Polynomial Regression Example – Quadratic Fit, Y = time to chug a beverage, X = weight for n = 13 college guys
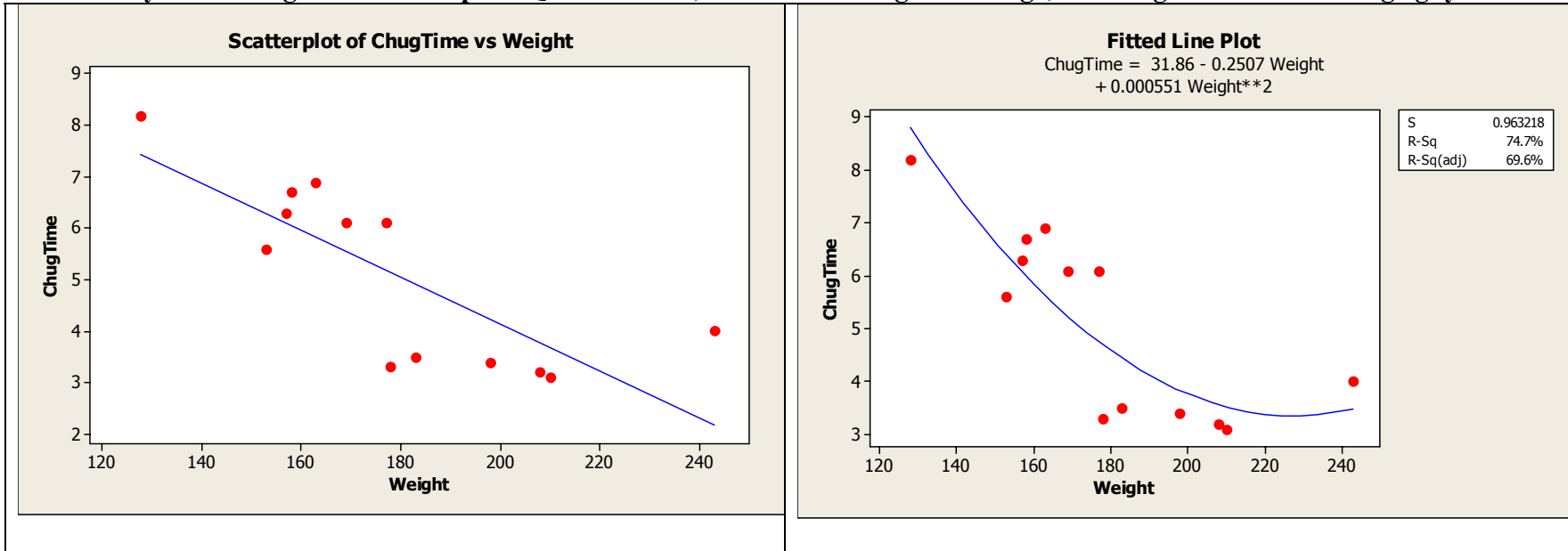

Scatterplot of ChugTime vs Weight

Fitted Line Plot
ChugTime = 31.86 - 0.2507 Weight + 0.000551 Weight**2

S	0.963218
R-Sq	74.7%
R-Sq(adj)	69.6%

Mean Weight = 178.85 pounds. WtCentered = (Weight – Mean Weight) = Weight – 178.85

The regression equation is
ChugTime = 31.9 - 0.251 Weight + 0.000551 Wt-Sqd

Predictor	Coef	SE Coef	T	P
Constant	31.858	8.498	3.75	0.004
Weight	-0.25070	0.09244	-2.71	0.022
Wt-Sqd	0.0005511	0.0002474	2.23	0.050

S = 0.963218   R-Sq = 74.7%   R-Sq(adj) = 69.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	27.331	13.666	14.73	0.001
Residual Error	10	9.278	0.928		
Total	12	36.609			

Correlation between weight and (weight)^2 = .995
Correlation between weight and (weight)^2 leads to large standard errors for the coefficients and unstable tests.

The regression equation is
ChugTime = 4.65 - 0.0536 WtCentered + 0.000551 WtC-Sqd

Predictor	Coef	SE Coef	T	P
Constant	4.6482	0.3375	13.77	0.000
WtCentered	-0.053573	0.009890	-5.42	0.000
WtC-Sqd	0.0005511	0.0002474	2.23	0.050

S = 0.963218   R-Sq = 74.7%   R-Sq(adj) = 69.6%

Analysis of Variance

Source	DF	SS	MS	F	P
Regression	2	27.331	13.666	14.73	0.001
Residual Error	10	9.278	0.928		
Total	12	36.609			

Correlation between Centered Wt and (Centered Wt)^2 = .353