# CHEN3600 – Computer-Aided Chemical Engineering Spring 2012

# Chemical Engineering Department CQ8

**T.D. Placek Auburn University**

**CQ8 – More Discrete Distributions**

DO NOT SUBMIT YOUR SOLUTION!

1. Twelve doughnuts sampled from a manufacturing process are weighed each day. The probability that a sample will have no doughnuts weighing less than the design weight is 6.872%.
   1. What is the probability that a sample of twelve doughnuts contains exactly three doughnuts weighing less than the design weight?
   2. What is the probability that the sample contains more than three doughnuts weighing less than the design weight?
   3. In a sample of twelve doughnuts, what is the expected number of doughnuts weighing less than the design weight?
2. A boiler containing eight welds is manufactured in a small shop. When the boiler is completed, each weld is checked by an inspector. If more than one weld is defective on a single boiler, the person who made that boiler is reported to the foreman.
   1. If 9.0% of all welds made by Joe Smith are defective, what percentage of all boilers made by him will have more than one defective weld?
   2. Over a long period of time how many times will Joe Smith be reported to the foreman for each 15 boilers he makes?
   3. If Joe makes 15 boilers in a shift, what is the probability that he will be reported for more than two of these 15 boilers?
3. 5% of the tools produced by a certain process are defective. Find the probability that in a sample of 40 tools chosen at random, exactly three will be defective. Calculate a) using the binomial distribution, and b) using the Poisson distribution as an approximation.