

AP Statistics - Confidence Intervals for a Proportion - Quiz

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

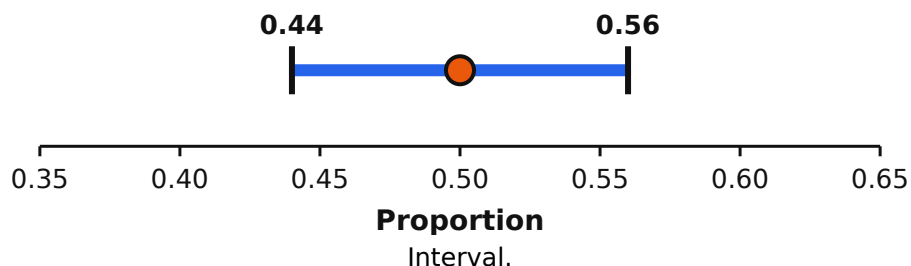
Name: _____ Class: _____ Date: ____/____/____

Ten multiple-choice questions test the interval formula and the meaning of confidence.
Read the explanations to avoid the usual wording mistakes.

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

Questions

Question 1



What is the margin of error for this interval?

- A. 0.12
- B. 0.06
- C. 0.50
- D. 0.44

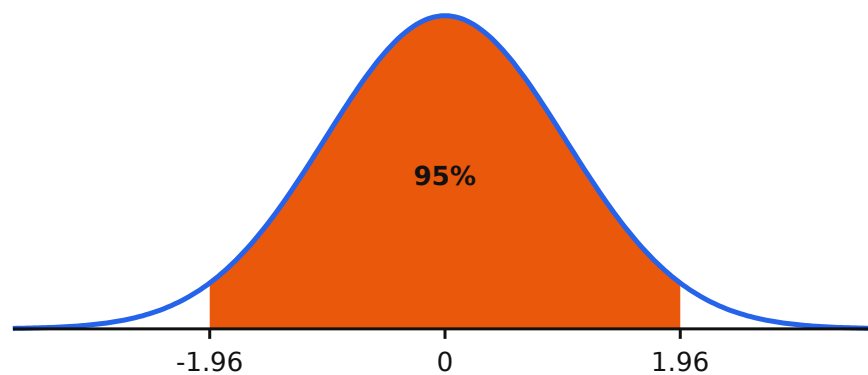
Question 2

$$p = 0.520.30.40.50.60.7$$

Roughly how many of the 20 intervals should capture the true proportion in the long run?

- A. 19
- B. 10
- C. 5
- D. 20

Question 3



The critical value $z^* = 1.96$ captures the middle 95% of the standard normal curve.

The value 1.96 is:

- A. the sample proportion
- B. the critical value z^* for 95% confidence

- C. the sample size
- D. the standard error

Question 4

Which change makes the interval narrower?

- A. Increasing the confidence level
- B. Decreasing the sample size
- C. Increasing the sample size
- D. Using $z^* = 2.576$

Question 5

A 95% CI is (0.31, 0.39). Which conclusion is correct?

- A. There is a 95% chance that p is between 0.31 and 0.39
- B. 95% of the sample lies within the interval
- C. 0.40 is not a plausible value for p
- D. $\hat{p}$ is 0.35 with no uncertainty

Question 6

The large counts condition for an interval requires:

- A. $n\hat{p} \geq 10$ and $n(1 - \hat{p}) \geq 10$
- B. $n \geq 30$
- C. $\hat{p} \geq 0.5$
- D. $n\hat{p} \leq 10$

Question 7

To halve the margin of error, the sample size should be:

- A. multiplied by 2
- B. divided by 2
- C. multiplied by $\sqrt{2}$
- D. multiplied by 4

Question 8

A confidence level of 99% compared with 95% gives:

- A. a narrower interval
- B. the same interval
- C. a smaller z^*
- D. a wider interval

Question 9

The standard error of $\hat{p}$ when $\hat{p} = 0.4$ and $n = 100$ is about:

- A. 0.24
- B. 0.049
- C. 0.4
- D. 0.0024

Question 10

A call-in poll with 5,000 responses shows 70% in favor. A 95% CI is invalid because:

- A. the sample was not random
- B. n is too large
- C. $\hat{p}$ is too high
- D. the confidence level is too low

Answers

1. **B** - The margin of error is half the width: $(0.56 - 0.44)/2 = 0.06$.
2. **A** - A 95% method captures the parameter about 95% of the time, which is about 19 of 20.
3. **B** - $z^* = 1.96$ leaves 2.5% in each tail of the standard normal curve.
4. **C** - Larger n decreases the standard error and margin of error.
5. **C** - A claimed value outside the interval is not plausible at that confidence level. The other statements misinterpret the interval.
6. **A** - At least 10 successes and 10 failures are needed for a normal model.
7. **D** - ME is proportional to $1/\sqrt{n}$.
8. **D** - Higher confidence requires a larger critical value and a larger margin of error.
9. **B** - $\sqrt{0.4(0.6)/100} = \sqrt{0.0024} = 0.049$.
10. **A** - Voluntary response samples are biased, so the interval formula does not apply.

Remember

- Interval: $\hat{p} \pm z^* \sqrt{\hat{p}(1 - \hat{p})/n}$; $z^* = 1.645, 1.960, 2.576$ for 90%, 95%, 99%.
- Conditions: Random, 10% ($n < 10\%$ of population), Large counts ($n\hat{p}$ and $n(1 - \hat{p})$ at least 10).
- Interpret the interval in context; interpret the level as the long-run capture rate.
- Higher confidence or smaller n gives a wider interval; quadrupling n halves the margin of error.
- A claimed value outside the interval is not plausible at that confidence level.