

This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike License](https://creativecommons.org/licenses/by-nc-sa/4.0/). Your use of this material constitutes acceptance of that license and the conditions of use of materials on this site.



Copyright 2006, The Johns Hopkins University and Karl Broman. All rights reserved. Use of these materials permitted only in accordance with license rights granted. Materials provided "AS IS"; no representations or warranties provided. User assumes all responsibility for use, and all liability related thereto, and must independently review all materials for accuracy and efficacy. May contain materials owned by others. User is responsible for obtaining permissions for use from third parties as needed.

Statistics for laboratory scientists

Solutions for the homework problems for lecture 13

1. **No.** The correct statement would be something like, "95% of such confidence intervals would contain the population mean."

2. The confidence interval would be

$$\bar{x} \pm 1.96 \times \sigma / \sqrt{n}$$

with width $2 \times 1.96 \times \sigma / \sqrt{n}$.

Thus we need to solve the following for n:

$$2 \times 1.96 \times 1.5 / \sqrt{n} = 1$$

$$\text{Thus } n = (2 \times 1.96 \times 1.5)^2 = 34.6.$$

Thus we need to measure **at least 35 samples**. This is too large!
We should get a more precise measuring device.

3. Sample mean = 3.496; sample SD = 0.301. The appropriate t-value (in R, use `qt(0.975, 4)`) is 2.776.

Thus the 95% confidence interval is $3.496 \pm 2.776 \times 0.301 / \sqrt{5}$
= (approx) **3.50 ± 0.37** = (approx) **(3.12, 3.87)**.