.135654	40.104427	323.172058
x3	4.728	54.050047	69.779814	101.03749	42.416469	40.172995	333.630181
x4	-9.987	51.389018	52.135654	42.416469	104.494861	41.836438	189.288889
x5	-4.023	32.551863	40.104427	40.172995	41.836438	81.703075	171.185742
y	0.247	287.863829	323.172058	333.630181	189.288889	171.185742	1523.902455

X'X Inverse, Parameter Estimates, and SSE							
Variable	Intercept	x1	x2	x3	x4	x5	y
Intercept	0.011080865	0.0029529243	-0.003699674	-0.000374962	0.0013291011	0.0006889208	-0.098435487
x1	0.0029529243	0.0182932394	-0.006818086	-0.003577274	-0.003829753	-0.000076263	1.1318050377
x2	-0.003699674	-0.006818086	0.0193260572	-0.007641234	-0.0028454	-0.001737881	0.8965984306
x3	-0.000374962	-0.003577274	-0.007641234	0.0188742351	-0.000597369	-0.003816955	2.0312371216
x4	0.0013291011	-0.003829753	-0.0028454	-0.000597369	0.0150046611	-0.004401521	-0.134235019
x5	0.0006889208	-0.000076263	-0.001737881	-0.003816955	-0.004401521	0.0172873939	0.2693269932
y	-0.098435487	1.1318050377	0.8965984306	2.0312371216	-0.134235019	0.2693269932	209.98772466

Parameter Estimates							
Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t	Type I SS	Type II SS
Intercept	1		0.15733	-0.63	0.5331	0.00061009	0.87444
x1	1		0.20215	5.60	<.0001	819.23219	70.02492
x2	1					247.09078	41.59611
x3	1		0.20534	9.89	<.0001	243.08466	218.60087
x4	1		0.18308	-0.73	0.4653	0.31054	1.20090
x5	1		0.19652	1.37	0.1738		4.19595

Question 1: What is the sample size of the data?

Question 2: Find out $\sum x_{1i}y_i$

Question 3: Write out the fitted equation.

Question 4: Find out the MSE.

Question 5: Find out the standard error of $\hat{\beta}_2$

Question 6: Apply t test on $H_0: \beta_3 = 2.5$ vs. $H_a: \beta_3 < 2.5$

Question 7: Find out Type I SS for X_5

Question 8: Find out the following extra sum of squares. If you cannot find it based on the above information, then write NA.

- a) $SSX_2 \mid X_1$
- b) $SSX_4 \mid X_1 X_2 X_3$
- c) $SSX_1 \mid X_2$
- d) $SSX_2 X_3 \mid X_1$
- e) SSX_5
- f) SSX_1
- g) $SSX_4 \mid X_1 X_2 X_3 X_5$

Question 9: Find out the SSReg for the model.

Question 10: Apply GLHT on $H_0: \beta_4 = \beta_5 = 0$ vs. H_a : at least one of them is not zero.

- a) Write out the reduced and full models.
- b) Calculate the test statistic.
- c) Find the degrees of freedom of the test statistic.
- d) Find the range of p-value based on the F table you have.
- e) What is your conclusion.