(12.8) a) The least-squares line is: $\hat{y} = 195.90154 + 0.67013x$

c) ANOVA Table:

Source	DF	SS	MS	F	P
Regression	1	43147	43147	69.582	0.003612
Error	3	1860	620		
Total	4	45007			

b)

Prof Asimov- Number of Books per Month

$y = 0.6701x + 195.9$
$R^2 = 0.9587$

(Time in Months vs Number of Books)
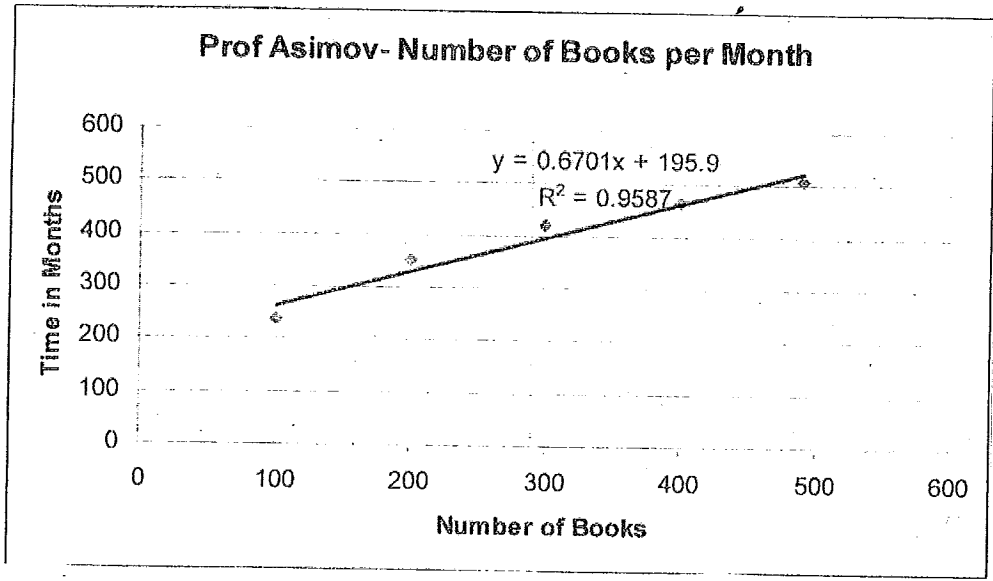
(12.11) a) Independent Variable X : <u>ELL</u>

Dependent Variable Y : <u>API</u>

b) Yes.

12.11

Achievement Test Corelation

$y = -3.0399x + 731.28$
$R^2 = 0.7298$

(API vs ELL)
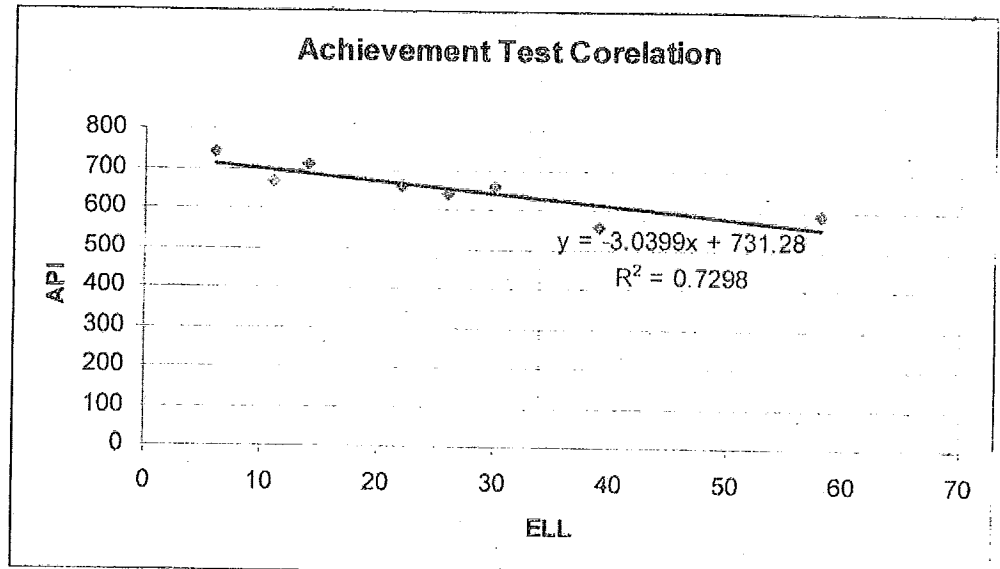
c) $\hat{y} = 731.277 - 3.040x$.

d) Yes. The line fit through the data points.

(12.20)

a) $\hat{y} = -1.065 + 4.489x$

b) Yes with $F = 468.67$ and $p\text{-value} = 0.00002695$

c) $r^2 = 0.9925$, the value of r is fairly close to 1. the largest possible value of r which indicates a fairly strong positive linear relationship between them.

(12.22)

a) The hypotheses to be tested are $H_0 : \beta = 0$ vs $H_a : \beta \neq 0$.

$$t = \frac{b - 0}{\sqrt{MSE/S_{xx}}} = \frac{0.67013}{\sqrt{620/96080}} = \frac{0.67013}{0.08033} = 8.342$$

Since $t_\alpha = t_{0.005, 3} = 5.841$, $t = 8.342 > t_{0.005, 3} = 5.841$, so $p\text{-value} < 0.005$.

b) $r^2 = \dfrac{SSR}{TotalSS} = \dfrac{(S_{xy})^2}{S_{xx} S_{xy}} = 0.9587$, the regression model is working very well.

c) Yes, it is a good fit for the data.

No, they are no any assumptions that may have been violated in fitting the linear model.

(12.39) a) Although very slight, the students might notice a slight curvature to the the points.

b) The fit of the linear is very good, assuming that this is indeed the correct model for this data set.

c) The normal probability plot follows the correct pattern for the assumption of normality. However, the residuals show the pattern of a quadratic curve, indicating that a quadratic rather than a linear model may have been the correct model for this data.

(12.50) a) negatively correlated, that means there is a negative linear relationship between O.tridens and O. lowei.

b) $H_0: P = 0$ vs $H_a. P \neq 0$

c) By Minitab Output, $r^2 = 0.3046$ and $r = -0.5519$ (negative regression)

Test statistic: $t = r \cdot \sqrt{\frac{n-2}{1-r^2}} = -0.5519 \cdot \sqrt{\frac{8}{0.6954}} = -1.871943$

$-t_{.025} = -2.306$, since $t > -t_{\alpha/2}$, so we do not reject H_0, which means the population correlation coefficient P equals 0.