Statistics MCQs – Estimation Part 2

21. Sand is packed into bags which are then weighed on scales. It is known that if full bags of sand are intended to weigh μ kg, then the weight recorded by the scales will be normally distributed with a mean μ kg and a standard deviation of 0.36kg. A particular bag of sand was weighed four times and the weight recorded each time was different. The sample mean weight was recorded as 36.2kg. What is a 95 % confidence interval for the true weight of the full bag of sand?

a. 34.35 to 35.05kg

b. 35.85 to 36.55kg

c. 34.21 to 35.19kg

d. 34.48 to 34.92kg

e. 37.75 to 38.45kg

Answer: B

22. Sand is packed into bags which are then weighed on scales. It is known that if full bags of sand are intended to weigh μ kg, then the weight recorded by the scales will be normally distributed with a mean μ kg and a standard deviation of 0.5kg. A particular bag of sand was weighed four times and the weight recorded each time was different. The sample mean weight was recorded as 34.7kg. What is a 95 % confidence interval for the true weight of the full bag of sand?

a. 34.35 to 35.05kg

b. 35.85 to 36.55kg

c. 34.21 to 35.19kg

d. 34.48 to 34.92kg

e. 37.75 to 38.45kg

Answer: C

23. Sand is packed into bags which are then weighed on scales. It is known that if full bags of sand are intended to weigh μ kg, then the weight recorded by the scales will be normally distributed with a mean μ kg and a standard deviation of 0.36kg. A particular bag of sand

was weighed ten times and the weight recorded each time was different. The sample mean weight was recorded as 34.7kg. What is a 95 % confidence interval for the true weight of the full bag of sand?

a. 34.35 to 35.05kg

b. 35.85 to 36.55kg

c. 34.21 to 35.19kg

d. 34.48 to 34.92kg

e. 37.75 to 38.45kg

Answer: D

24. Sand is packed into bags which are then weighed on scales. It is known that if full bags of sand are intended to weigh μ kg, then the weight recorded by the scales will be normally distributed with a mean μ kg and a standard deviation of 0.36kg. A particular bag of sand was weighed four times and the weight recorded each time was different. The sample mean weight was recorded as 38.1kg. What is a 95 % confidence interval for the true weight of the full bag of sand?

a. 34.35 to 35.05kg

b. 35.85 to 36.55kg

c. 34.21 to 35.19kg

d. 34.48 to 34.92kg

e. 37.75 to 38.45kg

Answer: E

25. An analyst is conducting a hypothesis test to determine if the mean time spent on investment research by portfolio managers is different from 3 hours per day. The test uses a random sample of 64 portfolio managers, where the sample mean time spent on research is found to be 2.5 hours. The population standard deviation is 1.5 hours. What is the 99 % confidence interval for the population mean time spent on investment research by portfolio managers?

a. (2.02,2.98)

b. (2.22,3.18)

c. (1.86,3.14)

d. (2.11,2.89)

e. (1.82,2.78)

Answer: A

26. An analyst is conducting a hypothesis test to determine if the mean time spent on investment research by portfolio managers is different from 3 hours per day. The test uses a random sample of 64 portfolio managers, where the sample mean time spent on research is found to be 2.7 hours. The population standard deviation is 1.5 hours. What is the 99 % confidence interval for the population mean time spent on investment research by portfolio managers?

a. (2.02,2.98)

b. (2.22,3.18)

c. (1.86,3.14)

d. (2.11,2.89)

e. (1.82,2.78)

Answer: B

27. An analyst is conducting a hypothesis test to determine if the mean time spent on investment research by portfolio managers is different from 3 hours per day. The test uses a random sample of 64 portfolio managers, where the sample mean time spent on research is found to be 2.5 hours. The population standard deviation is 2 hours. What is the 99 % confidence interval for the population mean time spent on investment research by portfolio managers?

a. (2.02,2.98)

b. (2.22,3.18)

c. (1.86,3.14)

d. (2.11,2.89)

e. (1.82,2.78)

Answer: C

28. An analyst is conducting a hypothesis test to determine if the mean time spent on investment research by portfolio managers is different from 3 hours per day. The test uses a random sample of 100 portfolio managers, where the sample mean time spent on research is found to be 2.5 hours. The population standard deviation is 1.5 hours. What is the 99 % confidence interval for the population mean time spent on investment research by portfolio managers?

a. (2.02,2.98)

b. (2.22,3.18)

c. (1.86,3.14)

d. (2.11,2.89)

e. (1.82,2.78)

Answer: D

29. An analyst is conducting a hypothesis test to determine if the mean time spent on investment research by portfolio managers is different from 3 hours per day. The test uses a random sample of 64 portfolio managers, where the sample mean time spent on research is found to be 2.3 hours. The population standard deviation is 1.5 hours. What is the 99 % confidence interval for the population mean time spent on investment research by portfolio managers?

a. (2.02,2.98)

b. (2.22,3.18)

c. (1.86,3.14)

d. (2.11,2.89)

e. (1.82,2.78)

Answer: E

30. A researcher wants to investigate the amount of lead per litre of waste water produced by her company. She plans to use statistical methods to estimate the population mean of lead content per litre of water. Based on previous recordings she assumes that the lead content is normally distributed with a standard deviation of 20mg per litre. She decides that she can afford a sample size of 500, but not larger, and with this sample finds a sample mean of 632mg of lead per litre. The 95 % confidence interval for the mean lead content per litre of waste water produced by her company then is:

a. (630.25,633.75)

b. (639.25,642.75)

c. (629.81,634.19)

d. (630.04,633.96)

e. (630.69,633.31)

Answer: A

31. A researcher wants to investigate the amount of lead per litre of waste water produced by her company. She plans to use statistical methods to estimate the population mean of lead content per litre of water. Based on previous recordings she assumes that the lead content is normally distributed with a standard deviation of 20mg per litre. She decides that she can afford a sample size of 500, but not larger, and with this sample finds a sample mean of 641mg of lead per litre. The 95 % confidence interval for the mean lead content per litre of waste water produced by her company then is:

a. (630.25,633.75)

b. (639.25,642.75)

c. (629.81,634.19)

d. (630.04,633.96)

e. (630.69,633.31)

Answer: B

32. A researcher wants to investigate the amount of lead per litre of waste water produced by her company. She plans to use statistical methods to estimate the population mean of lead content per litre of water. Based on previous recordings she assumes that the lead content is normally distributed with a standard deviation of 25mg per litre. She decides that she can afford a sample size of 500, but not larger, and with this sample finds a sample mean of 632mg of lead per litre. The 95 % confidence interval for the mean lead content per litre of waste water produced by her company then is:

a. (630.25,633.75)

b. (639.25,642.75)

c. (629.81,634.19)

d. (630.04,633.96)

e. (630.69,633.31)

Answer: C

33. A researcher wants to investigate the amount of lead per litre of waste water produced by her company. She plans to use statistical methods to estimate the population mean of lead content per litre of water. Based on previous recordings she assumes that the lead content is normally distributed with a standard deviation of 20mg per litre. She decides that she can afford a sample size of 400, but not larger, and with this sample finds a sample mean of 632mg of lead per litre. The 95 % confidence interval for the mean lead content per litre of waste water produced by her company then is:

a. (630.25,633.75)

b. (639.25,642.75)

c. (629.81,634.19)

d. (630.04,633.96)

e. (630.69,633.31)

Answer: D

34. A researcher wants to investigate the amount of lead per litre of waste water produced by her company. She plans to use statistical methods to estimate the population mean of lead content per litre of water. Based on previous recordings she assumes that the lead content is normally distributed with a standard deviation of 15mg per litre. She decides that she can afford a sample size of 500, but not larger, and with this sample finds a sample mean of 632mg of lead per litre. The 95 % confidence interval for the mean lead content per litre of waste water produced by her company then is:

a. (630.25,633.75)

b. (639.25,642.75)

c. (629.81,634.19)

d. (630.04,633.96)

e. (630.69,633.31)

Answer: E

35. Suppose that a random sample of 50 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 8.6 ml with a population standard deviation of 2.88ml. Calculate a 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study.

a. (7.55,9.65)

b. (8.15,10.25)

c. (7.49,9.71)

d. (7.43,9.77)

e. (7.68,9.52)

Answer: A

36. Suppose that a random sample of 50 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 9.2 ml with a population standard deviation of 2.88ml. Calculate a 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study.

a. (7.55,9.65)

b. (8.15,10.25)

c. (7.49,9.71)

d. (7.43,9.77)

e. (7.68,9.52)

Answer: B

37. Suppose that a random sample of 50 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 8.6 ml with a population standard deviation of 3.06ml. Calculate a 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study.

a. (7.55,9.65)

b. (8.15,10.25)

c. (7.49,9.71)

d. (7.43,9.77)

e. (7.68,9.52)

Answer: C

38. Suppose that a random sample of 40 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 8.6 ml with a population standard deviation of 2.88ml. Calculate a 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study.

a. (7.55,9.65)

b. (8.15,10.25)

c. (7.49,9.71)

d. (7.43,9.77)

e. (7.68,9.52)

Answer: D

39. Suppose that a random sample of 50 bottles of a particular brand of cough medicine is selected and the alcohol content of each bottle measured. The sample mean alcohol content is 8.6 ml with a population standard deviation of 2.54ml. Calculate a 99 % confidence interval for the true mean alcohol content for the population of all bottles of the brand under study.

a. (7.55,9.65)

b. (8.15,10.25)

c. (7.49,9.71)

d. (7.43,9.77)

e. (7.68,9.52)

Answer: E

40. Your statistics lecturer wants you to determine a confidence interval estimate for the mean test mark for the next test. In the past, the test marks have been normally distributed with a population standard deviation of 30.9. A 95 % confidence interval estimate if your class has 30 students and a sample mean mark of 74.2 is:

a. 63.14 to 85.26

b. 65.18 to 83.22

c. 65.63 to 82.77

d. 64.14 to 84.26

e. 68.14 to 80.26

Answer: A