

## PSY 222 Research Methods

Name: \_\_\_\_\_

R homework: Sampling distribution of means (10 points)

For this assignment, use the beta distribution matched with the last digit of your student ID number:

- if your student number ends with a 0 or 1, use `beta(6,2)`
- if your student number ends with a 2 or 3, use `beta(2,6)`
- if your student number ends with a 4 or 5, use `beta(4,4)`
- if your student number ends with a 6 or 7, use `beta(3,1)`
- if your student number ends with a 8 or 9, use `beta(1,3)`

1. Create a population of 9000 scores by drawing random samples from the assigned beta distribution. The scores will be between 0 and 1, so we will pretend they represent exam scores (proportion correct). Use the beta distribution assigned to you. For example, if you were assigned `beta(6,2)`:

```
pop = rbeta(9000,6,2)
```

2. Make a histogram of the population of scores. Make the limits of the x-axis go from 0 to 1.

**Print the histogram to turn in.**

```
hist(pop, xlim=c(0,1))
```

3. Find the mean and standard deviation of the population of scores:

```
mean(pop)  
sd(pop)
```

4. Draw 1000 samples of size 30 from the population, and find the mean of each sample.

```
sample_means = replicate(1000,mean(sample(pop, 30)))
```

5. Make a histogram of the sample means (i.e., the sampling distribution of means).

Make the limits of the x-axis go from 0 to 1. **Print the histogram to turn in.**

```
hist(sample_means, xlim=c(0,1))
```

6. Find the mean and standard deviation of the sample means.

7. Answer these questions:

a. How would you describe the shape of the distribution of scores in the population?  
Is it symmetric, positively skewed, negatively skewed, unimodal, bimodal?

b. What is the mean and standard deviation of the population?

c. How would you describe the shape of the distribution of sample means?

d. What is the mean and standard deviation of the sample means?  
How do they compare to the population mean and standard deviation?

Turn in this page, the histogram of the population, and the histogram of the sample means.