**Topics: Normal distribution, Functions of Random Variables**

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?
2. 0.3875
3. 0.2676
4. 0.5
5. 0.6987

car is ready in 1hour and they started work in dropped car after 10 minutes=60(mins)-10(mins)=50 mins

x=50 mins

z=(X-mu)/sigma

=(45-50)/8=-0.625=0.2676

Answer :- B.0.2676

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

False ...because the mean is 38,the normally distributed curve,so after the age of 44 there clerical employees are less.

1. A training program for employees under the age of 30 at the center would be expected to attract about 36 employees.

true

1. If *X1* ~ *N*(μ, σ2) and *X*2 ~ *N*(μ, σ2) are *iid* normal random variables, then what is the difference between 2 *X*1 and *X*1 + *X*2? Discuss both their distributions and parameters.

In which states that any large sum of independent, identically distributed random variables is approximately Normal.there is no differences between them.There is no closed form for the distribution function of the Normal distribution.

1. Let X ~ N(100, 202). 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.

1. 90.5, 105.9
2. 80.2, 119.8
3. 22, 78
4. 48.5, 151.5
5. 90.1, 109.9

i assumes values in answers are assigned in a,b values...

B)80.2,119.8

(80.2-100)/20 =-0.99

(119.8-100)/20=0.99

B values are only inthese ranges(-0.99 to 0.99)

1. Consider a company that has two different divisions. The annual profits from the two divisions are independent and have distributions Profit1 ~ N(5, 32) 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
2. Specify a Rupee range (centered on the mean) such that it contains 95% probability for the annual profit of the company.
3. Specify the 5th percentile of profit (in Rupees) for the company
4. Which of the two divisions has a larger probability of making a loss in a given year?

X is the sum of two random variables have normal distribution.

E(x)=45\*(profit1+profit2)=45\*(5+7)=540 million rupees

sd(x)=45\*(profit1+profit2)½=45\*(9+16)½=225 million rupees

X~N(540,225)

A)

approximately 95% data falls on the right decision

µ±2σ=540±(2\*225)

540-450=90

540+450=990

(90,990)

B) µ-1.5σ=540-(1.5\*225)=202.5million ruppes.

C) this questions concerns the original profit decisions

for devision1=Z score for a profit of zero:Z=(X-µ)/σ

(0-5)/3=-1.66=0.0485