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MATH 080

Homework 4

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Chapter 7

67.

A- Correct Statement. Because, the mean a sampling distribution of the means, equals the mean of the data distribution.

B- Correct. The central limit theorem states that when taking a large random sample from a population with replacement, the distribution sample means will be normally distributed.

C- Correct, because the standard deviation of the sampling will decrease and becomes close to the standard deviation of mean of the data distribution.

68.

A. $\bar{X} \sim N(36, 2.5)$

B. 1

C. 34.31

69.

A. X is the yearly income of someone in a third world country.

B. The average salary from samples of 1000 residents of a third world country.

C. $\bar{X} \sim N(2000, \frac{8000}{\sqrt{1000}})$

D. Very wide differences in data values can have averages smaller than standard deviations.

E. The distribution of the sample mean will have higher probabilities closer to the population mean.

$$P(2000 < \bar{X} < 2100) = 0.1537$$

$$P(2100 < \bar{X} < 2200) = 0.1317$$

71.

The answer is B.

Chapter 8

95.

A-

1. 71
2. 3
3. 48

B- X is the height of a Swiss male and is the mean height from a sample of 48 Swiss males.

C. Normal. We know the standard deviation for the population, and the sample size is greater than 30.

D.

1. Confidence interval (70.151, 71.49)

2. EBM= 0.849

E. The confidence interval will decrease in size, because the sample size increased.

96.

A- The random variable X represents the length of the engineering conferences. The random variable \bar{X} represents the mean length of 84 randomly selected engineering conferences.

B- Since the population distribution is unknown, the appropriate distribution to be used in this problem is t-distribution with $n-1$ degrees of freedom.

C-

i. 3.6622, 4.21783

iii. 0.2778

97.

A-

$$\bar{x} = 23.6$$

$$\sigma = 7$$

$$n = 100$$

B- X is the time needed to complete an individual tax form. \bar{X} is the mean time to complete tax forms from a sample of 100 customers.

C- $N(23.6, \frac{80007}{\sqrt{100}})$ because we know sigma.

D-

$$(22.228, 24.972)$$

$$EBM = 1.372$$

E- It will need to change the sample size. The firm needs to determine what the confidence level should be, then apply the error bound formula to determine the necessary sample size.

F- The confidence level would increase as a result of a larger interval. Smaller sample sizes result in more variability. To capture the true population mean, we need to have a larger interval.

G- According to the error bound formula, the firm needs to survey 206 people. Since we increase the confidence level, we need to increase either our error bound or the sample size.