

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 16

1.  $\bar{X} - \bar{Y} = -7.75$ ;  $SE = 3.55$ ;  $T = -2.184$ ;  $k = 11.263$ 
    - a.  $P\text{-value} = 2 * pt(-2.184, 11.263) = \mathbf{0.051}$
    - b. Conclusion: **reasonable, but not terribly strong evidence against  $H_0$ .**
  
  2.  $P\text{-value} = pt(-2.184, 11.263) = \mathbf{0.025}$ .  
**Same conclusion; somewhat stronger evidence in this case.**
  
  3. The sample mean of the differences is 99.83. The sample SD of the differences is 50.50. Thus the estimated standard error of the sample mean of the differences is  $50.50/\sqrt{6} = 20.62$ .
    - a. The t-statistic for the test is  $99.83/20.62 = 4.84$ . Thus the P-value is  $2 * (1 - pt(4.84, 5)) = \mathbf{4.7 \times 10^{-3}}$ .
    - b. Thus we conclude that **the treatment does have an effect**. Note that the 95% confidence interval for the mean effect of the treatment is (47,153).
-