

1. Calculate the standard error of the sampling distribution of $\hat{p}$ when taking samples of size n . Show your work.
 - a. $\hat{p} = 0.76$, $n = 40$

 - b. $\hat{p} = 0.41$, $n = 100$

2. There are three conditions that need to be satisfied in order to construct a confidence interval for a population proportion, p .
 - a. Explain why the random sampling condition is necessary.

 - b. Explain why the 10% condition is necessary.

 - c. Explain why the large counts condition is necessary.

3. Grand Canyon University surveyed 1,000 randomly selected college students from various post-secondary institutions in the United States. The survey found that 84% of the students surveyed prefer studying alone rather than with others. Using this information:
- Identify the parameter of interest.
 - Check if the conditions for constructing a 95% confidence interval for p are met.
 - Identify the statistic and calculate its standard error.
 - Identify the critical value, z^* .
 - Calculate the margin of error for the 95% confidence interval.
 - Construct a 95% confidence interval for p .
 - Interpret the interval in context.

4. A law firm receives a 360-page document of client depositions from a transcription service. To assess the quality of the service, a paralegal randomly selects 20 pages and determines that 3 pages contain typos. The paralegal wants to construct a 95% confidence interval for the proportion of pages in the complete document that containing typos. Which of the conditions for constructing a confidence interval are not met? Explain your answer.
5. A podcaster with thousands of listeners changes her episodes to a shorter format. To gauge listener reaction, she surveys a random sample of 80 listeners and finds that 74% prefer the shorter format. Calculate and interpret a 90% confidence interval for the proportion of all of her listeners who prefer the shorter format. Assume all conditions for constructing a confidence interval are met.

6. Let's investigate how the value of $\hat{p}$ influences the margin of error for a confidence interval when the sample size and confidence level remain constant. Consider samples of size 50 at a 95% confidence level with these four sample proportions: $\hat{p} = 0.35$, $\hat{p} = 0.65$, $\hat{p} = 0.50$, and $\hat{p} = 0.04$.
- Which sample proportion would produce the smallest margin of error?
 - Which sample proportion would produce the largest margin of error?
 - Which two sample proportions would produce the same margin of error? Explain why.
 - Write a sentence summarizing how the value of $\hat{p}$ affects the margin of error.
7. From a random sample of 297 employees at a certain company, 128 of the employees reported feeling strongly supported by their manager. Which of the following gives a 95% confidence interval for the proportion of all employees at this company who feel strongly supported by their manager?
- $0.431 \pm 1.96 \sqrt{\frac{(0.431)(0.569)}{297}}$
 - $0.431 \pm 1.645 \sqrt{\frac{(0.431)(0.569)}{297}}$
 - $128 \pm 1.96 \sqrt{\frac{(0.431)(0.569)}{297}}$
 - $128 \pm 1.96 \sqrt{\frac{(0.5)(0.5)}{297}}$

8. At the start of the school year, an education consulting company estimated the proportion of teachers in a particular school district who begin lessons by identifying learning targets. They observed a random sample of teachers in this district and constructed a 95% confidence interval of (0.544, 0.816). Near the end of the year, they observed another random sample of teachers of the same size from this district and found that 60% began lessons with learning targets. How does the end-of-year 95% confidence interval compare to the beginning-of-year interval?
- A) The end of year interval is wider and has a greater point estimate.
 - B) The end of year interval is narrower and has a greater point estimate.
 - C) The end of year interval is wider and has a smaller point estimate.
 - D) The end of year interval is narrower and has a smaller point estimate.