

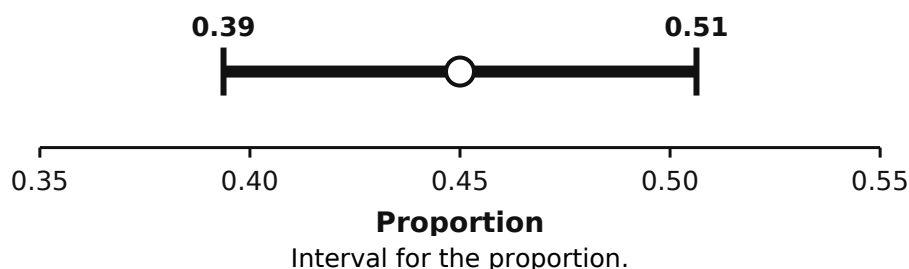
AP Statistics - Confidence Intervals for a Proportion - Test Answer Key

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

Each solution includes a scoring guide. Award points for checking conditions, for the correct interval, and for an interpretation that names the parameter and the population.

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

Question 1 - Build an interval [4 pts]



(a) Random sample; 300 is less than 10% of a city's adults; $n\hat{p} = 135$ and $n(1-\hat{p}) = 165$ are at least 10.

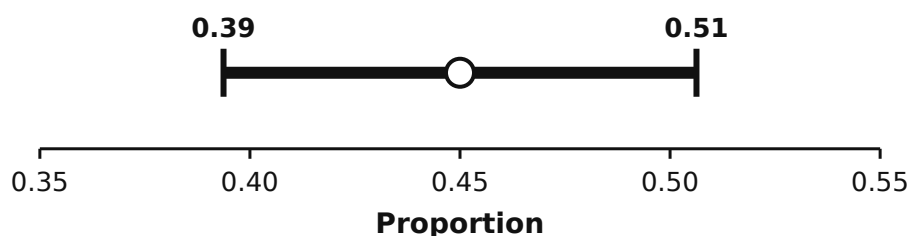
(b) $\hat{p} = 0.45$, $SE = 0.0287$, $ME = 0.0563$, interval (0.394, 0.506).

(c) We are 95% confident that the interval from 0.394 to 0.506 captures the true proportion of adults in the city who own or plan to buy a charger.

(0.394, 0.506).

Scoring: 1 point for random and 10%, 1 point for large counts, 1 point for the interval, 1 point for the interpretation in context.

Question 2 - Name the margin [1 pt]



Interval for the proportion.

$$\frac{0.51 - 0.39}{2} = 0.06.$$

0.06.

Scoring: 1 point for 0.06.

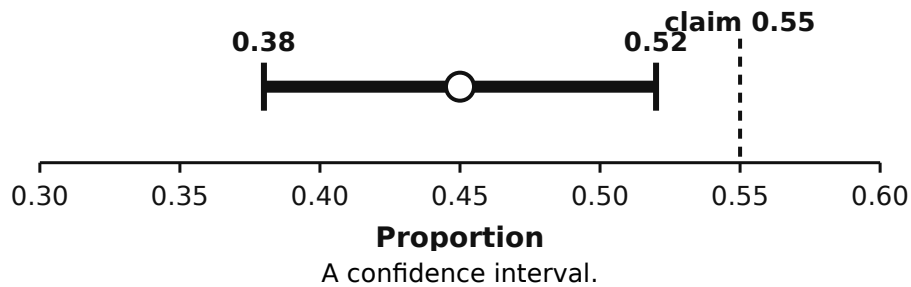
Question 3 - Interpret the level [2 pts]

The level refers to the method used.

If many random samples of size 300 were taken and a 95% interval computed from each, about 95% of those intervals would capture the true proportion.

Scoring: 1 point for referring to repeated sampling, 1 point for the 95% capture rate.

Question 4 - Claim [2 pts]



0.55 is above the upper endpoint 0.52.

No. 0.55 is not a plausible value, so there is convincing evidence the proportion is less than 0.55.

Scoring: 1 point for comparing 0.55 with the interval, 1 point for the conclusion.

Question 5 - Sample size [3 pts]

$$n \geq \left(\frac{2.576}{0.02} \right)^2 (0.25) = 4147.4.$$

n = 4148.

Scoring: 1 point for z^* , 1 point for $p^* = 0.5$ setup, 1 point for rounding up.

Question 6 - Conditions [2 pts]

$n\hat{p} = 4$ is less than 10.

No: the large counts condition fails.

Scoring: 1 point for computing the count, 1 point for the conclusion.

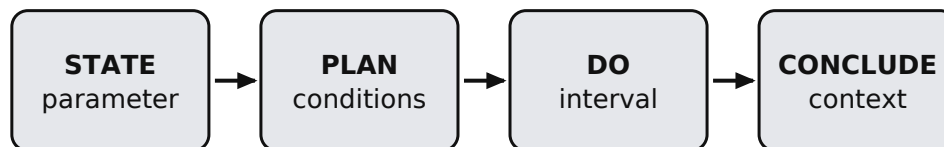
Question 7 - Effect of changes [3 pts]

(a) wider; (b) narrower (half as wide); (c) narrower, since $p\text{-hat}(1 - p\text{-hat})$ decreases from 0.25 to 0.09.

Wider; half as wide; narrower.

Scoring: 1 point each.

Question 8 - Process [3 pts]



Four steps.

STATE, PLAN, DO, CONCLUDE. In PLAN, name the procedure and check the random, 10%, and large counts conditions.

State, plan, do, conclude; PLAN = name the interval and check conditions.

Scoring: 1 point for the four steps, 1 point for naming the procedure, 1 point for the three conditions.

Total
20 points