Statistics 13   **Instructor: Nicolas Christou**

Quiz 1
02 March 2016

Name: _____

Please submit the answers to the following questions using `R`. Upload a file with your `R` commands to `CCLE`. Note: Probabilities or percentiles of distributions must be computed using the functions `pnorm`, `qnorm`, etc.

1. Access the data:

   ```
   a <- read.table("http://www.stat.ucla.edu/~nchristo/statistics13/
       jura.txt", header=TRUE)
   ```

   Create a new data set with the following variables: `x, y, Co, Zn, Ni`.

2. Use the data in question 1. Consider the variable `Co`. Do the following: (a). Compute the summary statistics. (b). Construct its histogram and boxplot. (c). Construct a bubble plot .

3. Consider the data in question 1. Run the regression of `Co` on `Ni`, plot `Co` against `Ni`, and fit the regression line through the scatterplot.

4. In a cubic foot the number of certain particles follows the Poisson distribution with parameter $\lambda = 30$. Find the probability that in one cubic foot we count less than 25 such particles.

5. Consider the data in question 1. Construct the distribution of the sample mean when repeated samples of size $n = 100$ are selected from the variable `Ni`. Use 10000 samples.

6. Suppose $X \sim N(-58, 6)$. Find $P(-53 < X < -48)$.

7. The probability of winning a roulette game is $\frac{1}{38}$. Find the probability of winning exactly 3 times in 40 such games.

8. The lifetime of an electronic component follows the exponential distribution with parameter λ. Let $X_1, X_2, \ldots, X_{15}$ be the lifetimes of 15 such components. Find $P(2\lambda \sum_{i=1}^{15} X_i > 35)$.

9. In a hypothesis testing for the mean with unknown standard deviation it was found that $t = -1.36$. The sample size was $n = 31$ and the hypothesis to test was
   $H_0 : \mu = 60$
   $H_a : \mu < 60$
   Find the p-value for this test.

10. Find the 78th percentile of $N(-40, 9)$.