AP Statistics   Name _____   Date: _____
Sampling Distribution of Sample Proportion

Imagine a very large candy machine filled with orange, brown and yellow candies (think Reese's Pieces). When you insert money, the machine dispenses a sample of candies. In this Activity, you will use an applet to investigate the sample-to-sample variability in the proportion of orange candies dispensed by the machine.

Launch the Reese's Pieces applet at www.tinyurl.com/rhs-reeeses.
The population proportion of orange candies is .45.
Type .45 in the box labeled "probability of orange."

1. Check the Animate box. Click on the "Draw Samples" button. An animated simple random sample of n=25 candies should be dispensed. Was your sample proportion of orange candies (look at the value of "most recent $\hat{p}$ " in the applet window) close to the actual population proportion, p = 0.45? _____

2. Click "Draw Samples" 9 more times so that you have a total of 10 sample results.
Look at the dotplot of your $\hat{p}$-values, what is the shape _____
Click the "Summary Stats" box.
What is the mean of your 10 sample proportions? _____
What is the standard deviation? _____

3. To take more samples quickly, enter 390 in the "number of samples" box. Click on the "Animate" box to turn the animation off (if you don't it will take too long to run the 390 samples). Then click "Draw Samples". You have now taken a total of 400 samples of 25 candies from the machine.
Describe the shape, center and spread of the approximate sampling distribution of $\hat{p}$ shown in the dotplot_____
How does it compare to #2 _____

4. Clear the dotplot by hitting the "Reset" button. Change sample size to 50 and take 400 samples of 50 candies.
Describe the shape, center and spread of the approximate sampling distribution of $\hat{p}$ shown in the dotplot_____
How does it compare to #3 _____

5. Clear the dotplot. Change p = .15 and sample size to 25.
How will the sampling distribution of $\hat{p}$ change? _____
Take the 400 samples.
Describe the shape, center and spread of the approximate sampling distribution
of $\hat{p}$ shown in the dotplot_____
Does it confirm what you answered above? _____

6. Clear the dotplot. Change sample size to 50.
How will this affect the sampling distribution of $\hat{p}$? _____
Take the 400 samples.
Describe the shape, center and spread of the approximate sampling distribution
of $\hat{p}$ shown in the dotplot_____
Does it confirm what you answered above? _____

8. Write a brief summary about what you learned concerning the sampling
distribution of $\hat{p}$. It should mention the shape, center and spread of the sampling
distribution.