

# ISYE 3104 Fall 2005

## Homework #1 Solutions

### Answer for question 2.

**a. Low cost:** Introducing lower cost products into the market to gain some market share.

**Product differentiation:** Introducing unique products to either create a new market segment or to offer different choices to customers.

**Quality:** Quality has different meanings in different contexts but mainly it is the ability of the product to give the service as designed.

**Delivery Speed:** Quick response to the customer demand.

**Delivery Reliability:** Delivering the products on time, as promised.

**Flexibility:** Ability to adjust to the continuously changing market parameters. Responding to these changes quickly.

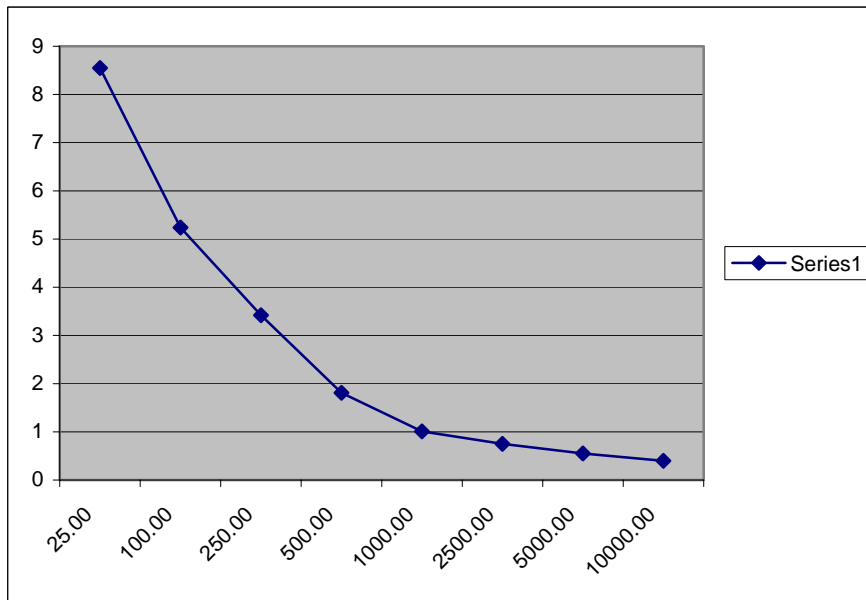
**Note:** The answers can vary from one student to other but the main ideas for each strategic dimension should be clear.

**b.** Wal-Mart with the low cost dimension shows a great success.

**c.** Wal-Mart differentiates itself by being the lowest cost competitor. In order to succeed in this, Wal-Mart manages its supply chain very efficiently and it uses its purchasing power significantly. Higher management of Wal-Mart names their company as a distribution company instead of a sales company. Wal-Mart can also lower the costs by understanding the best selling products and their characteristics, and then producing the same specifications cheaper by outsourcing.

**d.** Although its main focus is US, Wal-Mart is expanding through other countries. The company is for sure globally competitive but it will take some time for them to penetrate into new markets. The biggest competitors of Wal-Mart are Target, K-Mart and Sears.

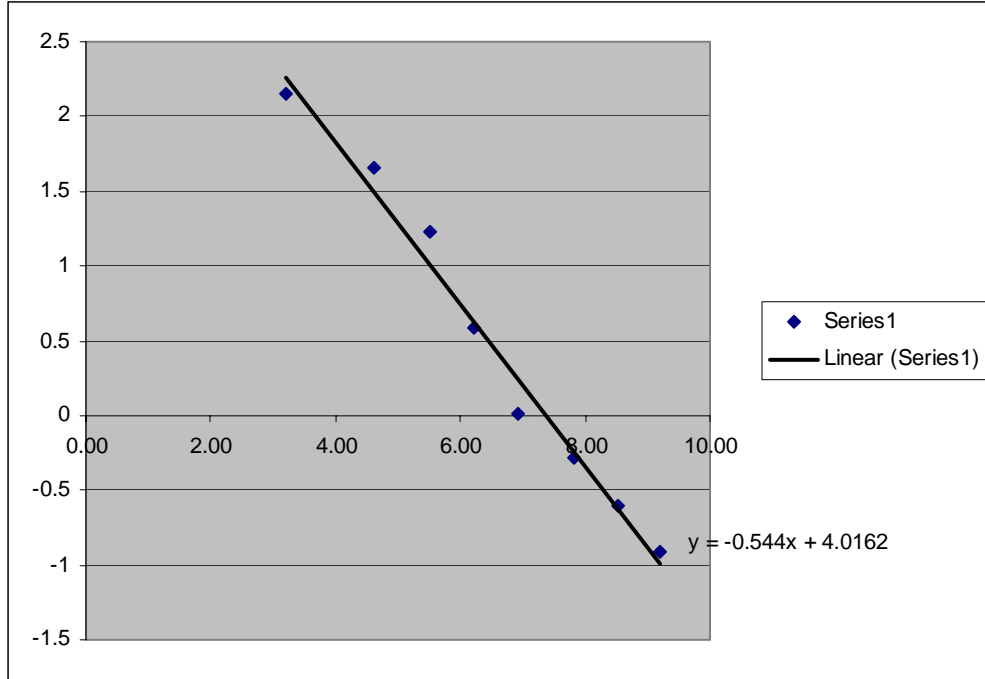
### Answer for question 3.



**a.**

Note: The above graph can be different if the scatter diagram is used, because the x-axis is not scaled in this graph.

**b-c-d.**



**Note:** For part (c) students will do a ballpark fit. Therefore the found intercept and slope will be different for each student. But the ballpark intercept and slope shouldn't be very apart from the exact calculations, which are: intercept= 4.0162 and slope=-0.544

**e.**

Using estimates from part (d): (which is the exact calculation of best fit)

$$a = \exp(\text{intercept}) = \exp(4.0162) = 55.49$$

$$b = -\text{slope} = 0.544$$

$$Y(u) = (55.49)u^{-0.544}$$

Using the estimates from part (c):

Let ballpark intercept be I and ballpark slope be S.

$$\text{Then } a = \exp(I)$$

$$b = -S$$

$$Y(u) = \exp(I) u^S$$

**f.** For best fit:

$$Y(1) = 55.49$$

$$Y(1238) = 1.15$$

For ballpark fit:

$$Y(1) = \exp(I)$$

$$Y(1238) = \exp(I) 1238^S$$

Two estimates will be close to each other if ballpark intercept and slope is close to the exact intercept and slope of the best line. The difference is going to be explained by the student.

**g.** The learning curve percentage is based on the best fit analysis not on the ballpark fit.

$$\ln(L) = -b \ln(2)$$

$$L = \exp(-b \ln(2)) = 68.6\%$$

**h.** The learning curve is not valid indefinitely. There might be some absolute lower limit on the production time of the product due to the nature of the manufacturing process. Therefore the production time cannot decrease after some point. But the learning curve calculations keep giving lower production times as we go higher in cumulative number of units produced. Thus, the results of learning curve should be interpreted with caution.

#### **Answer for question 4.**

**a.**  $\ln(0.75) = -b \ln(2)$

$$b = -\ln(0.75) / \ln(2) = 0.415$$

$$Y(u) = 35u^{-0.415}$$

Equality where to find breakeven quantity:

$$\sum_{u=1}^n 35u^{-0.415} + 5,000,000 = 39n$$

**b.** Breakeven point  $n = 5,000,000 / (39 - 35) = 1,250,000$