Confidence Intervals for a Proportion

Go to [http://www.rossmanchance.com/applets/NewConfsim/Confsim.html](http://www.rossmanchance.com/applets/NewConfsim/Confsim.html). The applet allows one to visually investigate confidence intervals for a proportion. This link is in the Chapter 7 folder in the Course Materials folder on Blackboard.

**Simulating Confidence Intervals** *(Click [here](http://www.rossmanchance.com/applets/NewConfsim/Confsim.html) for a javascript version of this applet.)*

Specify the sample size $n$ and the true proportion $\pi$. When you click the **Sample** button, 50 separate samples of size $n$ will be selected from a population with a proportion of successes equal to $\pi$. For each of the 50 samples, a **95% confidence interval** is displayed in the plot to the right. Each of these intervals is computed based using the standard normal approximation. If an interval does not contain the true proportion, it is displayed in red.

Additional simulations can be carried out by clicking the **Simulate** button multiple times. The cumulative number of times that each type of interval contains the true proportion is also tabled. Press the **Reset** button to clear existing results and start a new simulation. Things to try with the applet:

1. Simulate at least 25 intervals with $n = 30$ and $p = 0.5$. What proportion of the 95% confidence intervals contain 0.5?

2. Repeat #1 except simulate at least 1000 intervals. What proportion of the 95% confidence intervals contain 0.5?
3. Simulate at least 25 intervals with \( n = 100 \) and \( p = 0.5 \).
   a. What proportion of the 95% confidence intervals contain 0.5?
   b. How does the typical width of these intervals compare to the \( n = 30 \) and \( p = 0.5 \) case above?

4. Now repeat #3, except simulate at least 1000 intervals. What proportion of the 95% confidence intervals contain 0.5?

5. Simulate at least 25 intervals with \( n = 30 \) and \( p = 0.1 \). What proportion of the 95% confidence intervals contain 0.1?

6. Repeat #5, except simulate at least 1000 intervals. What proportion of the 95% confidence intervals contain 0.1?