(b) So, $P \cdot V^{1.40371} = 15929.3723241$ —(1)

is the equation connecting P & V

(c) given $V = 100$

using equation 1

$$P = \frac{15929.3723241}{(100)^{1.40371}} \simeq 24.81867$$

4

X	0	1	2	3	4	5	6
Y	2.4	2.1	3.2	5.6	9.3	14.6	21.9

$$Y = W_0 + W_1 x + W_2 x^2$$

$$J = \frac{1}{2m} \sum_{i=1}^{m} \left(\omega_0 + \omega_1 x_i + \omega_2 x_i^2 - y_i \right)^2$$

$$\frac{\partial J}{\partial \omega_0} = \frac{1}{2m} \sum_{i=1}^{m} 2\left(\omega_0 + \omega_1 x_i + \omega_2 x_i^2 - y_i\right)(1)$$

$$\frac{\partial J}{\partial \omega_1} = \frac{1}{2m} \sum_{i=1}^{m} 2\left(\omega_0 + \omega_1 x_i + \omega_2 x_i^2 - y_i\right)(x_i)$$

$$\frac{\partial J}{\partial \omega_2} = \frac{1}{2m} \sum_{i=1}^{m} 2\left(\omega_0 + \omega_1 x_i + \omega_2 x_i^2 - y_i\right)(x_i^2)$$

Solving $\frac{\partial J}{\partial \omega_0} = 0$, $\frac{\partial J}{\partial \omega_1} = 0$, $\frac{\partial J}{\partial \omega_2} = 0$

$$\frac{\partial J}{\partial \omega_0} = \frac{1}{m}\left(\omega_0 m + \omega_1 \sum x_i + \omega_2 \sum x_i^2 - \sum y_i\right) = 0$$

$$\frac{\partial J}{\partial \omega_1} = \frac{1}{m}\left(\omega_0 \sum x_i + \omega_1 \sum x_i^2 + \omega_2 \sum x_i^3 - \sum y_i x_i\right) = 0$$

$$\frac{\partial J}{\partial \omega_2} = \frac{1}{m}\left(\omega_0 \sum x_i^2 + \omega_1 \sum x_i^3 + \omega_2 \sum x_i^4 - \sum y_i x_i^2\right) = 0$$

$$\omega_0 \cdot (7) + \omega_1 \cdot (21) + \omega_2 (91) - 59.1 = 0 \quad \text{---(1)}$$

$$\omega_0 (21) + \omega_1 (91) + \omega_2 (441) - 266.9 = 0 \quad \text{---(2)}$$

$$\omega_0 (91) + \omega_1 (441) + \omega_2 (2275) - 1367.5 = 0 \quad \text{---(3}$$

~~so~~ Solving equations (1), (2) and (3), we get

$\omega_0 = 2.5095$, $\omega_1 = -1.2$, $z = 0.73334$

equation comes out to be

$$2.5095 - 1.2x + 0.73334x^2 = 0$$