Module 20 self-assessment

Question 1

The following data show the unit costs of producing certain electronic components and the number of the units produced.

$$(x, y) = \{(50, 108), (100, 65), (250, 21), (500, 13), (1000, 4), (2000, 2.2), (5000, 1)\},$$

where x is the lot size and y the unit cost. Fit a model of the form $y = ax^b$ in order to predict the unit cost for a lot size of 300.

Question 2

The pressure P of a gas corresponding to various volumes V was recorded as follows

$$(V, P) = \{(50, 64.6), (60, 51.3), (70, 40.5), (90, 25.9), (100, 7.8)\}$$

with measurement units cm^3 and kg/cm^2. The ideal gas law is given by the equation

$$PV^\lambda = C,$$

where λ and C are constants. After transforming the above equation use least squares to estimate the two constants and then predict the pressure for that gas when $V = 80$ cm^3.