

Answers to 'Q' Questions

13 Correlation and Regression

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Q13.1

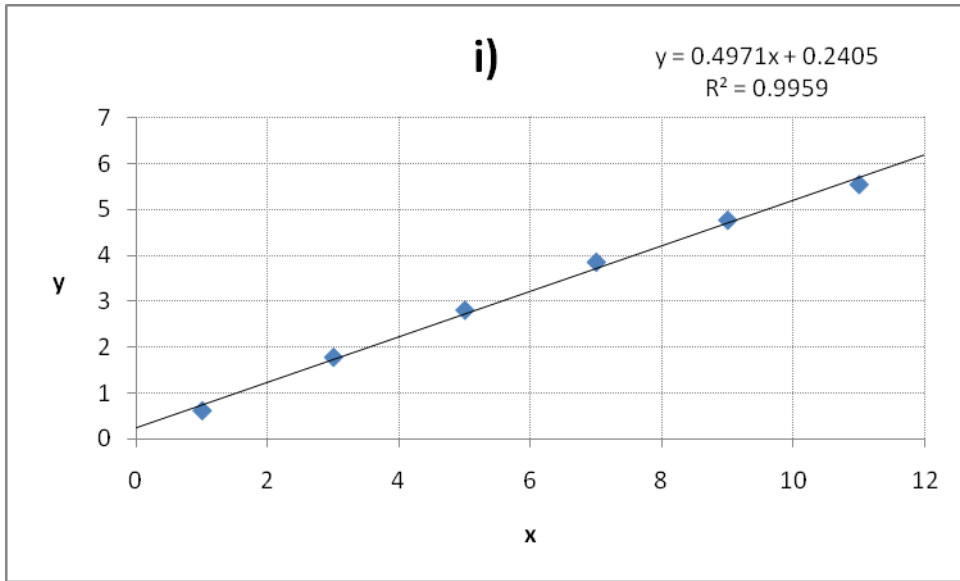
- i) Using CORREL in Excel, Correlation Coefficient $r = 0.715$
- ii) Critical Value from tables, $r_{CRIT} = 0.622$. Since $r > r_{CRIT}$, there is a linear relationship. ($p = 0.023$)
- iii) See Ch13E.xls, using Data Analysis Tools > Regression, the 2-tailed value is 0.105284 so the 1-tailed value is $0.105284/2 = 0.052642$

Q13.2

- i) [13.6] $r = \frac{m \times s_x}{s_y} = \frac{1.11 \times \sqrt{0.006627}}{\sqrt{0.027721}} = 0.542$
- ii) For sample size = 10, 1-tail, $r_{CRIT} = 0.549$ from tables
As $r < r_{CRIT}$, no evidence to accept that there is a linear relationship
- iii) MiniTab gives the 2-tailed value as 0.10528 so the 1-tailed will be $0.10528/2 = 0.05264$

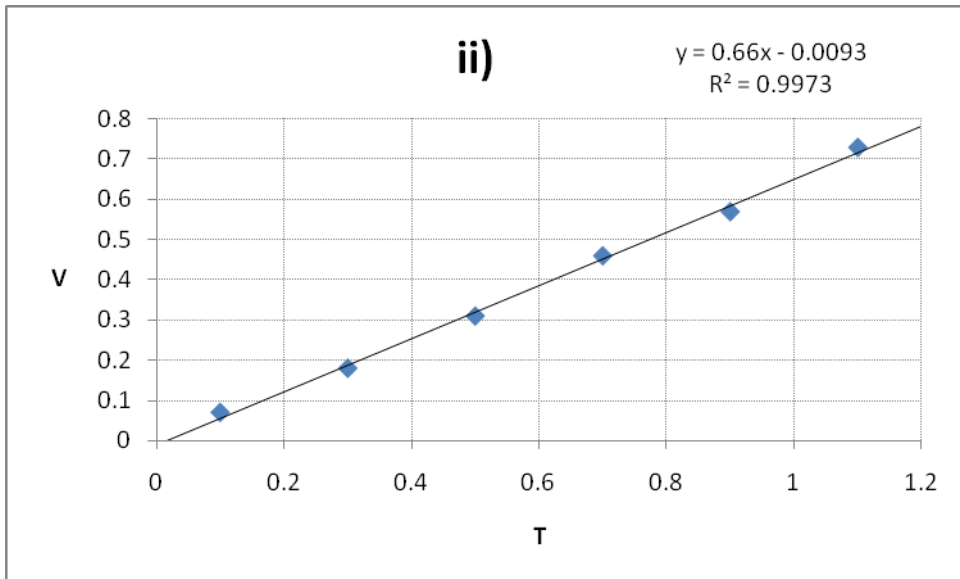
Q13.3

i)



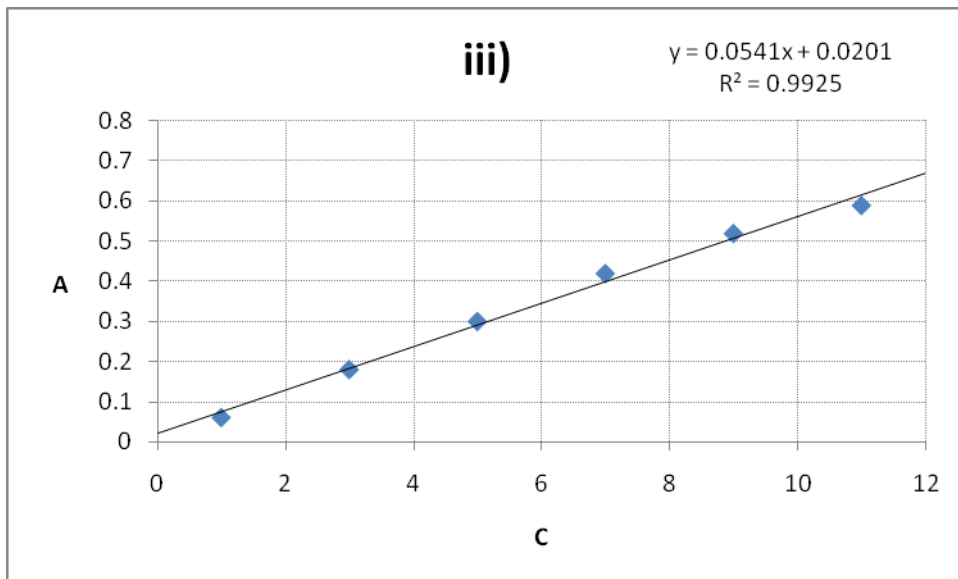
There may be a slight curvature as the first and last points are both below the line. There is a considerable intercept.

ii)



A good scatter of points, high value of correlation coefficient r and small intercept.

iii)



Slightly lower r value than i) and there does seem to be small curvature on these points.

Q13.4

i) See Excel Ch13E.xls. Sheet Q13.4

$$C_0 = 1.578431$$

ii) uncertainty in $C_0 = 0.147652$

iii) $df = n - 2 = 5 - 2 = 3$

$$t_{2,0.05,3} = 3.18$$

$$Cd = 3.18 \times 0.1476 = 0.469$$

$$CI = (1.578 - 0.469) \text{ to } (1.578 + 0.469) = 1.1 \text{ to } 2.05 \quad \text{to 2 dp.}$$