The SAS System

Obs	y	Q1	Q2	Q3	time	timesq
1	344.39	1	0	0	1	1
2	246.63	0	1	0	2	4
3	131.53	0	0	1	3	9
4	288.87	0	0	0	4	16
5	313.45	1	0	0	5	25
6	189.76	0	1	0	6	36
7	179.10	0	0	1	7	49
8	221.10	0	0	0	8	64
9	246.84	1	0	0	9	81
10	209.00	0	1	0	10	100
11	51.21	0	0	1	11	121
12	133.89	0	0	0	12	144
13	277.01	1	0	0	13	169
14	197.98	0	1	0	14	196
15	50.68	0	0	1	15	225
16	218.08	0	0	0	16	256
17	365.10	1	0	0	17	289
18	207.51	0	1	0	18	324
19	54.63	0	0	1	19	361
20	214.09	0	0	0	20	400
21	267.00	1	0	0	21	441
22	230.28	0	1	0	22	484
23	230.32	0	0	1	23	529
24	426.41	0	0	0	24	576
25	467.06	1	0	0	25	625
26	306.03	0	1	0	26	676
27	253.23	0	0	1	27	729
28	279.46	0	0	0	28	784
29	336.56	1	0	0	29	841
30	196.67	0	1	0	30	900
31	152.15	0	0	1	31	961
32	319.67	0	0	0	32	1024
33	440.00	1	0	0	33	1089
34	315.04	0	1	0	34	1156
35	216.42	0	0	1	35	1225
36	339.78	0	0	0	36	1296
37	434.66	1	0	0	37	1369
38	399.66	0	1	0	38	1444

39	330.80	0	0	1	39	1521
40	539.78	0	0	0	40	1600
41	.	1	0	0	41	1681
42	.	0	1	0	42	1764
43	.	0	0	1	43	1849
44	.	0	0	0	44	1936

The SAS System

The AUTOREG Procedure

Dependent Variable	y
	y

The SAS System

The AUTOREG Procedure

Ordinary Least Squares Estimates			
SSE	124335.672	DFE	34
MSE	3657	Root MSE	60.47257
SBC	457.32279	AIC	447.189513
MAE	43.4728079	AICC	449.734968
MAPE	23.0352115	HQC	450.853386
Durbin-Watson	0.8397	Regress R-Square	0.7443
		Total R-Square	0.7443

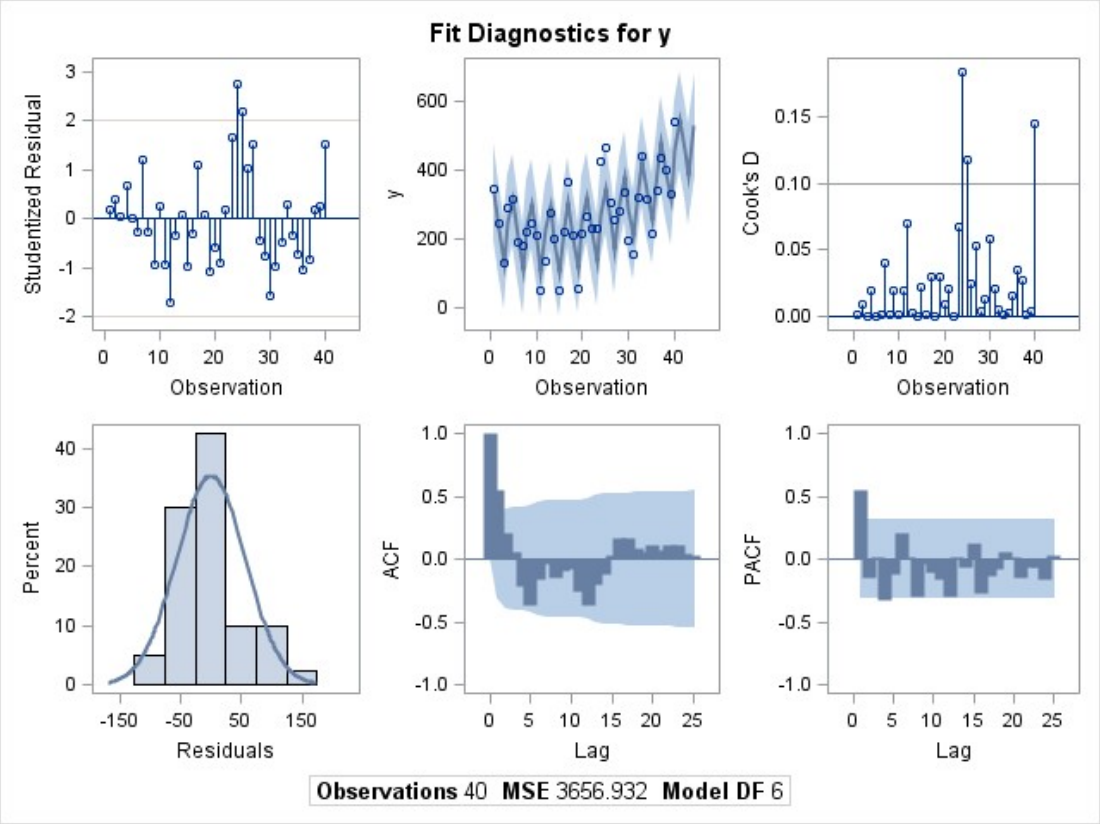
Durbin-Watson Statistics			
Order	DW	Pr < DW	Pr > DW
1	0.8397	<.0001	1.0000

NOTE: Pr<DW is the p-value for testing positive autocorrelation, and Pr>DW is the p-value for testing negative autocorrelation.

Parameter Estimates						
Variable	DF	Estimate	Standard Error	t Value	Approx Pr > |t|	Variable Label
Intercept	1	276.6363	35.0485	7.89	<.0001	
time	1	-7.4583	3.3960	-2.20	0.0350	time
timesq	1	0.3012	0.0803	3.75	0.0007	timesq
Q1	1	65.7706	27.1592	2.42	0.0209	Q1
Q2	1	-37.8701	27.0958	-1.40	0.1713	Q2
Q3	1	-127.6113	27.0574	-4.72	<.0001	Q3

The SAS System

The AUTOREG Procedure



The SAS System

Obs	yhat	resid	LowerPI	UpperPI	LowerCI	UpperCI	y	Q1	Q2	Q3	time	timesq
1	335.250	9.140	196.859	473.641	271.619	398.881	344.39	1	0	0	1	1
2	225.055	21.575	88.252	361.857	164.958	285.152	246.63	0	1	0	2	4
3	129.361	2.169	-6.089	264.811	72.410	186.313	131.53	0	0	1	3	9
4	251.623	37.247	117.282	385.964	197.361	305.885	288.87	0	0	0	4	16
5	312.646	0.804	180.459	444.834	263.962	361.331	313.45	1	0	0	5	25
6	204.861	-15.101	73.194	336.528	157.606	252.116	189.76	0	1	0	6	36
7	111.578	67.522	-19.726	242.882	65.344	157.811	179.10	0	0	1	7	49
8	236.249	-15.149	105.150	367.348	190.600	281.898	221.10	0	0	0	8	64
9	299.682	-52.842	169.684	429.681	257.298	342.067	246.84	1	0	0	9	81
10	194.307	14.693	64.259	324.355	151.771	236.842	209.00	0	1	0	10	100
11	103.433	-52.223	-26.746	233.612	60.499	146.367	51.21	0	0	1	11	121
12	230.515	-96.625	100.123	360.906	186.940	274.089	133.89	0	0	0	12	144
13	296.358	-19.348	166.440	426.275	254.223	338.492	277.01	1	0	0	13	169
14	193.392	4.588	63.268	323.516	150.625	236.159	197.98	0	1	0	14	196
15	104.928	-54.248	-25.431	235.288	61.450	148.407	50.68	0	0	1	15	225
16	234.419	-16.339	103.795	365.043	190.154	278.685	218.08	0	0	0	16	256
17	302.672	62.428	172.206	433.138	258.875	346.469	365.10	1	0	0	17	289
18	202.116	5.394	71.549	332.684	158.019	246.214	207.51	0	1	0	18	324
19	116.063	-61.433	-14.609	246.734	71.657	160.468	54.63	0	0	1	19	361
20	247.964	-33.874	117.184	378.743	203.242	292.685	214.09	0	0	0	20	400
21	318.626	-51.626	187.847	449.406	273.905	363.348	267.00	1	0	0	21	441
22	220.480	9.800	89.809	351.152	176.075	264.886	230.28	0	1	0	22	484
23	136.836	93.484	6.269	267.404	92.739	180.934	230.32	0	0	1	23	529
24	271.147	155.263	140.681	401.613	227.350	314.944	426.41	0	0	0	24	576
25	344.220	122.840	213.596	474.844	299.955	388.485	467.06	1	0	0	25	625
26	248.484	57.546	118.124	378.843	205.005	291.962	306.03	0	1	0	26	676
27	167.250	85.980	37.126	297.373	124.482	210.017	253.23	0	0	1	27	729
28	303.970	-24.510	174.053	433.888	261.836	346.105	279.46	0	0	0	28	784
29	379.453	-42.893	249.061	509.844	335.878	423.027	336.56	1	0	0	29	841
30	286.126	-89.456	155.948	416.305	243.192	329.061	196.67	0	1	0	30	900
31	207.302	-55.152	77.254	337.350	164.767	249.837	152.15	0	0	1	31	961
32	346.433	-26.763	216.434	476.431	304.048	388.817	319.67	0	0	0	32	1024
33	424.325	15.675	293.226	555.424	378.676	469.974	440.00	1	0	0	33	1089
34	333.409	-18.369	202.105	464.713	287.175	379.642	315.04	0	1	0	34	1156
35	256.994	-40.574	125.327	388.661	209.739	304.249	216.42	0	0	1	35	1225
36	398.535	-58.755	266.347	530.722	349.850	447.219	339.78	0	0	0	36	1296
37	478.837	-44.177	344.496	613.178	424.575	533.098	434.66	1	0	0	37	1369

38	390.330	9.330	254.880	525.780	333.379	447.282	399.66	0	1	0	38	1444
39	316.325	14.475	179.523	453.128	256.228	376.422	330.80	0	0	1	39	1521
40	460.276	79.504	321.885	598.667	396.645	523.906	539.78	0	0	0	40	1600
41	542.988	.	400.944	685.032	471.761	614.215	.	1	0	0	41	1681
42	456.891	.	312.328	601.454	380.765	533.017	.	0	1	0	42	1764
43	385.296	.	237.908	532.685	303.932	466.661	.	0	0	1	43	1849
44	531.656	.	381.152	682.160	444.775	618.537	.	0	0	0	44	1936

The SAS System

The ARIMA Procedure

Preliminary Estimation

Initial Autoregressive Estimates	
	Estimate
1	0.39081

Constant Term Estimate	161.7678
White Noise Variance Est	10300.71

Conditional Least Squares Estimation											
Iteration	SSE	MU	AR1,1	NUM1	NUM2	NUM3	NUM4	NUM5	Constant	Lambda	R Crit
0	503039	265.5458	0.39081	4.62294	0.12422	111.5483	-20.9197	-134.052	161.7678	0.00001	1
1	103069	275.1621	0.59443	-4.75566	0.28514	70.00092	-27.7867	-121.253	111.5982	1E-6	0.913399
2	83331	283.9529	0.59431	-9.22173	0.35352	70.10855	-35.4263	-126.524	115.1982	1E-7	0.437607
3	83331	283.9491	0.59408	-9.21968	0.35348	70.10688	-35.4286	-126.525	115.2595	1E-8	0.000295

ARIMA Estimation Optimization Summary	
Estimation Method	Conditional Least Squares
Parameters Estimated	7
Termination Criteria	Maximum Relative Change in Estimates
Iteration Stopping Value	0.001
Criteria Value	0.000372
Alternate Criteria	Relative Change in Objective Function
Alternate Criteria Value	8.715E-8
Maximum Absolute Value of Gradient	75.82023
R-Square Change from Last Iteration	0.000295
Objective Function	Sum of Squared Residuals
Objective Function Value	83331.44
Marquardt's Lambda Coefficient	1E-8
Numerical Derivative Perturbation Delta	0.001
Iterations	3

Conditional Least Squares Estimation							
Parameter	Estimate	Standard Error	t Value	Approx Pr > |t|	Lag	Variable	Shift
MU	283.94906	47.55019	5.97	<.0001	0	y	0
AR1,1	0.59408	0.14701	4.04	0.0003	1	y	0
NUM1	-9.21968	5.46550	-1.69	0.1011	0	time	0

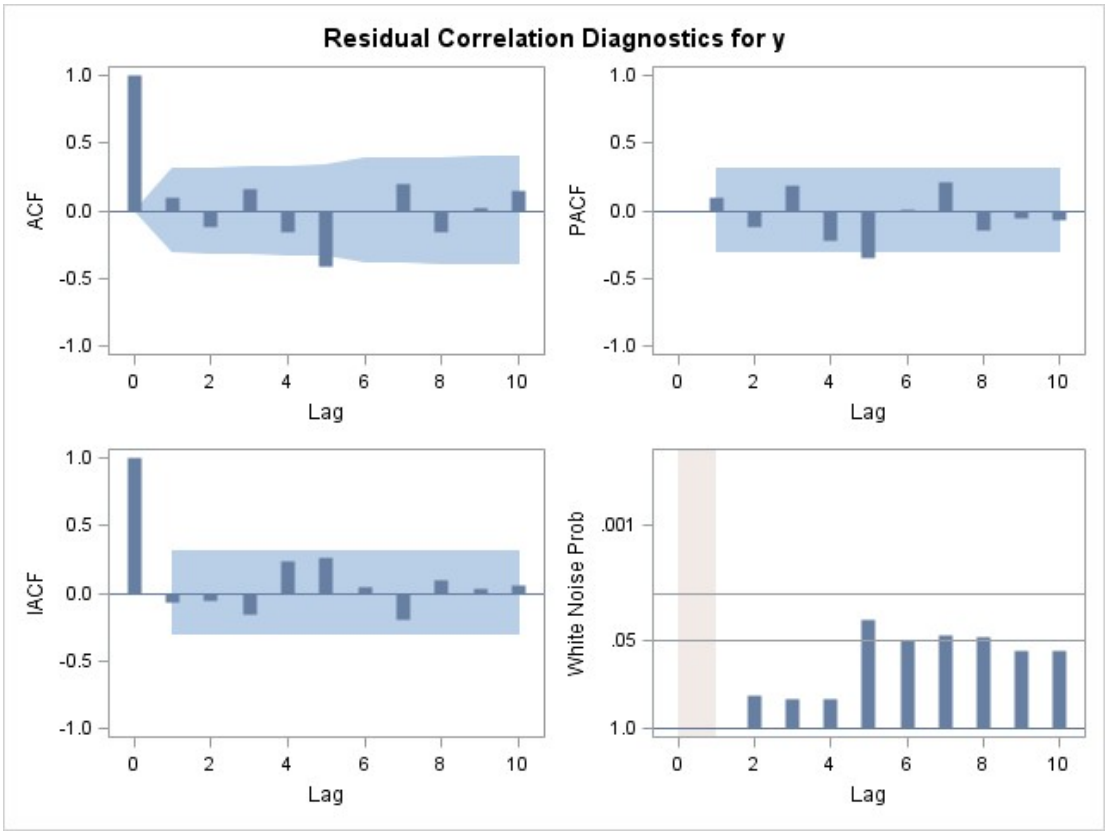
NUM2	0.35348	0.13315	2.65	0.0121	0	timesq	0
NUM3	70.10688	17.42697	4.02	0.0003	0	Q1	0
NUM4	-35.42856	19.52221	-1.81	0.0787	0	Q2	0
NUM5	-126.52509	16.95695	-7.46	<.0001	0	Q3	0

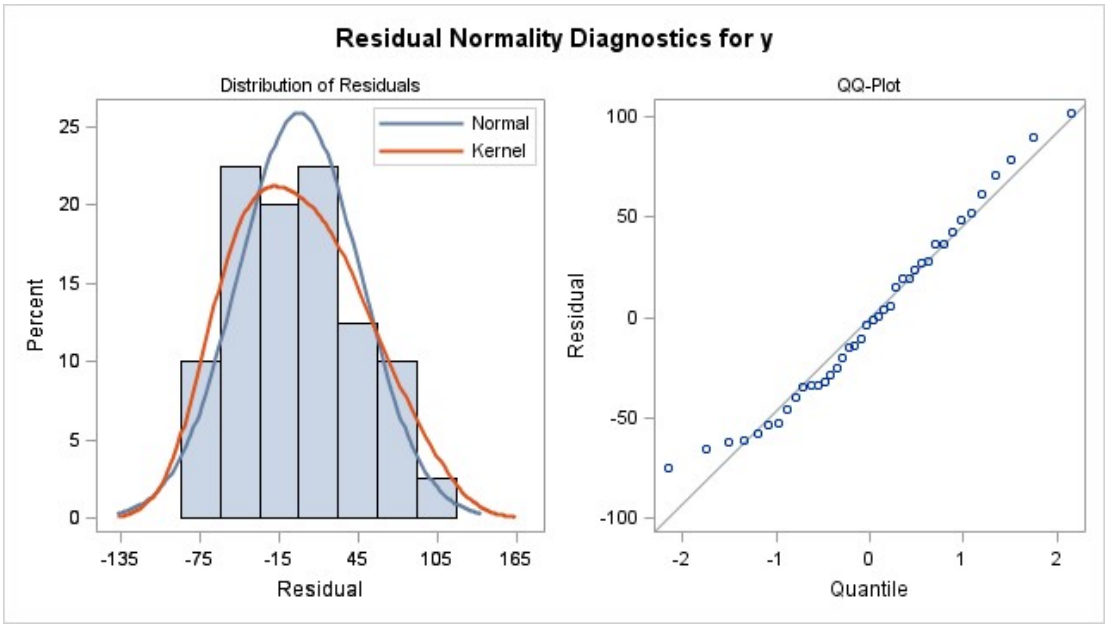
Constant Estimate	115.2595
Variance Estimate	2525.195
Std Error Estimate	50.25132
AIC	433.1832
SBC	445.0053
Number of Residuals	40

*** AIC and SBC do not include log determinant.**

Correlations of Parameter Estimates							
Variable Parameter	**y MU**	**y AR1,1**	**time NUM1**	**timesq NUM2**	**Q1 NUM3**	**Q2 NUM4**	**Q3 NUM5**
y MU	1.000	0.057	-0.785	0.643	-0.270	-0.201	-0.143
y AR1,1	0.057	1.000	-0.144	0.183	0.045	0.046	0.033
time NUM1	-0.785	-0.144	1.000	-0.963	0.044	-0.034	-0.054
timesq NUM2	0.643	0.183	-0.963	1.000	-0.013	0.051	0.061
Q1 NUM3	-0.270	0.045	0.044	-0.013	1.000	0.586	0.360
Q2 NUM4	-0.201	0.046	-0.034	0.051	0.586	1.000	0.575
Q3 NUM5	-0.143	0.033	-0.054	0.061	0.360	0.575	1.000

Autocorrelation Check of Residuals									
To Lag	**Chi-Square**	**DF**	**Pr > ChiSq**	**Autocorrelations**					
6	11.13	5	0.0489	0.093	-0.114	0.154	-0.159	-0.406	-0.004
12	25.82	11	0.0069	0.195	-0.162	0.026	0.151	-0.159	-0.379
18	30.27	17	0.0244	-0.032	-0.074	-0.019	0.149	0.182	0.024
24	32.02	23	0.0997	-0.036	0.106	-0.048	0.001	0.070	0.006





Model for variable y	
Estimated Intercept	283.9491

Autoregressive Factors	
Factor 1:	1 - 0.59408 B**(1)

Input Number 1	

Input Variable	time
Overall Regression Factor	-9.21968

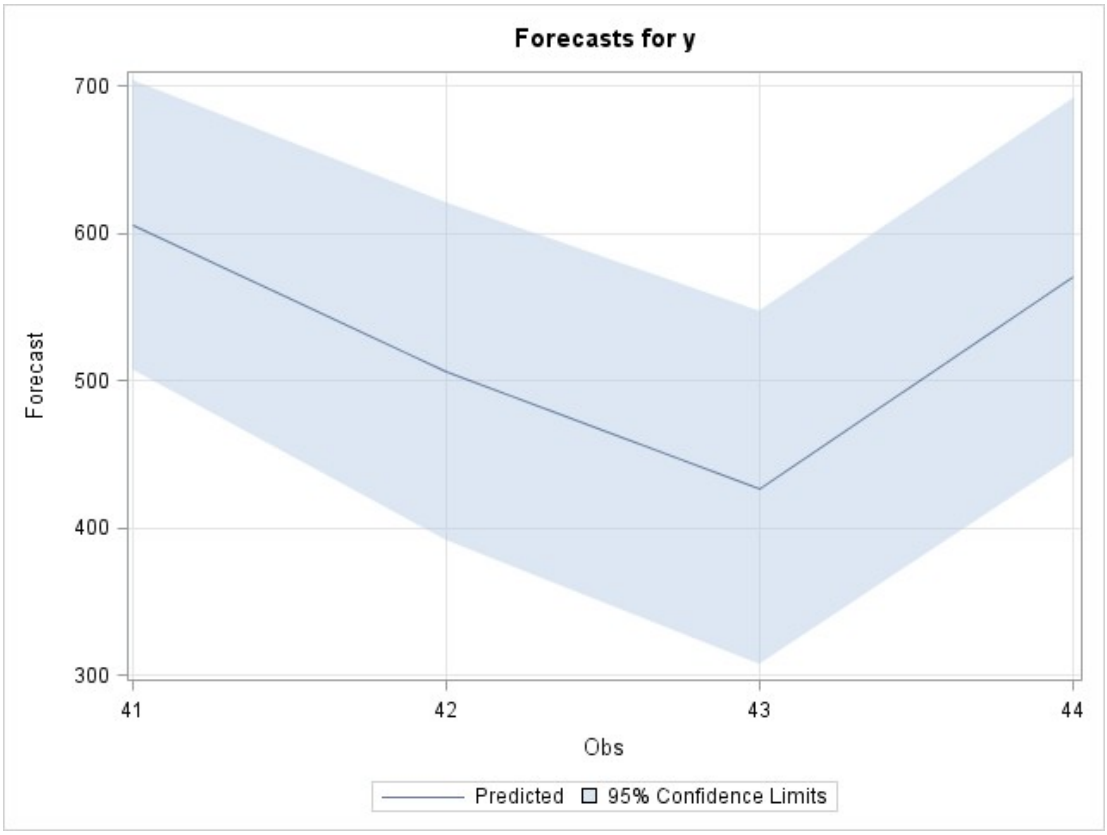
Input Number 2	
Input Variable	timesq
Overall Regression Factor	0.353478

Input Number 3	
Input Variable	Q1
Overall Regression Factor	70.10688

Input Number 4	
Input Variable	Q2
Overall Regression Factor	-35.4286

Input Number 5	
Input Variable	Q3
Overall Regression Factor	-126.525

Forecasts for variable y				
Obs	Forecast	Std Error	95% Confidence Limits	
41	605.3285	50.2513	506.8378	703.8193
42	505.6717	58.4502	391.1114	620.2320
43	426.9411	61.0817	307.2232	546.6591
44	569.9732	61.9838	448.4872	691.4592


Forecasts for y
700
600
500
400
300
Forecast
41
42
43
44
Obs
Predicted
95% Confidence Limits

The SAS System

Obs	y	FORECAST	STD	L95	U95	RESIDUAL
1	344.39	345.190	50.2513	246.699	443.681	-0.800
2	246.63	231.020	50.2513	132.529	329.511	15.610
3	131.53	141.938	50.2513	43.447	240.428	-10.408
4	288.87	251.885	50.2513	153.394	350.375	36.985
5	313.45	338.267	50.2513	239.776	436.758	-24.817
6	189.76	203.941	50.2513	105.450	302.432	-14.181
7	179.10	100.602	50.2513	2.111	199.093	78.498
8	221.10	273.743	50.2513	175.252	372.233	-52.643
9	246.84	292.751	50.2513	194.261	391.242	-45.911
10	209.00	160.262	50.2513	61.771	258.753	48.738
11	51.21	109.073	50.2513	10.582	207.564	-57.863
12	133.89	195.954	50.2513	97.463	294.445	-62.064
13	277.01	240.278	50.2513	141.787	338.769	36.732
14	197.98	178.670	50.2513	80.179	277.161	19.310
15	50.68	104.159	50.2513	5.668	202.649	-53.479
16	218.08	198.420	50.2513	99.929	296.910	19.660
17	365.10	294.222	50.2513	195.731	392.713	70.878
18	207.51	236.079	50.2513	137.588	334.570	-28.569
19	54.63	116.044	50.2513	17.553	214.535	-61.414
20	214.09	208.138	50.2513	109.647	306.629	5.952
21	267.00	300.371	50.2513	201.881	398.862	-33.371
22	230.28	187.467	50.2513	88.976	285.958	42.813
23	230.32	140.387	50.2513	41.896	238.878	89.933
24	426.41	324.476	50.2513	225.985	422.967	101.934
25	467.06	439.618	50.2513	341.128	538.109	27.442
26	306.03	320.578	50.2513	222.088	419.069	-14.548
27	253.23	200.796	50.2513	102.305	299.286	52.434
28	279.46	354.641	50.2513	256.150	453.132	-75.181
29	336.56	370.020	50.2513	271.530	468.511	-33.460
30	196.67	261.901	50.2513	163.410	360.392	-65.231
31	152.15	155.825	50.2513	57.334	254.316	-3.675
32	319.67	315.737	50.2513	217.246	414.228	3.933
33	440.00	416.202	50.2513	317.712	514.693	23.798
34	315.04	346.795	50.2513	248.304	445.285	-31.755
35	216.42	250.736	50.2513	152.245	349.227	-34.316
36	339.78	379.657	50.2513	281.166	478.147	-39.877
37	434.66	455.035	50.2513	356.544	553.526	-20.375

38	399.66	371.656	50.2513	273.165	470.146	28.004
39	330.80	330.189	50.2513	231.698	428.679	0.611
40	539.78	477.937	50.2513	379.446	576.428	61.843
41	.	605.329	50.2513	506.838	703.819	.
42	.	505.672	58.4502	391.111	620.232	.
43	.	426.941	61.0817	307.223	546.659	.
44	.	569.973	61.9838	448.487	691.459	.