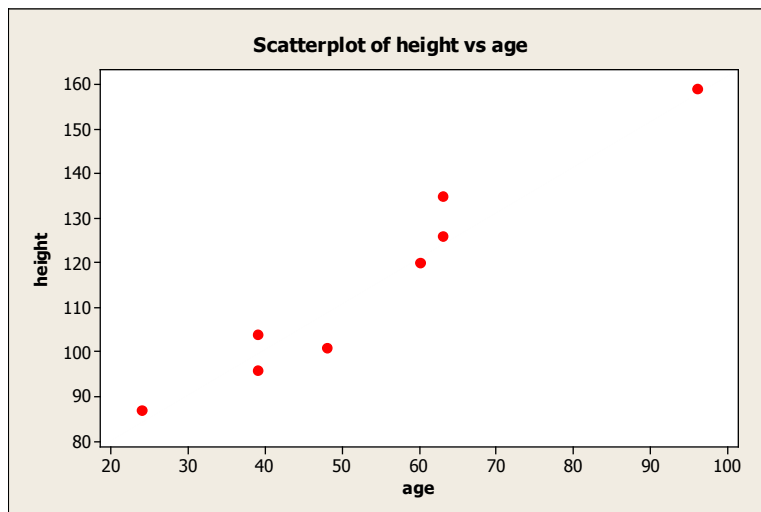


**Correlations: age, height**

Pearson correlation of age and height = 0.973

P-Value = 0.000

Regression Analysis: height versus age

The regression equation is

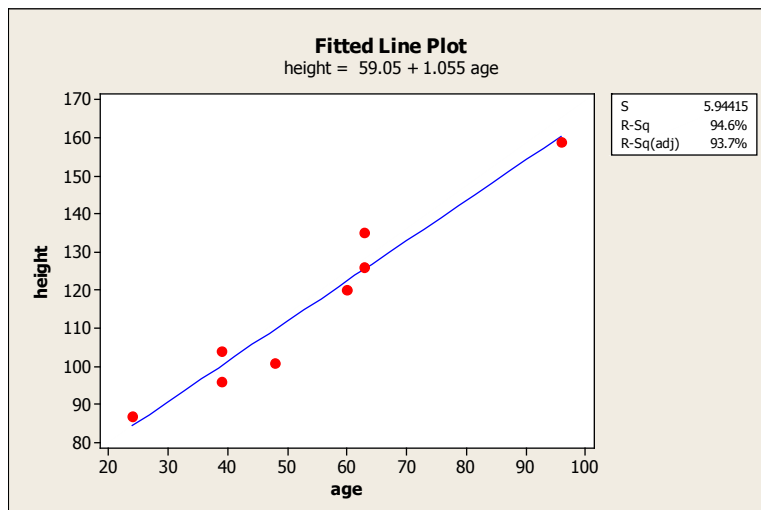
height = 59.0 + 1.05 age

Predictor	Coef	SE Coef	T	P
Constant	59.048	5.932	9.95	0.000
age	1.0547	0.1027	10.27	0.000

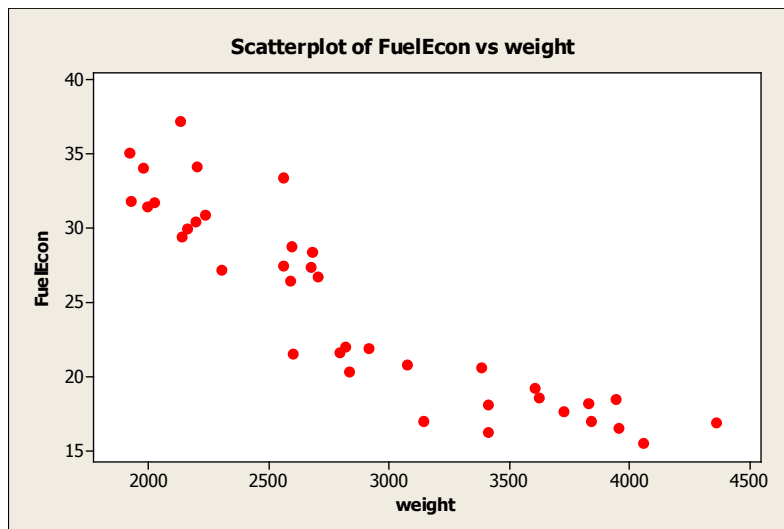
S = 5.94415 R-Sq = 94.6% R-Sq(adj) = 93.7%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	1	3724.0	3724.0	105.40	0.000
Residual Error	6	212.0	35.3		
Total	7	3936.0			



Weight and Mileage (Fuel Economy) Example on p.410



Correlations: FuelEcon, weight

Pearson correlation of FuelEcon and weight = -0.903
P-Value = 0.000

Regression Analysis: FuelEcon versus weight

The regression equation is
 $\text{FuelEcon} = 48.7 - 0.00836 \text{ weight}$

Predictor	Coef	SE Coef	T	P
Constant	48.709	1.955	24.91	0.000
weight	-0.0083644	0.0006634	-12.61	0.000

S = 2.85232 R-Sq = 81.5% R-Sq(adj) = 81.0%

Analysis of Variance

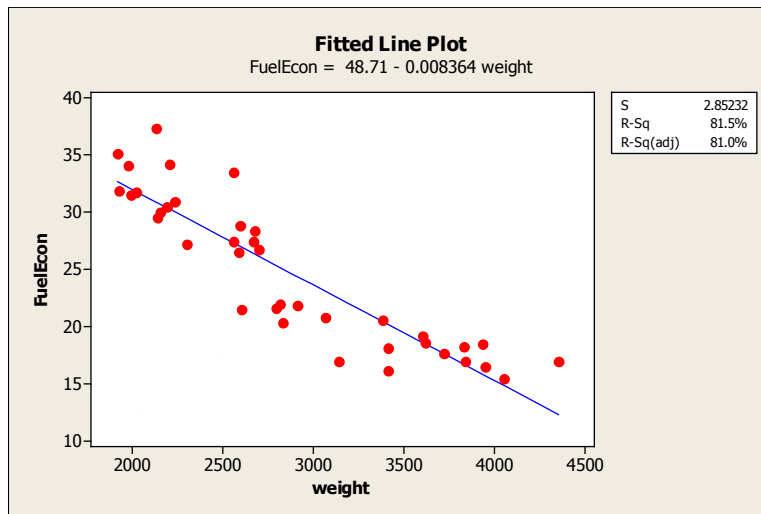
Source	DF	SS	MS	F	P
Regression	1	1293.2	1293.2	158.95	0.000
Residual Error	36	292.9	8.1		
Total	37	1586.1			

Unusual Observations

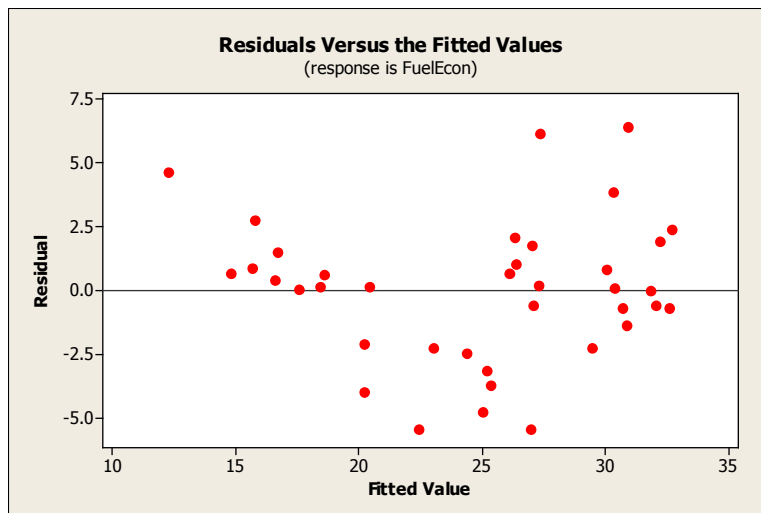
Obs	weight	FuelEcon	Fit	SE Fit	Residual	St Resid
19	2130	37.300	30.893	0.671	6.407	2.31R
28	2556	33.500	27.329	0.506	6.171	2.20R

R denotes an observation with a large standardized residual.

Fitted Line Plot



Residual Plot (Residuals versus Fitted Values)



Regression Analysis: FuelEcon versus weight, wtsqd

The regression equation is

$$\text{FuelEcon} = 75.3 - 0.0271 \text{ weight} + 0.000003 \text{ wtsqd}$$

Predictor	Coef	SE Coef	T	P
Constant	75.305	8.222	9.16	0.000
weight	-0.027080	0.005687	-4.76	0.000
wtsqd	0.00000311	0.00000094	3.31	0.002

S = 2.52473 R-Sq = 85.9% R-Sq(adj) = 85.1%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	1362.99	681.50	106.91	0.000
Residual Error	35	223.10	6.37		
Total	37	1586.09			

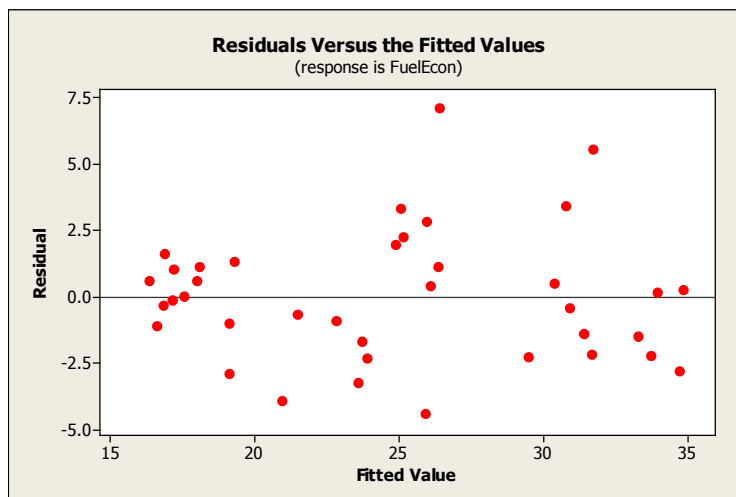
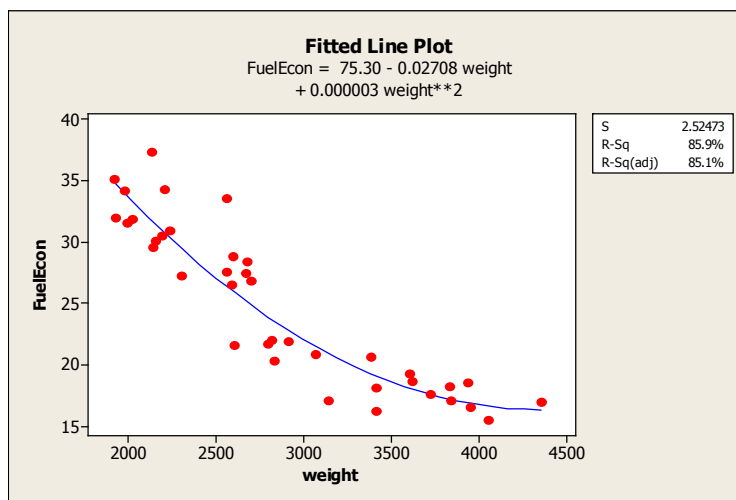
Source	DF	Seq SS
weight	1	1293.21
wtsqd	1	69.79

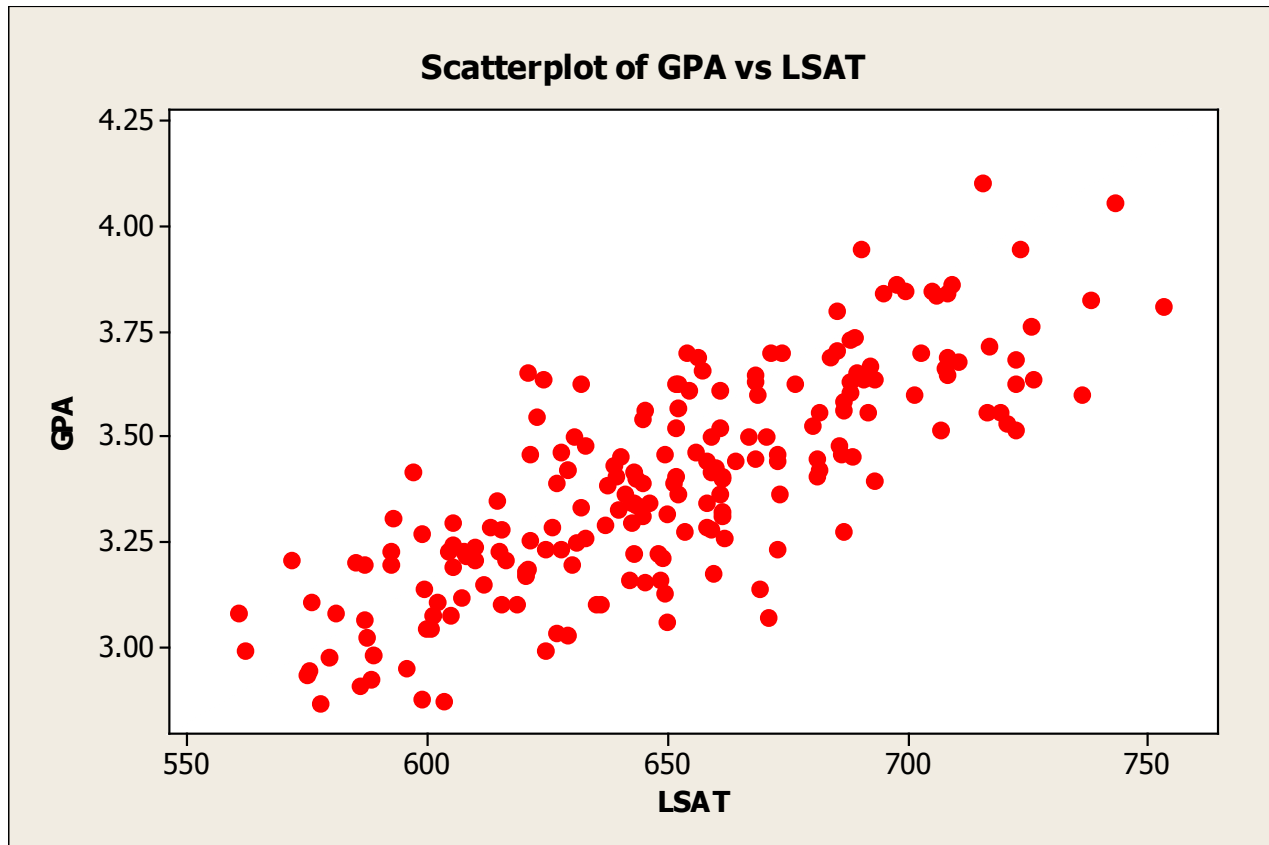
Unusual Observations

Obs	weight	FuelEcon	Fit	SE Fit	Residual	St Resid
1	4360	16.900	16.317	1.568	0.583	0.29 X
19	2130	37.300	31.725	0.645	5.575	2.28R
28	2556	33.500	26.393	0.529	7.107	2.88R

R denotes an observation with a large standardized residual.

X denotes an observation whose X value gives it large influence.





Weight and Mileage (Fuel Economy) Example on p.410 - revisited

SAS Program

```
data one;
  input weight @@; datalines;
4360 2155 2830 3380 3840 2585 2670 2595 2020 2600 4054 2560 3140 3070 3725 2910 1990 2700 2130
1925 3605 2300 2795 3620 3955 1975 2135 2556 2190 3940 2230 3410 3410 3830 1915 2679 2200 2815
;
data two;
  input fuelecon @@; datalines;
16.9 30.0 20.3 20.6 17.0 26.5 27.4 28.8 31.8 21.5 15.5 27.5 17.0 20.8 17.6 21.9 31.5 26.8 37.3
31.9 19.2 27.2 21.6 18.6 16.5 34.1 29.5 33.5 30.5 18.5 30.9 16.2 18.1 18.2 35.1 28.4 34.2 22.0
;
data all;
  merge one two;

proc nlin;
  parms a=60 b=-1 k=-1 t=2500;
  g=a+(b-k)*t;
  mean=(a+b*weight)*(weight LE t)+(g+k*weight)*(weight > t);
  model fuelecon=mean;
run;
```

SAS Output

The NLIN Procedure
Dependent Variable fuelecon
Method: Gauss-Newton

Iterative Phase

Iter	a	b	k	t	Sum of Squares
0	60.0000	-1.0000	-1.0000	2500.0	3.2206E8
1	59.7220	-0.0133	-0.00706	2500.0	266.0
2	56.4271	-0.0117	-0.00699	2624.9	260.5
3	52.8792	-0.00994	-0.00587	3130.3	241.4
4	54.7699	-0.0108	-0.00373	3322.1	216.4
5	57.6381	-0.0121	-0.00261	3136.9	203.3
6	57.2326	-0.0119	-0.00204	3215.9	202.2
7	58.0215	-0.0123	-0.00234	3173.6	201.2
8	58.1829	-0.0123	-0.00240	3165.3	201.2
9	58.1897	-0.0123	-0.00240	3164.9	201.2

NOTE: Convergence criterion met.

Source	DF	Sum of Squares	Mean Square	F Value	Approx Pr > F
Model	3	1384.9	461.6	78.02	<.0001
Error	34	201.2	5.9172		
Corrected Total	37	1586.1			

Parameter	Estimate	Approx Std Error	Approximate 95% Confidence Limits	
a	58.1897	3.2699	51.5444	64.8350
b	-0.0123	0.00132	-0.0150	-0.00964
k	-0.00240	0.00248	-0.00744	0.00264
t	3164.9	196.3	2766.0	3563.9

Example 15.2: Fuel Economy versus Car Weight

