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Math 80

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Homework #4

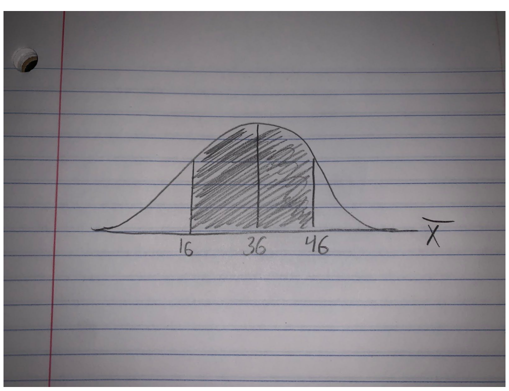
67. A. The statement is true because the mean of the random variable will be similar to the sample mean.

B. The statement is true because the central limit theorem states as the sample mean increases it creates a stronger possibility of a normal distribution.

C. The statement is true because as the sample size increases it causes the sample mean to decrease which will bring its value closer to the standard deviation.

68. A. $10/\sqrt{16}=2.5$. N(36,2.5)

B. normalcdf=(5, 1E99, 36, 2.5)= 0. 1-0= 1 $P(X \geq 5)$



C. invNorm(.25,36,2.5) $\approx$ 34.31

69. A. X is the income that a person from a third world country will earn in a year.

B. It is the average salary of the 1,000 people from the country that was included in the survey.

C. $8000/\sqrt{1000} \approx 252.98$. N(2000, 252.98)

D. The standard deviation is greater than the average due to the varying earrings from the different people that were surveyed. They all come from different social classes which makes it difficult for them to have similar salaries.

E. normalcdf(2000, 2100, 2000, 252.98) $\approx$ .154 normalcdf(2100, 2200, 2000, 252.98) $\approx$ .132

The 1,000 residents will most likely average a salary between 2,000 to 2,1000 dollars because that has the higher probability of .154 compared to the salaries between 2,100 to 2,200.

71. B= N(4.59, 10/ $\sqrt{16}$)

Chapter 8

95. A. **i.** Sample mean= 71 inches

ii. Standard deviation= 2.8 inches

iii. n= 48

B. X is the height of the male Swedes that were surveyed. The other variable represents the mean height from the 48 male Swedes that were included in the sample.

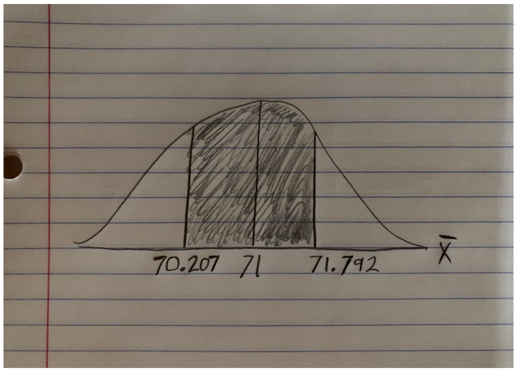
C. This is an example of a normal distribution because the sample size is larger than 30.

3/ $\sqrt{48}$ $\approx$ .404 N(71,.404)

D. **i.** Upper limit: 71+1.96(2.8/ $\sqrt{48}$) $\approx$ 71.792

Lower limit: 71-1.96(2.8/ $\sqrt{48}$) $\approx$ 70.207

95%CL: (70.207, 71.792)

ii. 

iii. EBM= 71.792-70.207/2 ≈ .793

E. The larger sample size will decrease the confidence interval. There will be a more accurate population mean because the data will not differ as much.

96. A. X is the duration of days for the engineering conferences. The other variable is the length of 84 randomly sampled engineering conferences.

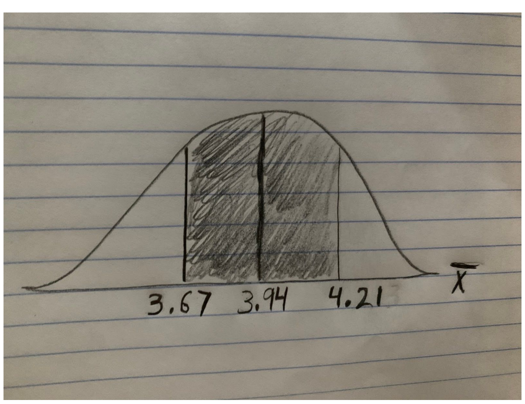
B. This is a normal distribution because the sample is larger than 30. $1.28/\sqrt{84} \approx .139$

N(3.94, .139)

C. **i.** Upper limit: $3.94+1.96(1.28/\sqrt{84}) \approx 4.21$

Lower limit: $3.94-1.96(1.28/\sqrt{84} \approx 3.67$

95% CL: (3.67, 4.21)

ii. 

iii. EBM: 4.21-3.67/2 ≈ .274

97. A. **i.** Sample mean= 23.6 hours

ii. Standard deviation= 7 hours

iii. n= 100 people

B. X is the amount of hours needed to fill out a tax form. The other variable is the mean of the hours needed to complete the tax form.

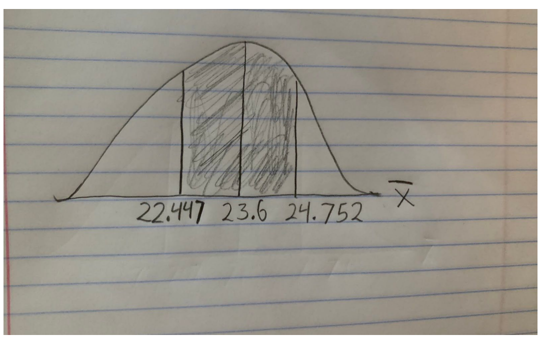
C. This is an example of a normal distribution because the sample is larger than 30.

$7.0/\sqrt{100} = .7$ N(23.6, .7)

D. **i.** Upper limit: $23.6+1.645(7.0/\sqrt{100}) \approx 24.752$

Lower limit: $23.6-1.645(7.0/\sqrt{100} \approx 22.447$

90% CL: (22.447, 24.752)

ii. 

iii. EBM: $24.752-22.447/2 \approx 1.152$

E. The sample size will have to be modified. From there the confidence interval must be found. Once that is completed the error bound formula is used to find the correct sample size.

F. The confidence interval will increase due to the smaller sample size. There will be a larger variability among the data compared to using a sample size of 100.

G. EBM= 206. The sample size should increase to combat the increase in the confidence interval.