HW12: Auction prices?
(assigned on Mon March 12, due on Wed March 14)

You may work with in a group of as many as three students on this assignment, handing in one report with all names, provided that you all contribute to the work. You must submit a word-processed report, with computer output integrated into your report as appropriate.

An economist at Vanderbilt University devised a study to compare different types of online auctions. In one experiment he compared a Dutch auction to a first-price sealed bid auction. (In the Dutch auction the item for sale starts at a very high price and is lowered gradually until someone offers to pay the reduced price. In the first-price sealed bid auction each bidder submits a single sealed bid before a particular deadline. After the deadline, the person with the highest bid wins.)

The researcher auctioned off collectible trading cards from the game Magic: The Gathering. He placed pairs of identical cards up for auction, one in a Dutch auction and the other in a first-price sealed bid auction. He repeated this for a total of 88 pairs of identical cards. The data are available from our course website in the file AuctionPrices.txt. (The direct URL is: http://statweb.calpoly.edu/arossman/stat301/AuctionPrices.txt.)

a) First load the data into RStudio. (You might want to refer back to how you loaded data on game show prices in HW10. Also remember to attach the dataset. In fact, you might want to refer back often to R command used in HW10 as you work on this HW.) Produce a scatterplot to display the pairs of prices for the 88 cards (see R command below). Does the scatterplot reveal that cards with higher prices under one auction type also tend to have higher prices under the other auction type?

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> plot(dutch,FP)
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b) Produce a vector of differences, taking the Dutch auction price minus the first-price sealed bid price. Produce (and submit) a histogram of the differences. Comment on what the histogram reveals about whether one auction type tends to produce higher prices than the other auction type.

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> diff = dutch - FP
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c) For how many and what proportion of the 88 cards is the price higher with the Dutch auction?

d) Calculate (and report) the sample size, sample mean, and sample SD for Dutch auction prices, for the first-price sealed bid auction prices, and for the price differences.

e) Conduct a paired t-test of whether the sample data provide strong evidence that the auction types differ with regard to average price for these kinds of cards. Report the null and alternative hypotheses, test statistic (by hand), and p-value.

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> diff
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f) Summarize your test conclusion, in this context, using the .10 significance level.
g) Determine a 90% confidence interval for the population mean difference in price between the two auction types.

h) Summarize what the confidence interval reveals.

i) Is the confidence interval consistent with the test decision? Explain.

j) How many and what proportion of the 88 cards have a price difference that falls within the confidence interval? Should this be close to 90%? Explain.