

1. Spain has a high rate of cocaine use, so it's not surprising that euro paper currency in Spain often contains traces of cocaine.

Suppose researchers collect 33 twenty-euro notes in Madrid and 28 contained traces of cocaine.

Construct a 99% plus-four confidence interval for the proportion  $p$  of twenty-euro notes which contain traces of cocaine.

A. The 99% plus-four plus-four confidence interval is (0.575, 0.907).

B. The 99% plus-four plus-four confidence interval is (0.705, 0.977).

C. The 99% plus-four plus-four confidence interval is (0.705, 0.907).

D. The 99% plus-four plus-four confidence interval is (0.645, 0.977).

E. The 99% plus-four plus-four confidence interval is (0.605, 0.937).

F. The 99% plus-four plus-four confidence interval is (0.605, 0.977).

G. The 99% plus-four plus-four confidence interval is (0.645, 0.907).

H. The 99% plus-four plus-four confidence interval is (0.575, 0.937).

2. Does the order in which wine is presented make a difference in which wine is preferred? In one study, researchers had two choices of wine presented to each subject one at a time. The subjects were then asked to choose his or her preferred wine. However, unknown to the subjects, both wines were the same.

Out of a random sample of 29 subjects, 21 chose the wine that was presented to them first.

Construct a 95% confidence interval for the proportion  $p$  of subjects who preferred the first wine.

A. A 95% confidence interval is (0.511, 0.837).

B. A 95% confidence interval is (0.511, 0.897).

C. A 95% confidence interval is (0.561, 0.887).

D. A 95% confidence interval is (0.571, 0.887).

E. A 95% confidence interval is (0.561, 0.857).

F. A 95% confidence interval is (0.561, 0.837).

G. A 95% confidence interval is (0.571, 0.857).

H. A 95% confidence interval is (0.571, 0.897).

3. Does the order in which wine is presented make a difference in which wine is preferred? In one study, researchers had two choices of wine presented to each subject one at a time. The subjects were then asked to choose his or her preferred wine. However, unknown to the subjects, both wines were the same.

Out of a random sample of 27 subjects 19 chose the wine that was presented to them first.

For this particular sample, our sample proportion is  $\hat{p} = 0.704$ , and the margin of error at 99% confidence is  $\pm 22.64\%$ . Suppose we wanted to duplicate this study with a larger samples size to improve the results. Taking  $\hat{p} = 0.704$ , to be our initial guess  $p^*$ , find the sample size the size necessary in order to achieve a margin of error of  $\pm 2\%$  at 99% confidence.

- A. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3457$ .
- B. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3455$ .
- C. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3459$ .
- D. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3460$ .
- E. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3450$ .
- F. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3466$ .
- G. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3458$ .
- H. The sample size needed to achieve a margin of error of  $\pm 2\%$  at 99% confidence is  $n = 3448$ .

4. The inhabitants of Martinville, U.S.A. are casting their vote for mayor. On the ballot this election are:

1. Sleazy P. Martini (incumbent)
2. Stubbs the Cat

From a random sample of 475 voting-age Martinville residents when asked the question:

“Are you going to vote for Stubbs the Cat?”

340 of the sample answered “yes.”

Construct a 90% plus-four confidence interval for the proportion  $p$  of voting-age Martinville residents who say they will vote for Stubbs the Cat.

- A. The 90% plus-four plus-four confidence interval is (0.68, 0.708).
- B. The 90% plus-four plus-four confidence interval is (0.63, 0.698).
- C. The 90% plus-four plus-four confidence interval is (0.63, 0.748).
- D. The 90% plus-four plus-four confidence interval is (0.64, 0.708).
- E. The 90% plus-four plus-four confidence interval is (0.72, 0.708).
- F. The 90% plus-four plus-four confidence interval is (0.64, 0.698).
- G. The 90% plus-four plus-four confidence interval is (0.72, 0.748).
- H. The 90% plus-four plus-four confidence interval is (0.68, 0.748).

5. Spain has a high rate of cocaine use, so it’s not surprising that euro paper currency in Spain often contains traces of cocaine.

Suppose researchers collect 28 twenty-euro notes in Madrid and 23 contained traces of cocaine.

Fill in the blank with the correct symbol: \_\_\_\_\_ = 28

- A.  $s$
- B.  $\bar{x}$
- C.  $\hat{p}$
- D.  $n$
- E.  $p$
- F.  $\mu$
- G.  $\sigma$

6. The inhabitants of Martinville, U.S.A. are casting their vote for mayor. On the ballot this election are:

1. Sleazy P. Martini (incumbent)
2. Stubbs the Cat

From a random sample of 292 voting-age Martinville residents when asked the question:

“Are you going to vote for Stubbs the Cat?”

221 of the sample answered “yes.”

Construct a 95% confidence interval for the proportion  $p$  of voting-age Martinville residents who say they will vote for Stubbs the Cat.

- A. A 95% confidence interval is (0.748, 0.856).
- B. A 95% confidence interval is (0.708, 0.856).
- C. A 95% confidence interval is (0.708, 0.806).
- D. A 95% confidence interval is (0.708, 0.766).
- E. A 95% confidence interval is (0.668, 0.766).
- F. A 95% confidence interval is (0.748, 0.806).
- G. A 95% confidence interval is (0.668, 0.846).
- H. A 95% confidence interval is (0.748, 0.846).

7. Without any prior estimate of a population proportion  $p$ , what sample size would we need to achieve a margin of error of  $\pm 4\%$  at 99% confidence.

- A. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1030$ .
- B. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1045$ .
- C. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1044$ .
- D. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1031$ .
- E. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1037$ .
- F. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1028$ .
- G. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1041$ .
- H. The sample size needed to achieve a margin of error of  $\pm 4\%$  at 99% confidence is  $n = 1036$ .

8. The inhabitants of Martinville, U.S.A. are casting their vote for mayor. On the ballot this election are:

1. Sleazy P. Martini (incumbent)
2. Stubbs the Cat

From a random sample of 998 voting-age Martinville residents when asked the question:

“Are you going to vote for Stubbs the Cat?”

724 of the sample answered “yes.”

Find the margin of error of our estimate of  $p$  at the 90% confidence level.

- A. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0262$ , or  $\pm 2.62\%$ .
- B. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0182$ , or  $\pm 1.82\%$ .
- C. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0222$ , or  $\pm 2.22\%$ .
- D. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0312$ , or  $\pm 3.12\%$ .
- E. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0242$ , or  $\pm 2.42\%$ .
- F. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0192$ , or  $\pm 1.92\%$ .
- G. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0232$ , or  $\pm 2.32\%$ .
- H. At 90% confidence, the margin of error of our estimate of  $p$  is  $\pm 0.0152$ , or  $\pm 1.52\%$ .