Lab 5

1) Florida played a key role in the 2000 and 2004 USA presidential elections. Voter registration records in August 2010 show that **41%** of Florida voters are registered as Democrats and **36%** as Republicans. (Most of the others did not choose a party.) To test a random digit dialing device that you plan to use to poll voters for the 2010 Senate elections, you use it to call 250 randomly chosen residential telephones in Florida. Of the registered voters contacted, **34%** are registered Democrats. Is each of the boldface numbers a parameter or a statistic?

2) Suppose that the distribution of body mass index (BMI) among young women is Normal with mean 27 and standard deviation 7.5.
   a) You take an sample of 100 young women. According to the 99.7 part of the 68–95–99.7 rule, about what range of BMI values do you expect to see in your sample?
   b) You look at many samples of size 100. About what range of sample mean BMIs do you expect to see?

3) Suppose Z has a standard normal distribution. Find
   a) $P(Z < 2)$
   b) $P(Z > 1.8)$
   c) $P(1.13 < Z < 2.52)$
   d) the value k such that $P(Z < k) = 0.3$
   e) the value k such that $P(Z > k) = 0.29$
   f) the value k such that $P(-0.9 < Z < k) = 0.7$

4) A soft-drink machine is regulated so that it discharges an average of 200 millilitres per cup. If the amount of drink is normally distributed with a standard deviation equal to 15 millilitres,
   a) What fraction of the cups will contain more than 224 millilitres?
   b) What is the probability that a cup contains between 191 and 209 millilitres?
   c) how many cups will probably overflow if 230-milliliter cups are used for the next 1000 drinks?
   d) Below what value do we get the smallest 25% of the drinks?

5) The heights of 1000 students are approximately normally distributed with a mean of 174.5 cm and a standard deviation of 6.9 cm. If 200 random samples of size 25 are drawn from this population and the means recorded to the nearest tenth of a cm,
   a) Determine the mean and standard deviation of the sampling distribution of sample mean.
   b) Find the number of sample means that fall between 172.5 and 175.8 cm inclusive.
   c) Find the number of sample means falling below 172.0 cm.