

ANSWERS TO HOMEWORK # 1:

1) \implies Low cost, product differentiation, quality, delivery speed, delivery reliability, flexibility.

\implies Dell company mainly distinguishes itself from its competitors in the USA by product differentiation. Dell emphasizes on customization and variety by including the customers in the manufacturing cycle by carrying out a built-to-order mechanism.

2) a) $32,000 + 60 \cdot 10,000 = CP + 70 \cdot 1,000$

$$CP = 22,0000$$

b) Since $18,000 < 22,000$ (the break-even contract price)

then, choose to outsource

c) $32,000 + 60 \cdot Q = 180,000 + 70 \cdot Q$

$$\implies Q = 14,000 \implies \text{Breakeven quantity}$$

If Vestel management forecasts the demand to be at least 14,000 units, then they can decide to manufacture in-house.

3) a) For the first check,

$$Y(1) = a \cdot 1^{-b}$$

60 min

$$60 = a$$

$$Y(10) = 60 \cdot 10^{-b}$$

45 min

$$\ln(45) = \ln(60) - b \cdot \ln(10)$$

$$b \cdot \ln(10) = \ln(60) - \ln(45)$$

$$b = 0.125 \implies \text{Learning rate} = L = 2^{-b} = 2^{-0.125} = 0.917$$

b) Assume n^{th} unit is the one that the clerk will be able to work at 30 minutes (i.e. 2 checks per hour).

$$Y(n) = 60 \cdot n^{-0.125}$$

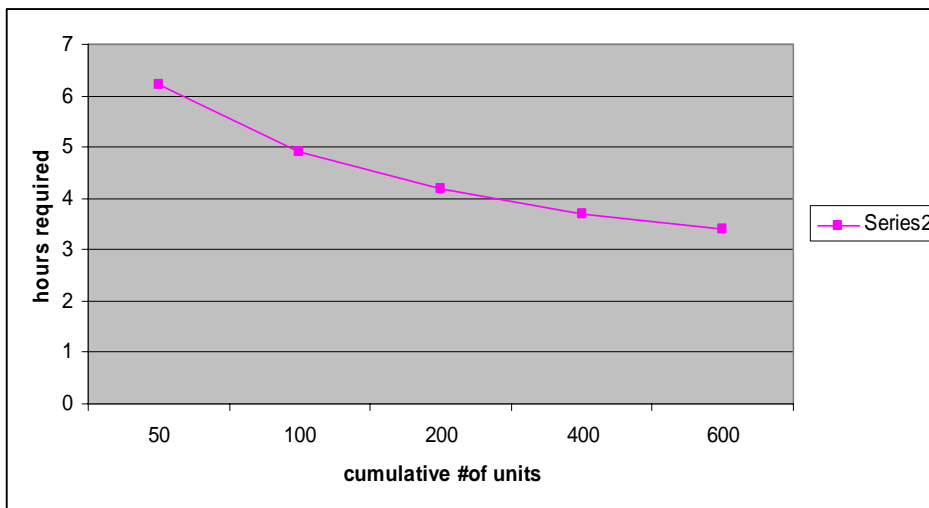
30 min

$$30 = 60 \cdot n^{-0.125}$$

$$\ln(0.5) = -0.125 \cdot \ln(n)$$

⇒ n = 256 Then, the clerk will be able to complete the 256th check in half an hour.

4) a)



b-c)

ln (# of cumulative units)

ln (hours required)

3.912

1.825

4.605

1.589

5.298

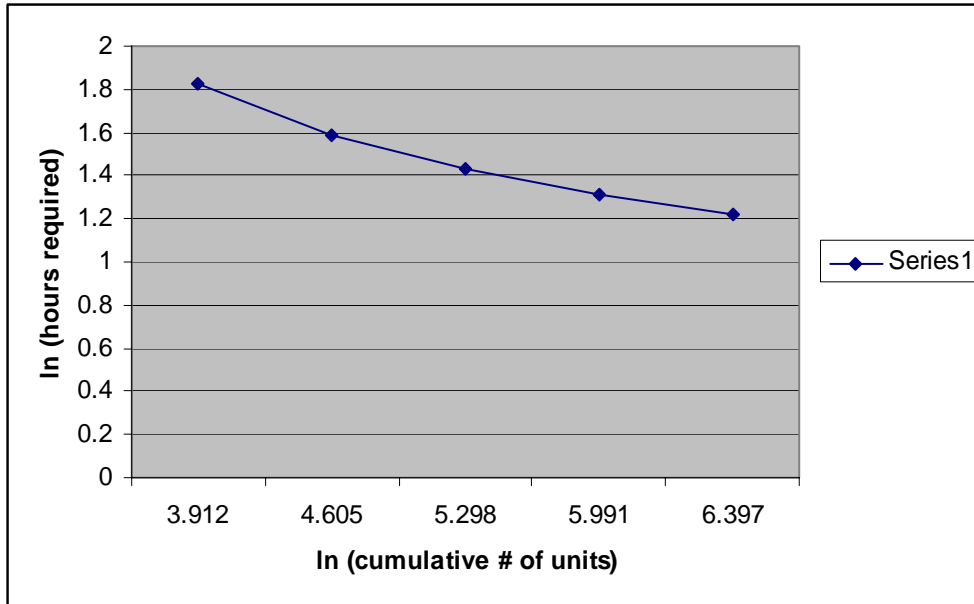
1.435

5.991

1.308

6.397

1.224



To find the equation of the line:

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{y - y_1}{x - x_1} \quad \text{where approximately } y_1 = 1.525 \quad y_2 = 1.224$$

$$x_1 = 3.912 \quad x_2 = 6.397$$

$$\frac{1.224 - 1.825}{6.397 - 3.912} = \frac{y - 1.825}{x - 3.912}$$

$$\Rightarrow -0.601 * \ln(x) + 2.351 = 2.485 * \ln(Y(x)) - 4.535$$

$$\Rightarrow \ln(Y(x)) = 2.771 - 0.242 * \ln(x)$$

$$\Rightarrow \text{For } x = 1, \quad \ln(Y(1)) = 2.771 - \underbrace{0.242 * \ln(1)}_0$$

$$Y(1) = 15.975$$

$$L = 2^{-b} \quad \text{where } b = 0.242$$

$$L = 0.846 \Rightarrow 84.6\%$$

$$d) \ln(Y(x)) = 2.771 - 0.242 * \ln(x)$$

$$\Rightarrow \ln(2.9) = 2.771 - 0.242 * \ln(x)$$

$$\Rightarrow \ln(x) = 7.05$$

$x \approx 1154^{\text{th}}$ part will be produced in 2.9 hours.