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. Suppose $X \sim N(-60, 12)$. Find $P(-80 < X < -40)$.

2. Suppose customers arrive at a cashier according to a Poisson process with parameter $\lambda = 15$ per hour. Find the probability that in the next hour we will observe exactly 16 customers.

3. 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, Cr, Pb, Zn`.

4. Consider the data in question 3. Run the regression of `Cr` on `Pb`, plot `Cr` against `Pb`, and fit the regression line through the scatterplot.

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

6. Consider the data in question 3. Construct the distribution of the sample mean when repeated samples of size $n = 100$ are selected from the variable `Cr`. Use 10000 samples.

7. The lifetime of a certain battery follows the exponential distribution with parameter λ. Let $X_1, X_2, \ldots, X_{25}$ be the lifetimes of 25 such batteries. Find $P(2\lambda \sum_{i=1}^{25} X_i > 60)$.

8. Find the 86th percentile of $N(-20, 9)$.

9. In a hypothesis testing for the mean with unknown standard deviation it was found that $t = -1.86$. The sample size was $n = 28$ and the hypothesis to test was
   $H_0 : \mu = 31$
   $H_a : \mu \neq 31$
   Find the p-value for this test.

10. The probability that a certain stock will increase at any given day is 30%. Suppose we observe this stock for 25 days. Find the probability that this stock will increase on more than 10 days.