Section 7.1

Experiment

- Get into a groups of two or three and open your computers and Excel!
- Enter the numbers 0 through 10 in Column A and the probabilities 1/11 next to them.
- Open Data Analysis under the Data tab. Select Random Number Generation. Fill out the information as in the example below.
- Find the averages of each sample. Then find the mean and std. dev. of all all 50 averages.

Experiment

- Everyone will roll a die provided by your teacher.
- The Experiment: Roll the die and record the outcome 10 times. Tally how many rolls there were and how many of the rolls were 5 or 6. We will call rolling a 5 or 6 a success.
- Repeat this experiment 9 more times.

Exper.	1	2	3	4	5	6	7	8	9	10
Rel. Freq.										

- Take an average over all 10 experiments. Everyone should have ONE average.
- Then, we'll talk.

Section 7.3

Example An unknown distribution has a mean of 90 and a standard deviation of 15. Samples of size $n = 25$ are drawn randomly from the population.

1. Find the probability that the sample mean is between 85 and 92.

2. Find the value that is 2 standard deviations above the expected value of the sample mean.

Example The length of time, in hours, it takes an "over 40" group of people to play one soccer match is normally distributed with a mean of 2 hours and a standard deviation of 0.5 hours. A sample of size $n = 50$ is drawn randomly from the population.

Find the probability that the sample mean is between 1.8 hours and 2.3 hours.

Section 7.4

Example Coal is carried from a mine in West Virginia to a power plant in New York in hopper cars on a long train. The automatic hopper car loader is set to put 75 tons of coal into each car. The actual weights of coal loaded into each car are normally distributed with a mean, μ, of 75 tons and a standard deviation, σ, of 0.8 ton.

1. What is the probability that one car chosen at random will have less than 74.5 tons of coal?

2. What is the probability that 20 cars chosen at random will have a mean load weight, $\overline{x}$, of less than 74.5 tons of coal?

3. Suppose that the weight of one coal car chosen at random did contain less than 74.5 tons of coal. Would that fact make you suspect that the automatic hopper car loader had slipped out of adjustment?

4. Suppose that the mean weight of twenty cars selected at random had a mean weight of less than 74.5 tons of coal. Would that fact make you suspect that the automatic hopper car loader had slipped out of adjustment?

Example This past year a first grade teacher began using a new method of teaching reading to first graders. A standardized test given at the end of the year was used to measure the effectiveness of the new method. The distribution of scores using the old method of teaching reading had a mean, μ, of 80 points and a standard deviation, σ, of 10 points.

1. If the new method of teaching reading is no different from the old method, what is the probability that a random sample of 40 first graders who were taught reading by the new method would have a mean test score greater than 85?

2. Suppose that the mean test score of a random sample of 40 first graders who were taught reading by the new method was greater than 85. Should this cause you to believe that the new method of teaching reading to first graders is better than the old method?

Example A large freight elevator can transport a maximum of 10000 pounds. Suppose a load of cargo containing 50 boxes needs to be transported via the elevator. Experience has shown that the weights of boxes for this type of cargo have a relative frequency distribution with $\mu = 205$ pounds and $\sigma = 14$ pounds. Based on this information, what is the probability that all 50 boxes can be safely loaded onto the freight elevator and transported?