Worksheet 11/13/2024

An observation in a statistical study is **statistically significant** if it is unlikely to have occurred by chance.

An observation is **statistically significant at the 0.05 (or 0.01) level** if the likelihood of seeing the opposite is 5% (or 1%, respectively).

Sample proportion = the proportion of data in the sample that satisfies a certain property

Sampling distribution = the distribution of the sample proportion

If the sample size (called n) is large, the sampling distribution is approximately a normal distribution, and the standard deviation is approximately $\frac{1}{2\sqrt{n}}$.

Null hypothesis: population parameter = claimed value

Alternative hypothesis: population parameter ≠ claimed value

Hypothesis test: to *reject* the null hypothesis or to *not reject* it (thus, support the alternative hypothesis).

Find the margin of error and the 95% confidence interval for the following studies. Briefly interpret the 95% confidence interval.

1) A survey of 65,000 households by the U.S. Department of Labor reported an unemployment rate of 4.3%.

2) A 2021 Pew Research Center poll found that 55% of the 5360 adults surveyed believe that the U.S. President should be elected by popular vote (rather than by using the Electoral College).

3) In a 2021 Morning Consult poll of 1993 registered voters, 57% of those responding supported (strongly or somewhat) President Biden's decision to rejoin the Paris Climate Agreement.

Consider the following claims related to statistical studies. State the null and alternative hypotheses for a hypothesis test. Describe the two possible outcomes of the test, using the context of the given situation.

4) The Superintendent claims that the median salary of a high school teacher in her school district is above the national median of $62,000.

5) The state hydrologist claims that the total precipitation for the year just ended is less than the average of 27.5 inches recorded over the prior ten years.

For each of the following events, state whether you think the difference between what occurred and what you would expect by chance is statistically significant. Explain.

6) In 120 rolls of a standard six-sided die, you get 2 sixes.

7) A basketball player with a 89% free-throw percentage misses 20 free throws in a row.