# Lecture 03B: univariate data analysis

Help Center

**Warning:** The hard deadline has passed. You can attempt it, but **you will not get credit for it**. You are welcome to try it as a learning exercise.

**Important note**: As mentioned in class last week, there were several requests to post the quizzes earlier.
To help you work on the quiz earlier, the quizzes will be based on the textbook material.

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This quiz is based on material from pages 45 to middle of 54 (skipping over the part on the Poisson distribution). Videos will be posted on this content on Thursday, periodically throughout the day; all will be available on early Thursday evening, before 7:00pm.

You have 1 attempt for the quiz. Please read the instructions carefully. Please double check your answers before submitting.

Solutions will be released when the quiz closes, at 09:25am, Friday, 23 January 2015.

- [ ] **In accordance with the Coursera Honor Code, I (Kevin Dunn) certify that the answers here are my own work.**

## Question 1

What is/are the reason(s) we use a $t$-distribution to calculate a confidence interval in certain cases?

(*Check all options that correctly apply*)

- [ ] It removes the requirement of having to know the population variance.
- [ ] It is easier to use, because the $t$-distribution only requires us to know one parameter, the $n-1$, which we always know.
- [ ] The $t$-distribution looks similar to the normal distribution.
- [ ] It is a symmetric distribution, and the confidence interv[illegible]metric.

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## Question 2

To calculate a confidence interval for the population parameter, $\mu$, of a sample of data, when we don't know the population standard deviation, we need to assume the following:

(*check all options that correctly apply*)

- [ ] that all the data samples are independent
- [ ] the data samples come from a normal distribution
- [ ] that we know the value of $\mu$ to calculate the confidence interval
- [ ] that we must use 95% limits: 2.5% in each tail

## Question 3

The 95% confidence interval for the activity of a biological compound is 87 to 93. You also know the number of samples used in the calculation is 17. From this ...

(*check all options that correctly apply*)

- [ ] we know the population mean has a 95% probability of lying inside the range from 87 to 94.
- [ ] we know the population mean is 90.
- [ ] we know that if you were to take a new sample of this biological compound then there is a 95% chance it will lie between 87 and 93.
- [ ] we have to assume the 17 samples were from a normal distribution, and independently taken.
- [ ] we know the range from 87 to 93 has a 95% chance of containing the population average.

## Question 4

A food production facility fills bags with muffin mix with a listed bag weight of 500 grams. The packaging system is set to fill bags with a mean weight of 520 grams, and this done so that only 2% of bags have a weight of 500 grams or less.

What is the standard deviation of the bag weights, assuming bag weights are from a normal distribution?

Important: *enter your answer correct to only one decimal place*

## Question 5

Calculate the 95% confidence interval for the following selection of data points which were independently sampled. You may assume the raw data come from a normal distribution.

$$[79, 48, 48, 52, 58, 33, 61, 21, 68, 28]$$

To answer this questions, please select all the options below that correctly apply (some options refer to intermediate steps in your calculations).

- [ ] The lower bound is 36.6 and the upper bound is 62.6.
- [ ] The critical values (plus and minus) for the 95% range within which we expect to find the $z$ value is $\pm 2.26$.
- [ ] The critical values (plus and minus) for the 95% range within which we expect to find the $z$ value is $\pm 1.96$.
- [ ] The sample standard deviation is 18.18 units.
- [ ] The mean of the sample of data is 45.5 units.
- [ ] The lower bound is 37.7 and the upper bound is 61.5.

## Question 6

For a variable that is $t$-distributed with 10 degrees of freedom, and using the statistical tables, or R:

(*check all options that correctly apply*)

- [ ] calculating 95% confidence intervals using this $t$-distribution will imply that the critical values are $c_t = \pm 2.23$.
- [ ] if the area in both tails is 10% (i.e. 5% in each tail) then the $z$-value is about 1.81.
- [ ] if the area in both tails is 10% (i.e. 5% in each tail), then the $z$-value is given in R by `qt(0.05, df=10)` or `qt(0.95, df=10)`

- [ ] **In accordance with the Coursera Honor Code, I (Kevin Dunn) certify that the answers here are my own work.**

Submit Answers  Save Answers

You cannot submit your work until you agree to the Honor Code. Thanks!