

**Homework #1**  
**Supply Chain Models: Manufacturing & Warehousing (ISyE 3104) – Fall 2002**  
**Due August 29, 2002**

Show all your work  
Total **50** points

**Question 1**

The XYZ Company is a major supplier for automobile parts. *Monthly* demand for a particular part is normally distributed with mean  $\mu=1000$  and standard deviation of  $\sigma=250$ .

- (a) What is the mean and standard deviation of *annual* demand? (5 points)
  - (b) What is the mean and standard deviation of *weekly* demand? (5 points)
- (Assume 4 weeks in a month; 48 weeks in a year)

**Question 2**

Consider The XYZ Company mentioned in Question 1. Assume that the owners of the company are planning to shift their industry focus from automobile parts to tires. Currently The XYZ Company has annual revenue of \$1,000,000. If they start manufacturing tires, they will be offering 4 different types of tires. After a quick market investigation, they found out that the *monthly* demand for each type of tire would be normally distributed with the parameters listed below:

<b>Tire Type</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
<b>Mean</b>	400	500	600	450
<b>Standard Dev.</b>	60	65	70	65
<b>Selling Price (\$)/tire</b>	50	40	30	45

(Note that the prices, at which each type of tire will be sold, are included in the table too.)

- (a) What is the distribution (with correct parameters) of *total annual* demand for the tires? (5 points)
  - (b) What is the probability that the *annual* revenue in new industry will exceed current *annual* revenue (1,000,000)? (10 points)
- Hint: Revenue= Selling price per item\* Number of Items sold

**Question 3**

A web site keeps track of the number of its visitors. According to their records, number of visitors *per day* is distributed normally with mean  $\mu=100$  and standard deviation of  $\sigma=40$ .

- (a) What is the probability that the number of visitors in a *week* is at least 450? (5 points)
- (b) What is the probability that the number of visitors in a *week* is at most 800?  
(5 points)

#### Question 4

Assume that the following data represent the demand figures observed during past 30 days by a computer desk manufacturer company.

26 37 27 30 22 45 30 18 36 38  
25 20 18 41 47 17 51 39 44 33  
32 50 37 31 19 28 23 20 25 38

- (a) Compute the mean and standard deviation of this sample? (5 points)
- (b) Rather than keeping track of each daily demand, suppose that the company has kept only grouped data as follows:

<u># of Desks sold</u>	<u># of Days (Frequency)</u>
0-20	6
21-29	7
30-38	10
39-47	5
48-56	2

Based on the observations, estimate the mean and the standard deviation of the daily demand. (Assume that all observations occur at the midpoint of each interval) (10 points)