12.14 Eleven student teachers took part in an evaluation program designed to measure teacher effectiveness and determine what factors are important. The response measure was a quantitative evaluation of the teacher. The regressor variables were scores on four standardized tests given to each teacher. The data are as follows:

y	x_1	x_2	x_3	x_4
410	69	125	59.00	55.66
569	57	131	31.75	63.97
425	77	141	80.50	45.32
344	81	122	75.00	46.67
324	0	141	49.00	41.21
505	53	152	49.35	43.83
235	77	141	60.75	41.61
501	76	132	41.25	64.57
400	65	157	50.75	42.41
584	97	166	32.25	57.95
434	76	141	54.50	57.90

Estimate the multiple linear regression equation

$$\mu_{Y|x_1,x_2,x_3,x_4} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4.$$

Correlation Matrix

	y	*x1*	*x2*	*x3*	*x4*
y	1				
x1	0.2565	1			
x2	0.2906	0.08453	1		
x3	-0.63737	0.128	-0.3809	1	
x4	0.70203	0.36658	-0.23452	-0.55377	1

SUMMARY OUTPUT

Adjusted R Square	
Multiple R	0.853286586
R Square	0.728097997
Adjusted R Square	0.546829996
Standard Error	71.14738328
Observations	11

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	81329.20821	20332.30205	4.01669346	0.064010376
Residual	6	30371.70088	5061.950147		
Total	10	111700.9091			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-884.6670264	748.6790585	-1.1816372	0.282056516	-2716.618687	947.2846345
x1	-0.838131327	1.413559779	-0.59292245	0.574884701	-4.296987502	2.620724848
x2	4.906609903	2.936870847	1.670693114	0.14581792	-2.279654179	12.09287398
x3	1.331129426	3.229660009	0.412157757	0.694544438	-6.571563925	9.233822778
x4	11.93128758	5.600806664	2.130280206	0.077179481	-1.773392626	25.63596778

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.848763699
R Square	0.720399816
Adjusted R Square	0.600571166
Standard Error	66.79563147
Observations	11

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	3	80469.3144	26823.1048	6.011916313	0.023792631
Residual	7	31231.59469	4461.656384		
Total	10	111700.9091			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-602.6902824	285.477357	-2.111166674	0.072663138	-1277.736964	72.35639936
x1	-0.420437752	0.925172991	-0.454442311	0.663267167	-2.608124242	1.767248739
x2	3.936587898	1.649291945	2.386835095	0.048393402	0.036632166	7.83654363
x4	9.924963706	2.600594251	3.81642146	0.006572766	3.775535472	16.07439194

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.843890336
R Square	0.712150899
Adjusted R Square	0.640188624
Standard Error	63.39657543
Observations	11

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	79547.90288	39773.95144	9.89616988	0.0068653
Residual	8	32153.00621	4019.125776		
Total	10	111700.9091			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-586.570495	268.8504275	-2.18177259	0.06069451	-1206.54069	33.3997028
x2	3.795291446	1.5372961	2.46880965	0.03878236	0.250280283	7.34030261
x4	9.453518074	2.263361717	4.176759729	0.00309332	4.234196594	14.6728396

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.656713538
R Square	0.43127267
Adjusted R Square	0.289090838
Standard Error	11.3109592
Observations	11

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	776.1339803	388.0669901	3.033247378	0.104620404
Residual	8	1023.502383	127.9377979		
Total	10	1799.636364			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	222.9910962	34.64210632	6.436995895	0.000201065	143.1062558	302.8759366
x3	-0.638847734	0.277685437	-2.30061663	0.050422275	-1.279191499	0.001496032
x4	-0.945911775	0.471444727	-2.006410766	0.079720417	-2.033065264	0.141241714