# OPS 370
# Homework #1

## Problem A (Module 2):

1.  Willie Wonka's Widget Factory has the following production data for 2012 and 2013.  To help increase revenue, Willie increased the sales price of widgets in the year 2013.

|                        | 2012      | 2013      |
|-----------------------:|-----------|-----------|
| Widgets produced       | 18,000    | 17,000    |
| Sale price per widget  | $53       | $61       |
| Total labor hours      | 25,000    | 23,000    |
| Wage rate / labor-hour | $17.00    | $18.00    |
| Total energy           | $63,000   | $61,000   |
| Total materials        | $310,000  | $340,000  |
| Other inputs           | $25,000   | $28,000   |

For 2012, compute the following productivity measures

a.  widgets/labor-hour

    _____

b.  widgets/labor-dollar

    _____

c.  dimensionless labor-productivity (Sales price per widget*Widgets produced)/(Labor $)

    _____

d.  widgets/total inputs

    _____

e.  dimensionless total productivity (Sales price per widget*Widgets produced)/(Total $)

    _____

2. Compute the growth rate from 2012 to 2013 for each of the productivity measures in problem 1 ----
   indicate which answer is correct?

   a. widgets/labor-hour          Answer: _____

      A. 2.59%       B. 2.66%       C. -2.59%       D. -2.66%       E. None of the above

   b. widgets/labor-dollar        Answer: _____

      A. 3.05%       B. 11.59%      C. -3.14%       D. -10.39%  E. None of the above

   c. dimensionless labor-productivity    Answer: _____

      A. 10.39%      B. 11.59%      C. -10.39%      D. -11.59%  E. None of the above

   d. widgets/total inputs        Answer: _____

      A. 10.39%      B. 11.59%      C. 7.80%        D. -7.80%       E. None of the above

   e. dimensionless total productivity    Answer: _____

      A. 6.12%       B. 5.77%       C. 11.59%       D. -6.12%       E. None of the above


4. The musicians of Bremen have an opportunity to install a new piece of equipment in early 2013 that
   would reduce material costs by 10% and labor hours by 20% in that year. The <u>annual</u> cost of this
   equipment is $100,000. They chose not install the equipment. Did he make the right choice ?

   Answer: _____ (place Yes or No)


## Problem B (Module 3):

   1. A restaurant owner has recently become concerned about the reliability of his staff. After
      surveying a group of customers, he has determined the following reliability probabilities:

      Host: 0.95
      Server: 0.90
      Cook: 0.85
      Cashier: 0.98

      What is the probability that this system will be reliable?

2. A manufacturer has designed a product.  This product has four components (Components A, B, C, and D).  The reliability probabilities associated with each product are:

A: 0.9
B: 0.75
C: 0.8
D: 0.6

a) What is the probability that this product will be reliable?

b) The manufacturer can afford to modify the product to incorporate redundancy in one of the components.  Which of the components should be selected and why?

c) If component C were to receive a redundant backup with a reliability probability of 0.6, what would be the reliability of the product?  What would be the failure probability?

d) If each component were to receive a redundant backup with a reliability probability of 0.5, what would be the reliability of the product?  What would be the failure probability?

## Problem C – Class Presentation

- Begin to prepare your 10 minute presentation to the class on a selected current event topic related to Operations Management in the news.

- Investigate the web for a real world example of any of the topics from the first 7 modules and relate the real world case to concepts we have discussed

- Submit an outline for your ten minute presentation and provide an outline of a 10 to 12 slide presentation. At this point turn in an outline of the key headings and key concepts for your presentation. Think in terms of:

    o Company
    o Major issue related to Operations Management
    o Problem
    o Potential measurement techniques
    o Potential Solution
    o How it relates to one of the modules we have discussed.