

§8.2 & 8.3: Sampling Distribution of a Sample Proportion

- 1.] A random sample is to be selected from a population that has a proportion of successes $p = .65$. Determine the mean and standard deviation of the sampling distribution of \hat{p} for each of the following sample sizes and determine if the distribution is Normally distributed:
 - a.) $n = 20$
 - b.) $n = 50$
 - c.) $n = 200$
- 2.] An article estimates that only 3% of Americans aged 65 or older prefer to watch the news online, rather than read or listen. Suppose that this estimate represents the entire population of Americans aged 65 or older.
 - a.) A random sample of size $n = 100$ people will be selected from this population and the sample proportion \hat{p} of those who watch news online will be calculated. What are the mean and standard deviation of the distribution of all possible \hat{p} 's from samples of this size?
 - b.) Would the sampling distribution from part a be Normal?
 - c.) Suppose $n = 400$. What would be the mean and standard deviation of the sampling distribution of \hat{p} ? How does the standard deviation now compare to when the sample was of size $n = 100$? Would the distribution be Normal?

- 3.] Suppose that we know for a fact that 37% of Kutztown University students that play Pokémon Go. Suppose we seek to take a sample of KU students of size $n = 175$. What is the probability that this sample yields a sample proportion \hat{p} less than 0.30?
- 4.] In a study of pet owners, it was reported that 24% celebrate their pet's birthday. Suppose that this estimate was based on a random sample of 200 pet owners. Is it reasonable to conclude that the proportion of *all* pet owners who celebrate their pet's birthday is less than 0.25? Use the sampling distribution of \hat{p} to support your answer.