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

C. 0.5

D. 0.6987

A.1

Probability that the service manager cannot meet his commitment-

.3875

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.

This statement is true as more employees at the processing center are older than 44 than 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.

Yes, this condition is true as the population distribution is maximum at centre and hence it is true

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.

A.3

Both the distribution will be different as the different data points will be different due to some difference in distribution and hence values will be different from each other.

4. 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.

A. 90.5, 105.9

B. 80.2, 119.8

C. 22, 78

D. 48.5, 151.5

E. 90.1, 109.9

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

2

) 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?