

**ISyE 3104 – Fall 2008**  
**Homework 2 – Due September 9, 2008 at 1:35pm**  
**(25 points)**

1. **(10 points)** TNBB computer manufacturer has been producing computers for 4 years. The computers have a common component which has been outsourced before. Now the company has the opportunity to produce that component itself. However, new equipment, which costs \$60,000, is required for the production of this component and the marginal cost after acquiring that equipment will be \$20 per unit. This key component costs \$80 when outsourced.
  - a. Find the yearly demand rate that will enable TNBB to make the investment worth in a year.
  - b. Suppose that \$20 is the cost of producing the first unit of this component in-house and there is an 80% experience curve (Hint: meaning that  $0.8=2^{-b}$  where  $y(x)$  refers to the cost of producing the  $x^{\text{th}}$  unit). Write an equation to compute the break-even quantity for producing in-house. (You do not need to compute the break even quantity.)
  
2. **(15 points)** A recently graduated industrial engineer joined a paper company. She observed the production process for a new paper product and noticed that it took 150 minutes to produce the first case of papers, whereas the 80<sup>th</sup> case took 60 minutes to produce.
  - a. Using the first and the 80<sup>th</sup> units (cases) calculate an estimate for the percentage of the learning curve. (Hint: you may use the linear equation after logarithm transformation  $\ln(Y(u)) = \ln(a) - b\ln(u)$ )
  - b. What is the estimated time required to produce the 200<sup>th</sup> unit (case)?
  - c. Write an equation to compute the total time required to produce the first 100 units (cases).