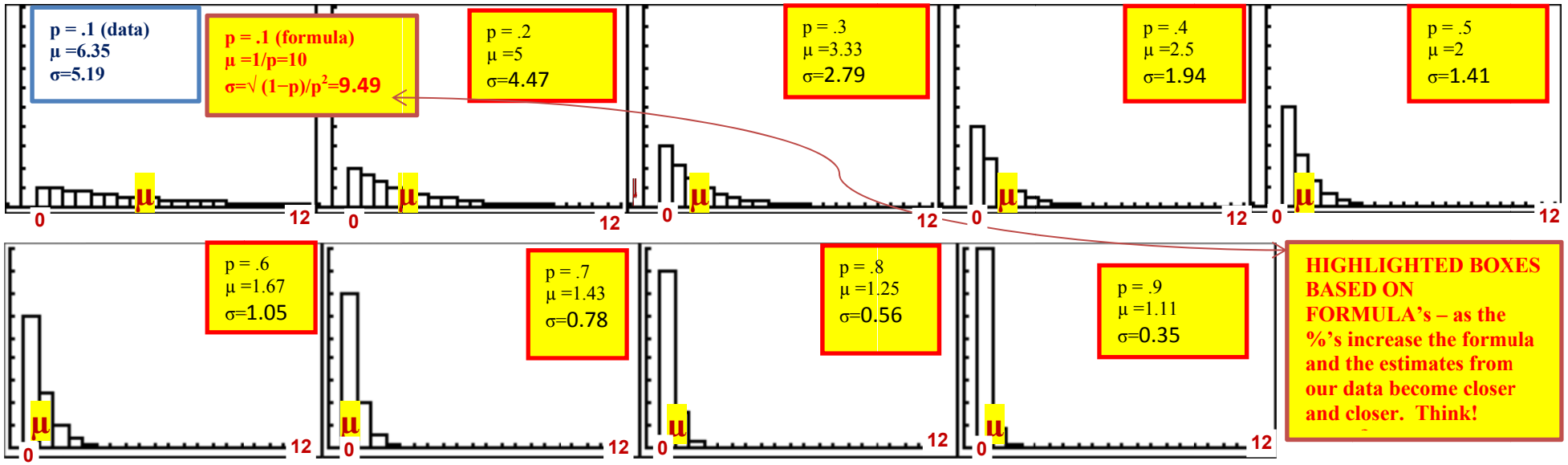
6.3 Geometric Activity

HW:
Come to class with (1) this worksheet complete (2) do the activity for p=0.1 (3) Be ready to discuss why the expected value and standard deviation for the data you inputted into your calc. is not equal to the theoretical formula values (4) Come to class with your calculator set up with the histogram.

Let's examine the geometric distributions for varying probabilities of defective light bulbs. Find when the first defective light bulb occurs as we sample light bulbs from a large population.

1. Create the geometric distribution for the probability of 10% defective bulbs by entering the following into your calculator.
   L1: X 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 (X continues to infinity, but this will give us an idea of these distributions)
   L2: P(X) **geometpdf(.1,L1)** (be sure to go on top of L2)
2. Create a histogram of this distribution and sketch below
   Use: Xlist: L1 & Freq: L2 **Window: xmin: 0, xmax: 21, xscl: 1, ymin: 0, ymax: 1, yscl: 0.1**
3. Calculate the mean and standard deviations for probability distribution. **1-Var Stats> List:[L1] FreqList:[L2] > μ=Σx=____ σx=____**
4. Repeat steps 1-3 for the remaining probabilities then answer the questions below.



5. What do you notice about the geometric distributions as the probability of success (defective) increases (shape, center, and spread)?
   - **As the probability for the first defective light bulb increases (from 10% to 90% defective), the mean decreases (from 10 to close to 1), the spread becomes very narrow, and the shape becomes less skewed right and more peaked at the mean.**
6. What are the parameter(s) for geometric models? What are the formulas for the mean and standard deviations for geometric distributions?

Geometric Distribution is G(p): **E(X)=μ= 1/p** **VAR(X)=σ²= q/p²** **q=(1-p)**