CH7Q67, 68, 69, 71 & CH8Q95, 96, 97

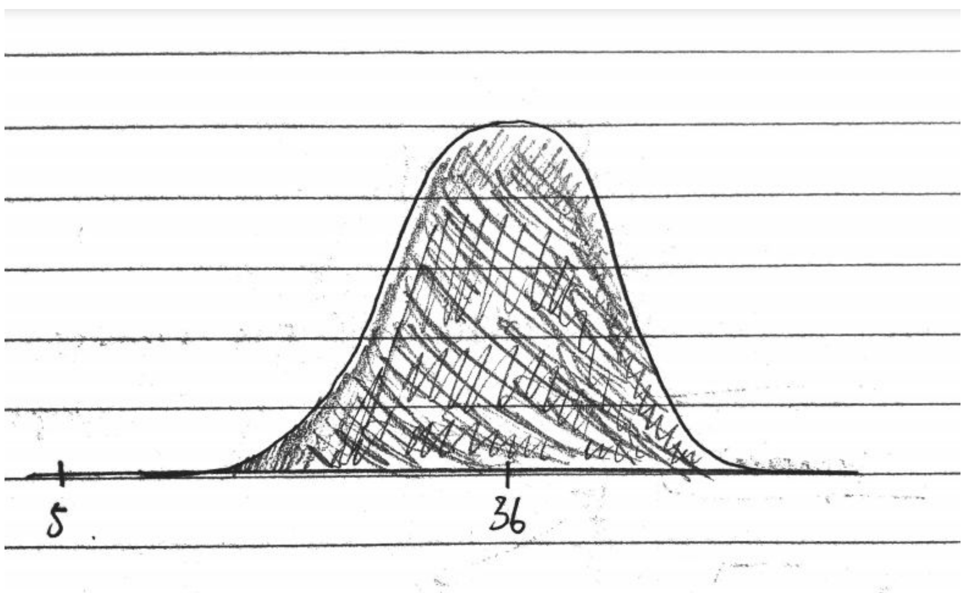
CH7

67

a) True. It is because as the sample size gets larger, more values from the population distribution are taken into the calculation of mean, which makes the mean of the samples closer to that of the population.
b) True. According to the central limit theorem, as the means of the samples are graphed in a histogram format, it would appear to be a bell curve, or a normal distribution, which makes sense as most of the means of the samples would be close to that of the population when the sample size is great enough.
c) False. Since a sample size would never be greater than the population size, they must have a different standard deviation. According to the central limit theorem, the standard deviation of a sample can be calculated as follows, sigma divided by the square root of the sample size. As the sample size increases, the standard deviation decreases.

68

a) X bar = N(36, 10/Sqrt/16)
b) 100% normalcdf(5, 1E99, 36, 10/Sqrt/16)



c) 34, invNorm(.25, 36, 10/Sqrt/16)

69

a) X is the average salary in Third World countries.
b) X bar is the average salary of the 1000 residents in the sample country
c) X bar~ N(2000, 8000/Sqrt/1000)

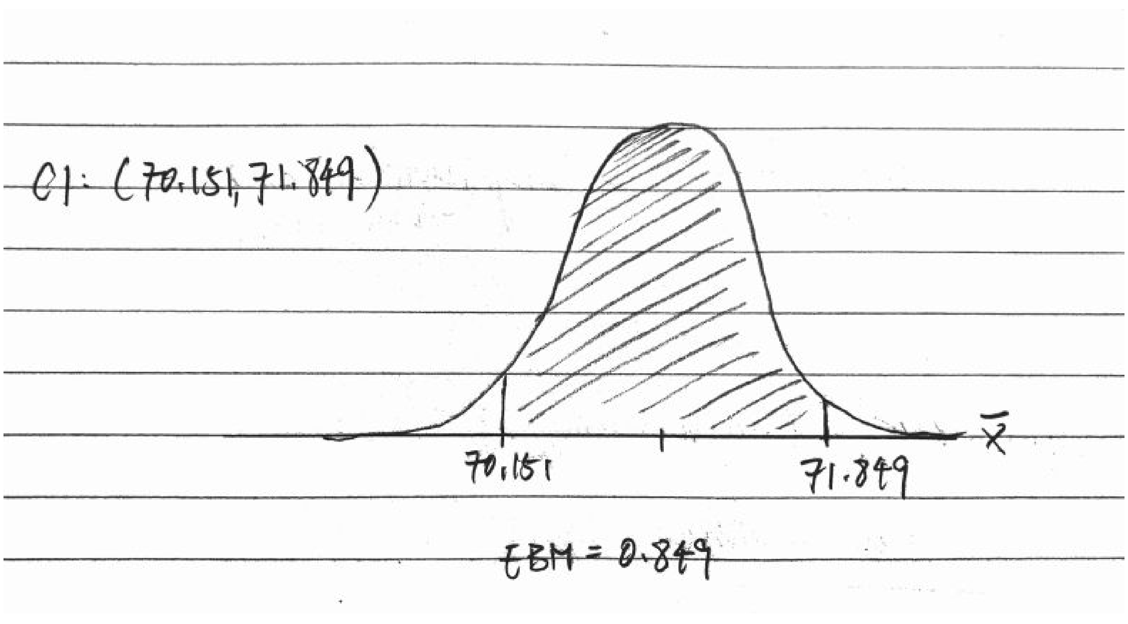
d) Since the mean of the wedgedly-distributed population would be very low (due to the majority who has very low income), outliers like the middle and high income cause a great difference between themselves and the mean income, thus a standard deviation that is greater than the mean.
e) Because the majority of the data represent a very low income, using a smaller sample might reduce the number of outliers in the sample. Thus, the average would probably get smaller. Also, we can test this using the normalcdf function, $P(2000<x<2100) = .153$ and $P(2100<x<2200) = 0.137$, in which the lower range has a higher probability.

71) choice B

CH8

95

a) i) 71
ii) 3 for the population
iii) 48
b) X is the mean height of a males in Sweden and X bar is that of the 48 male Swedes
c) A normal distribution because each individual male Swedes counts as a sample. When the sample mean should be a bell curve according to the central limit theorem
d)

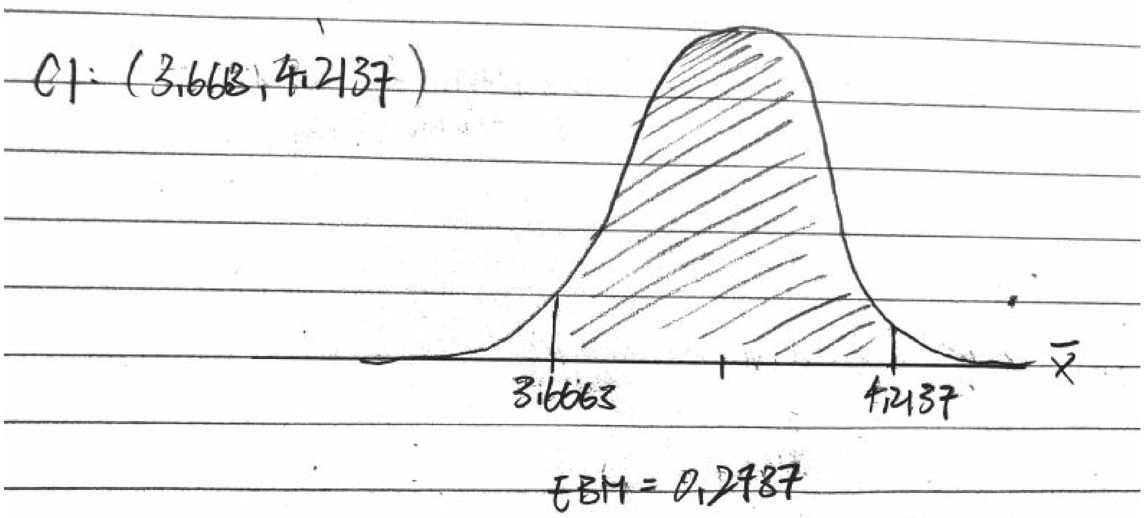


e) The confidence interval would get smaller because the calculated EBM range gets narrower due to the smaller standard deviation resulted from a greater sample size.

96

a) X is the means of all engineering conferences, and X bar is the mean of those 84 randomly selected engineering conferences from the magazine.

b) N(3.94,1.28/Sqrt/84) A normal distribution because the mean of the means in the selected conference would follow a bell curve according to the central limit theorem, and the standard deviation is known.



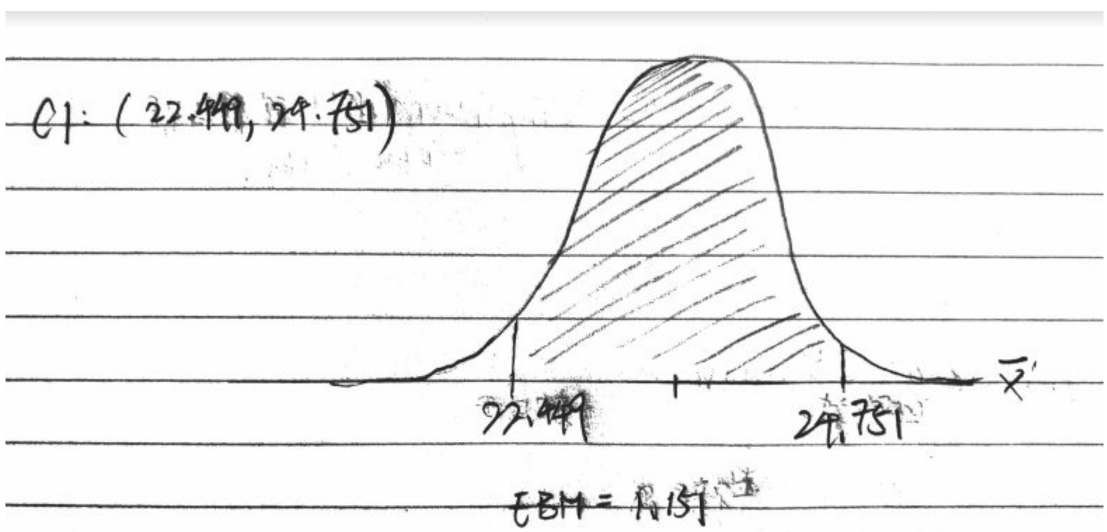
c)

97

a) i) 23.6
ii) 7.0
iii) 100

b) X is the average amount of time needed to complete one person's tax and X bar is that of the sample of 100 people

c) N(23.6, 7/Sqrt/100) A normal distribution because each person is a sample, and the means of their time completing their taxes follow a bell curve according to the central limit theorem, and the standard deviation is known.



d)

e) By using a different sample size. The company can use the Error bound formula to determine the new sample size after determining the confidence level.

f) The level of confidence increases because the standard deviation increases

g) The new sample size calculated from the error bound formula is 206 [(($Z_{0.98}$)^2 * 7^2)/(EBM^2)], EBM = 1. Since EBM is calculated by multiplying the Z value with the standard deviation divided by the square root of the number of samples, to reduce the EBM to 1, the sample size would need to be increased.