1)Probability that he can meet his customer's requirements is P(X<=50-45/8)=P(Z<=0.625)

# we compute pnorm(50,mean=45,sd=8)=cdf(50)=0.7340145

#Probability of taking time more than 1 hour is 1-0.7340145=0.265981

2)

A)False.

Since on calc % from pnorm we found out that probability of people above 44 are 15.

above44=pnorm(44,mean=38,sd=6,lower.tail = FALSE)

When we consider the case between 38 and 44 then according to equation below the probability obtained is 34.13%.

between44=pnorm(44,mean=38,sd=6,lower.tail = TRUE)-0.5,

B) True.

pnorm(30,mean=38,sd=6,lower.tail=TRUE)\*400 comes out be 36.48

3)Consider the normal distribution for X1 as N(µ1, σ1).For 2X1,the distribution will remain a normal distribution with the mean and variance on multiplying the normal random variable by factor of 2 will get doubled.

2X1 can be written as X1+X1=1.X1+1.X1

Mean of 2X1 is thus µ1+µ1=2µ1

Variance of 2X1 is thus 12. σ12+12. σ12=2 σ12

Thus the resultant normal distribution is N(2 µ1,2 σ12)

X1+X2 indicate a bivariate normal distribution formed by a combination of normal random variables X1 and X2.

Sum of normally distributed random variable are normally distributed random variable. Consider two random variables X1 and X2.Let their means be µ1 and µ2 and variances be σ12andσ22 .

Mean of X1+X2 is µ1+ µ2.

Variance of X1+X2 is σ12+ σ22

Thus the resultant normal distribution is N(µ1+ µ2, σ12+ σ22)

4)

Given mean:100

Given sd: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.

A symmetrical distribution of 99% means 0.495 on either side of the mean. By observing the normal distribution 49.5 % lies between the 2nd and 3rd standard deviation on both sides. Hence b from the options is 151.5.So a is 48.5.

Hence option D is right

5)

Norm dist 1:N(5,3^2)

Norm dist2:N(5,4^2)

Standardizing N1:

If we take a value two standard dev from mean say 11 and ,

Z=X-mu/sigma=11-5/3=2

Thus Z-score indicates the value is two std dev away from mean.

Standardizing N2:

Z=X-mu/sigma=11-7/4=1

Thus Z score indicates the value is one std dev away from mean.

Comparing Z scores of both we can say that N1 has less chance of profit,hence it is more loss-making than N2.