

- 6) We have collected 36 data points. We found the sample average to be $\bar{X} = 14.5$, and the sample variance is $S^2 = 4$. Find a 99% confidence interval for the population mean.
- 7) Using the sample mean and variance in Problem 6 above, test the hypothesis $H_0: \mu = 16$ at the significance level $\alpha = 0.05$.
- 8) The website <http://ucdata.berkeley.edu> contains data on the 2000 and 2004 presidential elections. We denote by X the change in Bush's vote percentage in counties having electronic voting machines. By Y we denote the change in Bush's vote percentage in counties without electronic voting machines. We found that $\bar{X} = 0.0242$, $\bar{Y} = 0.0407$, $S_X = 0.0210$, $S_Y = 0.0300$. The number of counties reporting was 15 for the X data and 52 for the Y data. Test the hypothesis that $\mu_X - \mu_Y > 0$ at the $\alpha = 0.05$ level.

- 9) Download the data fe.xls from the website
<http://myweb.lmu.edu/bfitzpatrick/Math306.htm>
Click on the Problem 9 tab at the bottom.
- Check for outliers in the data using MAD.
 - Construct a confidence interval for the mean at the $\alpha = 0.10$ level.
 - Construct a confidence interval for the mean at the $\alpha = 0.10$ level using trimmed average and winsorized variance, with a 10% trim.

- 10) In the fe.xls excel file, click on the Problem 10 tab.
- Sketch a box-and-whiskers plot of this data.
 - Generate 100 samples from this data, each sample being the same size as the original. Determine a 90% confidence interval for the *median* of this data.
 - Compare this confidence interval to a standard confidence interval for the mean of the original data.

BONUS 1. If X has the standard normal probability density function, determine (show your work, that is) the density function for $Y = X^2$

BONUS 2. If X has the exponential probability density function, determine (show your work, that is) the density function for $Y = X^2$

BONUS 3. How many coin flips would be required to obtain a confidence interval for probability of heads that is ± 0.01 from the proportion of heads?

BONUS 4. Plot the power of the test in Problem 7, as a function of the true mean value.