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

1. The time required for servicing transmissions is normally distributed with *μ* = 45 minutes and *σ* = 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

🡺

(b). 0.2676

Is the probability of the service manager cannot meet his commitment

And

The probability of the car will be ready within the 1hour is 0.73401447

1. The current age (in years) of 400 clerical employees at an insurance claims processing center is normally distributed with mean *μ* = 38 and Standard deviation *σ* =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 , more employees processing in center are between 38 & 44…..(0.341344)

And the older than the 44years processing inn center are (0.158655)

Therefore , statement A is false

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

🡺

Probability of employees under the age of 30 are (0.91211)

Expected to attract about 36 employees

400\*0.9121%==36.48

Therefore ,statement B is 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.
2. 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.
3. 90.5, 105.9
4. 80.2, 119.8
5. 22, 78
6. 48.5, 151.5
7. 90.1, 109.9

🡺 option D is correct

Two points==48.5,151.5

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.

🡺 mean profit division is 540 million rupees

Standard deviation of mean profit is 225 million rupees

Rupee range=(99million to 980 million)

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

🡺 5th percentile profit is 168.75

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

🡺 probability of division1 making loss is===0.048

Probability of division2 making loss is===0.040

Probability of making larger loss is division 1