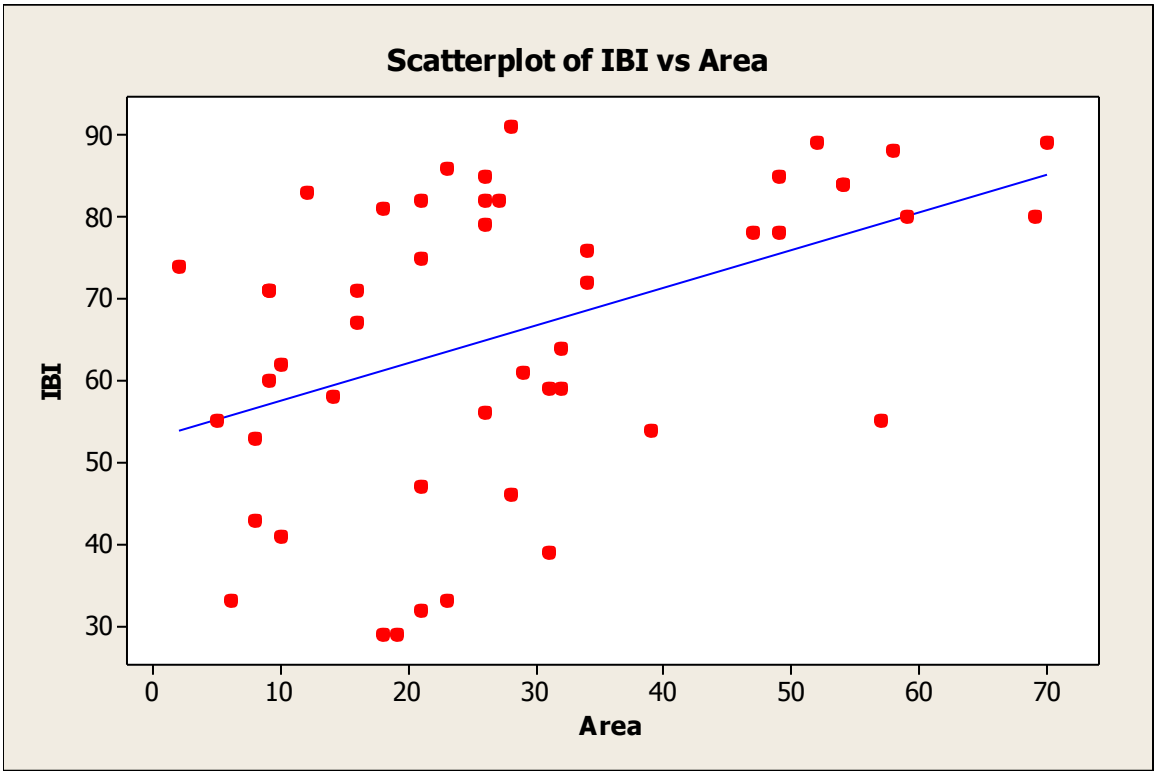
Problem 1.

(a).



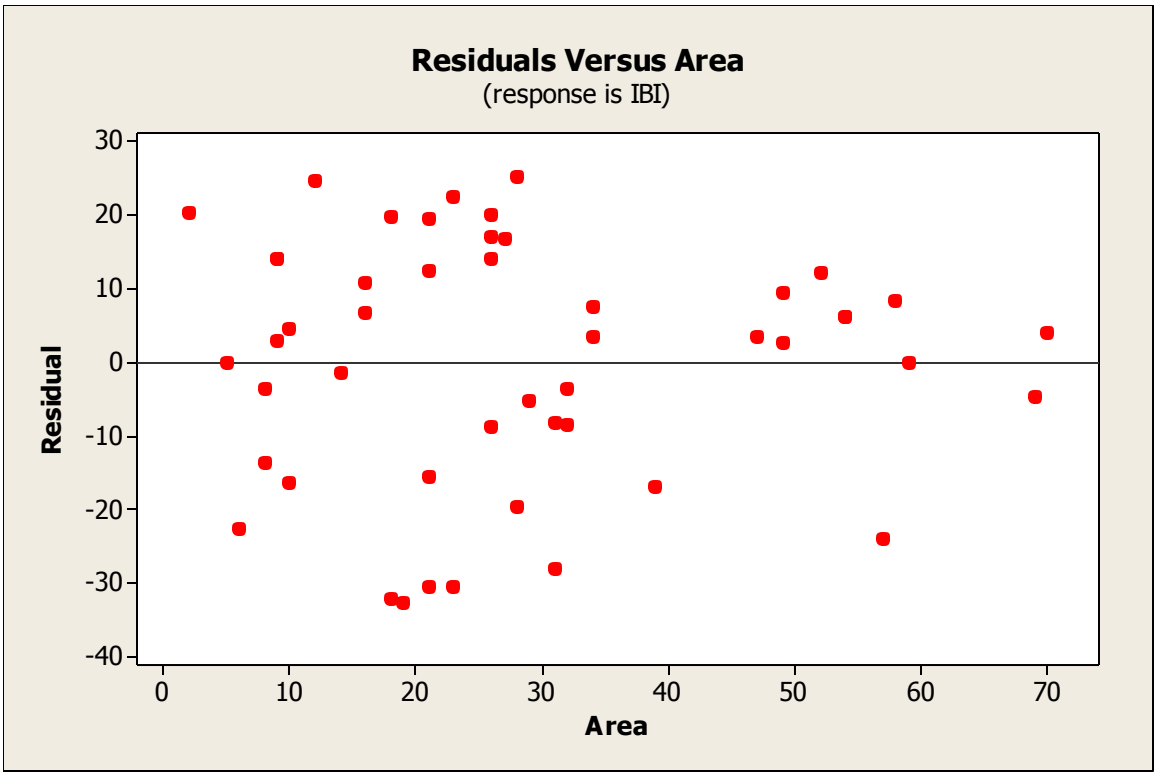
Regression Analysis: IBI versus Area

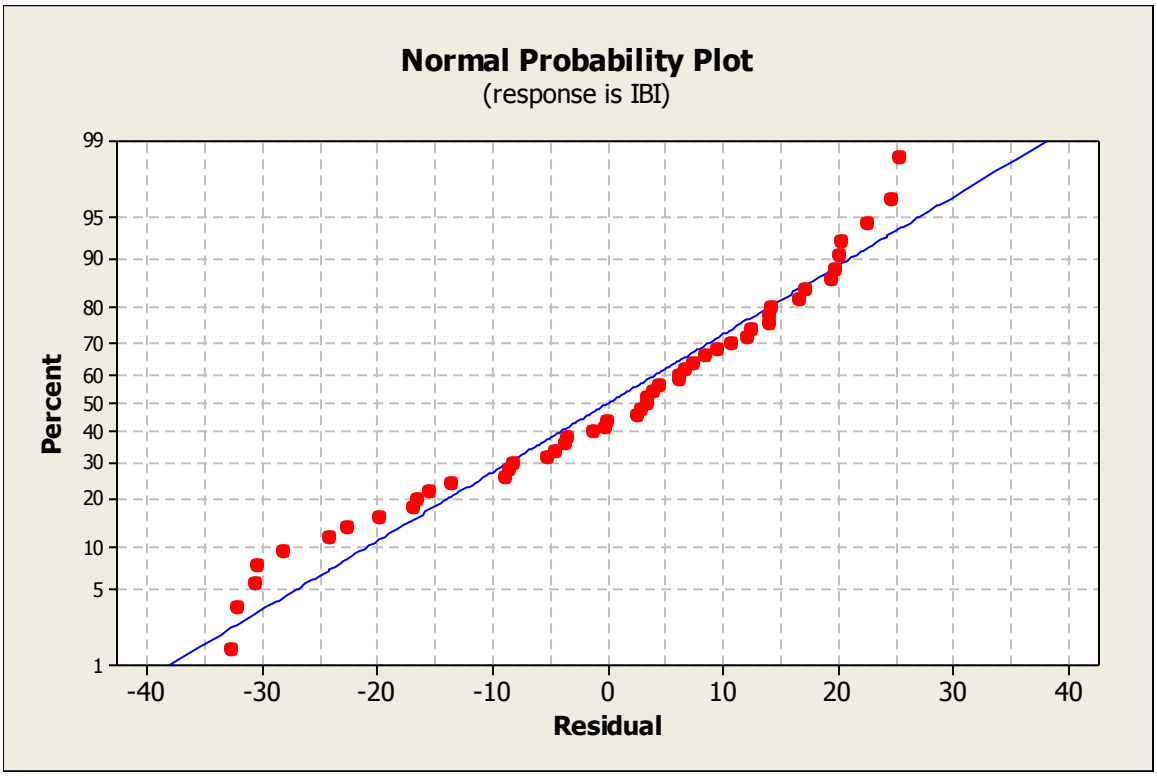
The regression equation is
IBI = 52.9 + 0.460 Area

Predictor	Coef	SE Coef	T	P
Constant	52.923	4.484	11.80	0.000
Area	0.4602	0.1347	3.42	0.001

S = 16.5346 R-Sq = 19.9% R-Sq(adj) = 18.2%

(b).





The residuals appear to be approximately Normal distributed. According to the graph,it is easy to see that the plot follows the regression line and the distribution seems to be normal. We can conclude that it is approximately normal distributed.

(c).

```
Predicted Values for New Observations

New Obs    Fit   SE Fit       95% CI            95% PI
      1  77.77     4.19  (69.34, 86.21)  (43.46, 112.09)


Values of Predictors for New Observations

New Obs  Area
      1  54.0
```

(d). The 95% prediction interval is (43.46, 112.09) for a future response when an area is 54km^2.

(e). **Correlations: Area, IBI**

```
Pearson correlation of Area and IBI = 0.446
P-Value = 0.001
```

H_0: p=0 H_a: p≠0

The P-value is 0.001. It is smaller than the significant level 0.05, so we reject the null hypothesis.

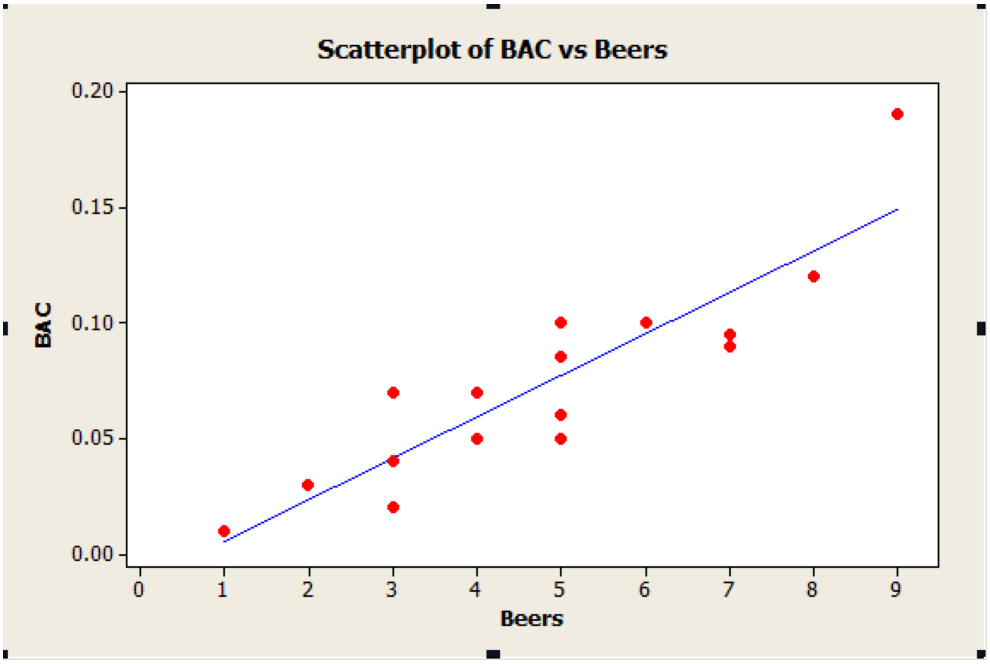
$t = r(n-2)^{0.5} / (1-r^2)^{0.5} = 3.41621$

p = (0.001+0.0005) / 2 = 0.00075

These two p-values are approximately equal, so the correlation is a good numerical measure to describe these data.

Problem 2.

(a).



Regression Analysis: BAC versus Beers

```
The regression equation is
BAC = - 0.0127 + 0.0180 Beers


Predictor      Coef   SE Coef      T      P
Constant   -0.01270   0.01264  -1.00  0.332
Beers      0.017964  0.002402   7.48  0.000


S = 0.0204410   R-Sq = 80.0%   R-Sq(adj) = 78.6%


Analysis of Variance

Source          DF        SS        MS      F      P
Regression       1  0.023375  0.023375  55.94  0.000
Residual Error  14  0.005850  0.000418
Total           15  0.029225
```

R-sq is 80%.

The data analysis shows that there is a strong relationship between the beer that student drank and the blood alcohol content. The more beers the students drink, the more BAC they get.

(b) H_0: p=0

H_a: p≠0

Correlations: Beers, BAC

```
Pearson correlation of Beers and BAC = 0.894
P-Value = 0.000
```
T = 7.48

Based on the T value, the related P-value is less than 0.0005.

So there is a significant evidence shows that drinking more beers increase BAC on the average in the population of all students.

(c) **Regression Analysis: BAC versus Beers**

```
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Analysis of Variance
```

```
Source          DF        SS        MS      F      P
Regression       1  0.023375  0.023375  55.94  0.000
Residual Error  14  0.005850  0.000418
Total           15  0.029225


Unusual Observations

Obs  Beers      BAC      Fit   SE Fit  Residual  St Resid
  3   9.00  0.19000  0.14897  0.01128   0.04103      2.41R

R denotes an observation with a large standardized residual.


Predicted Values for New Observations

New†Obs      Fit   SE Fit        90% CI              90% PI
      1  0.07712  0.00513  (0.06808, 0.08615)  (0.04000, 0.11424)


Values of Predictors for New Observations

New†Obs  Beers
      1   5.00
```

Since the upper bound of prediction interval is greater than 0.08, so he won't be confident about he will not get arrested.