

AP Statistics - Confidence Intervals for a Proportion - Worksheet

Common Core AP STAT 6.1, AP STAT 6.2, AP STAT 6.3, HSS-IC.B.4 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice AP Statistics topics 6.1 to 6.3. You will find critical values, check conditions, compute and interpret confidence intervals for a proportion, find margins of error and sample sizes, and use an interval to justify a claim.

AP Statistics · Common Core State Standards: **AP STAT 6.1, AP STAT 6.2, AP STAT 6.3, HSS-IC.B.4**

Exercise 1 - Critical values

Confidence	90%	95%	99%
z^*	1.645	1.960	2.576

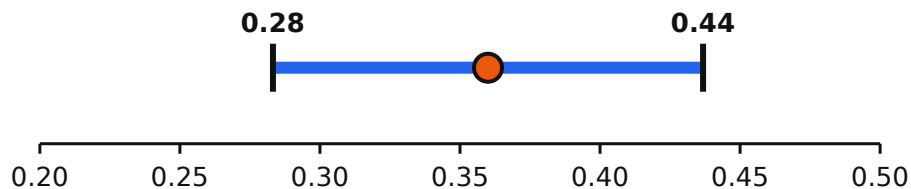
Common critical values.

Find z^* for a 90%, a 95%, and a 99% confidence interval. Explain why z^* grows with the confidence level.

Exercise 2 - Check conditions

In a random sample of 80 of the 4,000 students at a school, 12 say they own an electric scooter. Check the conditions for a z interval for p .

Exercise 3 - Compute an interval



95% interval: (0.283, 0.437).

In a random sample of 150 teens, 54 say they use a social media app daily. Construct a 95% confidence interval for the proportion of all teens in the region who do.

Exercise 4 - Interpret the interval

Interpret the interval (0.283, 0.437) from the previous problem.

Exercise 5 - Interpret the confidence level

What does 95% confidence mean in the previous problem?

Exercise 6 - Identify errors

A student writes: "There is a 95% probability that the true proportion is between 0.283 and 0.437." Explain the mistake.

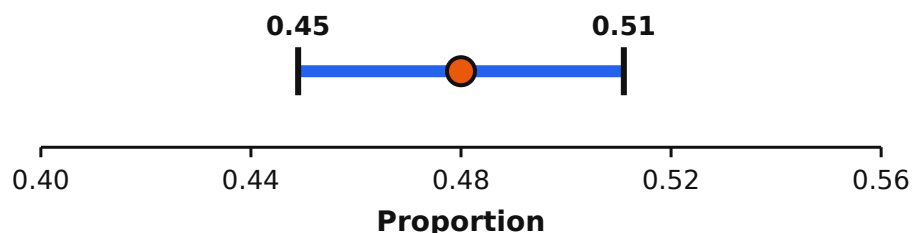
Exercise 7 - 90 percent interval

In a random sample of 350 voters, 210 support a proposition. Find a 90% confidence interval for the proportion of all voters who support it.

Exercise 8 - 99 percent interval

Using the same data (210 of 350), find the 99% interval and compare its width with the 90% interval.

Exercise 9 - Margin of error

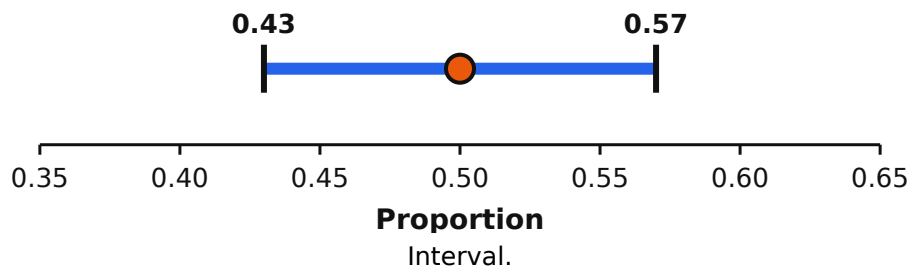


Poll result with margin of error 3.1 points.

A poll reports 48% support with a margin of error of 3.1 percentage points. Give the interval

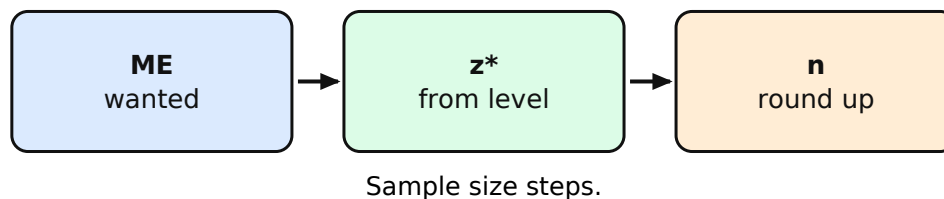
and interpret the margin of error.

Exercise 10 - Find $\hat{p}$ and ME from an interval



A 95% confidence interval for a proportion is (0.43, 0.57). Find the sample proportion and the margin of error.

Exercise 11 - Sample size

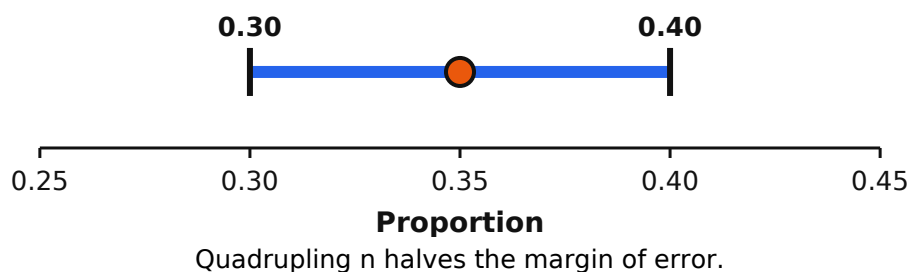


A club wants a 95% confidence interval with margin of error at most 0.04 for the proportion of members who support a new logo. No earlier estimate is available. Find the sample size.

Exercise 12 - Sample size with an estimate

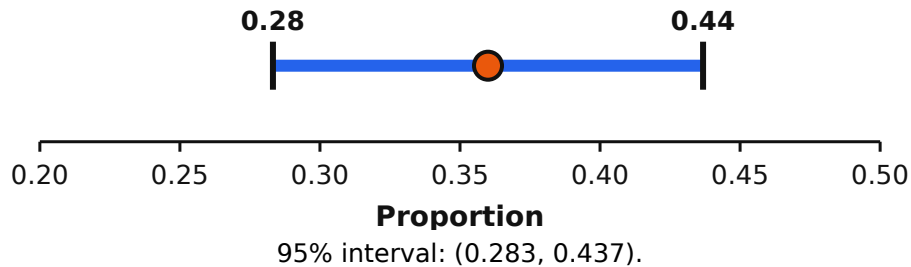
A previous study suggests that about 30% of people recycle. How large a sample is needed for a 95% interval with margin of error at most 0.03?

Exercise 13 - Effect of n



A 95% interval based on $n = 400$ has margin of error 0.05. About what margin of error results from $n = 1,600$ at the same confidence?

Exercise 14 - Claim justification



A manager claims that exactly half of all teens use the app daily. Does the 95% interval (0.283, 0.437) support the claim?

Exercise 15 - Claim not rejected

A radio host claims that 50% of listeners like a song. In a random sample of 100 listeners, 46 like it. Use a 95% interval to evaluate the claim.

Exercise 16 - Large counts fails

A random sample of 40 people has 3 left-handed people. Explain why a z interval is not appropriate.

Exercise 17 - Wider or narrower?

For each change, say whether the margin of error gets larger or smaller: (a) larger sample size, (b) higher confidence level, (c) sample proportion closer to 0.5.

Exercise 18 - Convenience sample

A phone-in poll gets 900 responses, 63% in favor, and a 95% interval of (0.598, 0.662) is reported. Is the interval valid?

Exercise 19 - Multi-step

A random sample of 500 homes finds 185 with a smart thermostat. (a) Find a 95% interval. (b) Interpret. (c) Is it plausible that 40% of all homes have one?

Exercise 20 - Two sizes

Aisha computes 95% intervals for p from two samples with the same $\hat{p} = 0.40$: one has $n = 100$, the other $n = 400$. Compare the widths.