**Assignment - 11**

1. The time required for servicing transmissions is normally distributed with  = 45 minutes and  = 8

minutes. The service manager plans to have work begin on the transmission of a customer’s car 10

minutes after the car is dropped off and the customer is told that the car will be ready within 1 hour

from drop-off. What is the probability that the service manager cannot meet his commitment?

A. 0.3875

B. 0.2676 – Ans-this is the probability that service manager can’t meet the commitment.

C. 0.5

D. 0.6987

Solution :

z = 50-45/8=0.625

P(z>0.625) = 1-P(z<0.625) = 1-0.734 = 0.2676

2. The current age (in years) of 400 clerical employees at an insurance claims processing center is

normally distributed with mean  = 38 and Standard deviation  =6. For each statement below,

please specify True/False. If false, briefly explain why.

1. More employees at the processing center are older than 44 than between 38 and 44.

Ans – False -  44 is one sd above the mean, so there is (1-2/3)/2=1/6 employees older than 44 and there are 2/3\*0.5=1/3 employees between 38 and 44.

B. A training program for employees under the age of 30 at the center would be expected to

attract about 36 employees.

Solution :True

z=30-38/6=-1.33

P(z<-1.33) = 0.0918

Total Employees = 400 \* 0.918 = 36.72

Can’t be continuous random variable

So 36 Is the answer.

3. If X1 ~ N(μ, σ2) and X2 ~ N(μ, σ2) are iid normal random variables, then what is the difference

between 2 X1 and X1 + X2? Discuss both their distributions and parameters.

**Ans – this topic has not been covered by mentor.**

4. Let X ~ N(100, 20). Find two values, a and b, symmetric about the mean, such that the probability of

the random variable taking a value between them is 0.99.

The Probability of going wrong = 1-0.99 = 0.01  
The Probability for a = -0.005   
The Probability for b = +0.005

Formula

Z(-0.005)\*20+100 = -(-2.57)\*20+100 = 151.4  
 Z(+0.005)\*20+100 = (-2.57)\*20+100 = 48.5

D. 48.5, 151.5

5. Consider a company that has two different divisions. The annual profits from the two divisions are

independent and have distributions Profit1 ~ N(5, 3) and Profit2 ~ N(7, 42) respectively. Both the

profits are in $ Million. Answer the following questions about the total profit of the company in

Rupees. Assume that $1 = Rs. 45

A. Specify a Rupee range (centered on the mean) such that it contains 95% probability for the

annual profit of the company.

B. Specify the 5th percentile of profit (in Rupees) for the company

C. Which of the two divisions has a larger probability of making a loss in a given year?

Ans- Not sure…Please explain this one.