QUESTIONS – Homework #4 – Estimation and Confidence Intervals

BANA 2010, Business Statistics, Fall 2020

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| Instructions.  All questions are multiple choice.  Submit answers through Canvas on or before the due date. No answers are accepted after the due date. If no answers are submitted by the due date, the grade will be zero.  Take care and note that answers through Canvas may only be submitted once. Therefore, download the Word file with the questions. Obtain all the answers. Then submit all your answers only once through Canvas. |

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|  | Support Material |  |
| Support for this assignment includes material at the website: MDHarper.com  At the MDHarper.com website, click the “Business Statistics” tab.  . . . | | |

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|  | Support Material |  |
| Supplemental material includes chapters in the textbook-1, Introduction to Business Statistics  I cover material that the textbook does not cover and the textbook covers material I do not.  The lecture will cover the key material for this course.  . . . | | |

Confidence Intervals

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| **Question 1**.  Let a random sample be drawn from a normal distribution with a known variance, s2.  A 100(1–)% Confidence Interval for  is given by `X ± Z(1–a/2) (s/√n)  How many statements are correct? 0 1 2 3 4  Statement A. If alpha=0.1, then the level of confidence is 90%  Statement B. If the level of confidence is 80%, then the standard normal random variate is approximately 1.282  Statement C. If (s/√n)=1, then the error bound is Z(1–a/2)  Statement D. If the size of a confidence interval is the difference between the upper and lower values, then a 90% confidence interval is greater than a 95% confidence interval.  . . . |

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| **Question 2**.  Let a random sample be drawn from a normal distribution with a known variance, s2.  How many statements are correct about the 90% confidence interval, ( 45 , 55 ) for m?  0 1 2 3 4  Statement A. The point estimate is 50  Statement B. The error bound on the point estimate is 10  Statement C. The standard normal variate is approximately 1.282  Statement D. The variance of the mean is approximately 3.04  . . . |

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| **Question 3**.  Let X~N( m , s2 = 212 ). A random sample with a sample size of 14 resulted in a sample mean of 55.  How many statements are correct? 0 1 2 3 4  Statement A. A 90% confidence interval for m is approximately ( 46 , 64 )  Statement B. A 80% confidence interval for m is approximately ( 48 , 62 )  Statement C. A 95% confidence interval for m is approximately ( 44 , 66 )  Statement D. A 85% confidence interval for m is approximately ( 47 , 63 )  . . . |

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| **Question 4**.  Let a random sample be drawn from a normal distribution with a known variance, s2.  How many statements are correct about the 90% confidence interval, (40,55) for m?  0 1 2 3 4  Statement A. Probability refers to the interval (40,50)  Statement B. Confidence refers to the parameter m  Statement C. The interval (40,50) contains the mean m with a confidence of 90%  Statement D. The parameter m lies in the interval (40,50) with a probability of 90%  . . . |

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| **Question 5**.  A random sample with a sample size of 12 resulted in a sample mean of 40 and a sample standard deviation of 8. How many statements are correct? 0 1 2 3 4  Statement A. A 90% confidence interval for m is approximately ( 36 , 44 )  Statement B. A 80% confidence interval for m is approximately ( 33 , 47 )  Statement C. A 95% confidence interval for m is approximately ( 35 , 45 )  Statement D. A 85% confidence interval for m is approximately ( 34 , 46 )  . . . |

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| **Question 6**.  A random sample drawn from a Normal distribution is used to construct a 90% confidence interval for the population mean, m. Assume the population variance is the same value as the sample variance. Consider a confidence interval based on the Normal distribution and the Student’s t-distribution. How many statements are correct? 0 1 2 3 4  Statement A. The error bound contains the Z-random variate from the Normal distribution when the population standard deviation is used in the confidence interval. The error bound contains the t-random variate from the Student’s t-distribution when the sample standard deviation is used in the confidence interval.  Statement B. The degrees of freedom in a Student’s t-distribution is the sample size minus one.  Statement C. As the sample size increases, the Student’s t-distribution approaches the Normal distribution.  Statement D. If the size of a confidence interval is the difference between the upper and lower values, then a 90% confidence interval based on a Normal distribution is greater than 90% confidence interval based on a Student’s t-distribution.  . . . |

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| **Question 7**.  A 100(1–)% Confidence Interval for  isX ± Z(1–) ( s/√n )  How many statements are correct? 0 1 2 3 4  Statement A. As the variance of the point estimate increases, the error bound of the point estimate decreases.  Statement B. As the level of confidence increases, the error bound of the point estimate decreases.  Statement C. As the sample size increases, the error bound of the point estimate increases.  Statement D. The variance of the sample mean is greater than the variance of the random variable.  . . . |

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| **Question 8**.  Let X~N( m , s2 = 202 ). Consider a 100(1–)% Confidence Interval,X ± Z(1–) ( s/√n ), for .  How many statements are correct? 0 1 2 3 4  Statement A. If the error bound is 3\*( s/√n ), then the level of confidence is approximately 0.9973  Statement B. If the error bound is 6, then a 90% confidence interval for m has a sample size of approximately 20.  Statement C. If the error bound is 9 for a sample size of 12, then the level of confidence is approximately 85%.  Statement D. If the sample size is 26, then the error bound for an 80% confidence interval for m is approximately 10.  . . . |

**For Questions 9 & 10, consider the problem.**

The delivery of PPE (Personal Protective Equipment) to front-line workers is dependent on supply chain efficiency which has had challenges in the past five weeks. Four districts in Region I has a weekly demand quota of 5,000. Each district can be over or under that mandated quota. Over is too costly and under is too risky. The initial policy in evaluating efficiency of deliveries stipulates that if a 90% confidence interval contains 5,000 units over a five-week period, then the supply chain is in compliance. Results from Region I indicate that District B is over, District C is under, and Districts A and D are in compliance as seen in the graph (values given in 1,000).

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You have been asked to analyze the four Districts in Region II. The data in thousands are:

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|  | District | District | District | District |
| Region II | A | B | C | D |
| Week 1 | 6 | 5 | 4 | 1 |
| Week 2 | 2 | 4 | 9 | 8 |
| Week 3 | 3 | 3 | 1 | 7 |
| Week 4 | 8 | 4 | 5 | 1 |
| Week 5 | 1 | 5 | 2 | 2 |

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| **Question 9.**  How many Districts in Region II are not in compliance? 0 1 2 3 4 |
| **Question 10.**  Upload one PDF file with a graph of the data from Region II formatted like the graph above. |

**>>>End of Homework<<<**