

Algebra 2 - Sampling, Surveys and Experiments - Test Answer Key

Common Core S-IC.A.1, S-IC.A.2, S-IC.B.3, S-IC.B.4, S-IC.B.5, S-IC.B.6 · maths-pdf.fr/en/

Use this answer key and scoring guide to grade the test on sampling, surveys, and experiments (S-IC.A.1). Each solution shows the full reasoning, and the scoring note explains how many points to award for correct setup, correct work, and a correct final answer. Partial credit rewards a sound method even when a small arithmetic slip changes the result.

Algebra 2 · Common Core State Standards: **S-IC.A.1, S-IC.A.2, S-IC.B.3, S-IC.B.4, S-IC.B.5, S-IC.B.6**

Question 1 - Classify studies [2 pts]

(a) Experiment: treatments are assigned at random. (b) Survey: a sample is asked questions.

(a) experiment; (b) survey

Scoring: 1 point for each classification.

Question 2 - Bias [2 pts]

The students are chosen for convenience, not at random. People at the dessert bar may like food more than other students, so the sample is biased.

Convenience sample; likely to overrepresent students who like the menu

Scoring: 1 point for each problem.

Question 3 - Margin of error [3 pts]

Sample size n	100	400	900
$1/\sqrt{n}$	0.10	0.05	0.033

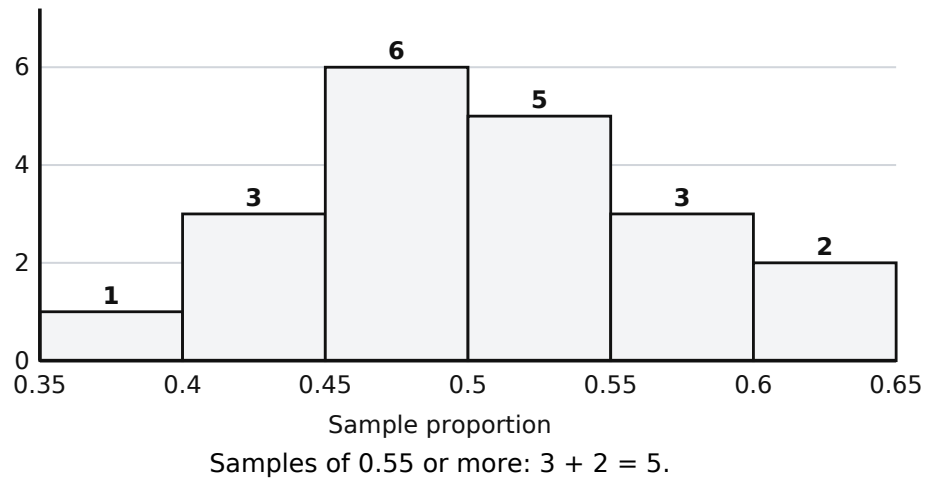
Completed table.

$$\frac{1}{\sqrt{400}} = 0.05 \text{ . } 54\% \pm 5\%.$$

49% to 59%

Scoring: 1 point for the table, 1 point for the margin of error of 400, 1 point for the interval.

Question 4 - Read a simulation [3 pts]



(a) The bars from 0.55 have counts 3 and 2: 5 samples. (b) $\frac{5}{20} = 0.25$. (c) Proportions near 0.65 occurred in at most 2 of 20 samples, so it is somewhat unusual but possible.

(a) 5; (b) 25%; (c) fairly unusual

Scoring: 1 point for each part.

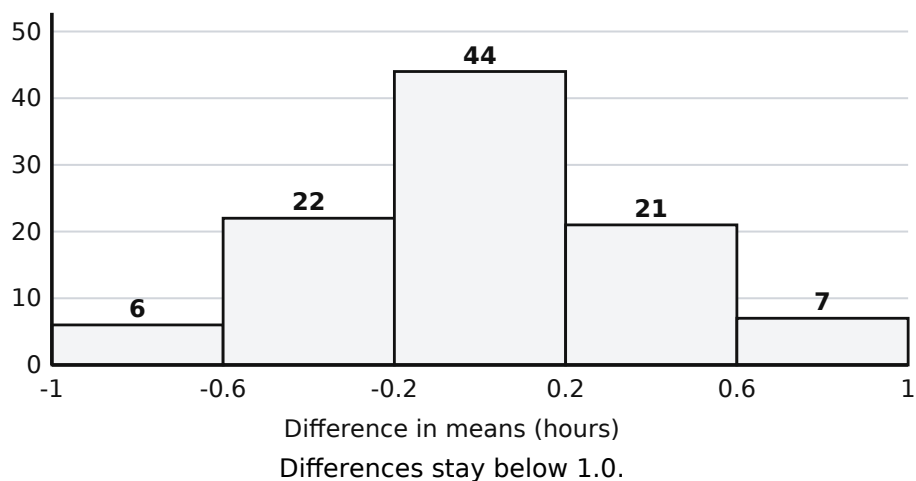
Question 5 - Design an experiment [2 pts]

Number the plants 1 to 30. Use a random number generator to select 15 numbers for the fertilizer group; the other 15 form the control group.

Random assignment of 15 and 15

Scoring: 1 point for random assignment, 1 point for equal groups with a control.

Question 6 - Compare treatments [2 pts]



None of the 100 simulated differences reached 1.0, so a difference this large almost never happens by chance.

Yes, the treatment likely had an effect

Scoring: 1 point for the comparison, 1 point for the conclusion.

Question 7 - Sample size [2 pts]

The margin is about $\frac{1}{\sqrt{n}}$. Half the margin needs four times the sample: $4 \cdot 250 = 1000$.

About 1,000 voters

Scoring: 1 point for the relationship, 1 point for the answer.

Question 8 - Evaluate a report [2 pts]

The respondents chose themselves (voluntary response), so the sample is biased and does not represent all people.

Not reliable: a voluntary response sample is biased

Scoring: 1 point for identifying the self-selected sample, 1 point for the conclusion.

Question 9 - Find the error [2 pts]

Students chose whether to eat breakfast, so other variables could explain the difference. Only a randomized experiment can show cause and effect.

Observational studies cannot establish cause

Scoring: 1 point for confounding, 1 point for the correct statement.

Total
20 points