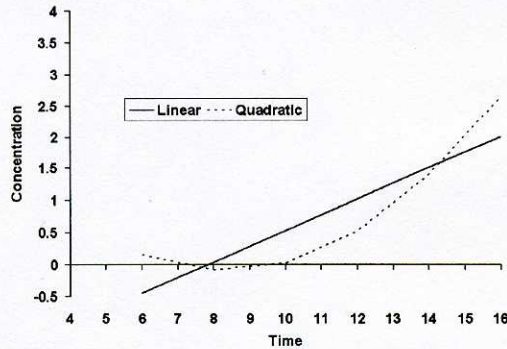
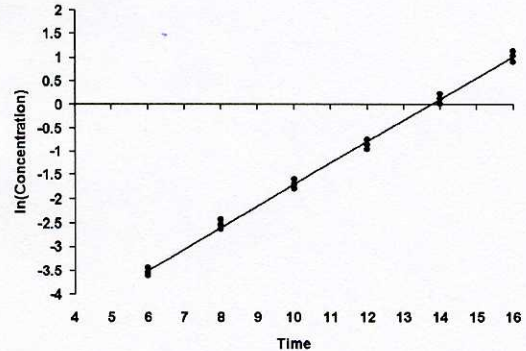


1. a Plots of  $Y$  vs.  $X$  and  $\ln Y$  vs.  $X$  are shown below. The least squares line and the least squares parabola are also shown.

Q.1.a (i)



Q.1.a (ii)



- b From the computer output we find:

(1) Degree 1:  $\hat{Y} = -1.932 + 0.246X$

(2) Degree 2:  $\hat{Y} = 3.172 - 0.781X + 0.047X^2$

(3)  $\ln Y$  on  $X$ :  $\ln \hat{Y} = -6.21 + 0.451X$

- (4) The above fitted equations are plotted on the graphs presented for 1(a).

c	Source	df	SS	MS	F
	Regression	1	12.7054	12.7054	43.69
	Residual:				
	Lack of fit	4	4.4195	1.1049	56.95
	Pure Error	12	0.2325	0.0194	
	Total	17	17.3574		

Explanation: the calculations are easier to understand if the ANOVA table for the quadratic regression (see part (d) below) is determined first. Working from that table, the SS(lack of fit) for the linear regression is the sum of the residual SS(lack of fit) and the regression SS(Quadratic). The MS column shown above is determined as usual (SS/df). The  $F$  statistic for the overall test is most easily determined by calculating the square of the  $t$ -statistic (6.610) shown near the top of the SAS output. The  $F$  statistic for lack of fit is calculated as MS(lack of fit)/MS(pure error)