

Collecting Data: Sampling Plans and Experiments

Grade 12 – AP Statistics math · Test Answer Key · Standards: AP Statistics Unit 1 (2026-27)

The scoring guide shows how the 20 points are earned. Written answers need context and a clear reason, and a correct method name without an explanation earns partial credit only.

Standards: AP Statistics Unit 1 (2026-27) · **Level:** Grade 12 AP Statistics

Question 1 Statistical Questions (2 points)

(a) Prices vary between stores, so variability is expected: statistical. (b) There is one height: not statistical.

(a) statistical; (b) not statistical

Scoring: 1 point each part, with a reason about variability.

Question 2 Simple Random Sample Selection (3 points)

(a) Reading left to right: 893, 104, 167, 692, 861, 834, 085, 543. Valid, new labels are 104, 167, 085, 543. (b) Groups above 600 (such as 893) or equal to 000 are skipped, and a repeated label is skipped. (c) Every student has the same chance, and every group of 4 students is equally likely to be the selected group.

Students 104, 167, 085, 543

Scoring: 1 point for each part: correct four labels, correct handling of invalid and repeated groups, explanation of equal chance for every group.

Question 3 Identify the Sampling Method (2 points)

(a) Whole groups are randomly chosen: a cluster sample. (b) A stratified sample takes some individuals from every group; a cluster sample takes all individuals from only some groups.

(a) cluster sample

Scoring: 1 point each part.

Question 4 Types of Bias (2 points)

(a) Undercoverage: households without landlines cannot be selected. (b) Nonresponse: many chosen households did not answer, and they may differ from those who did.

(a) undercoverage; (b) nonresponse

Scoring: 1 point each part.

Question 5 Observation and Confounding (2 points)

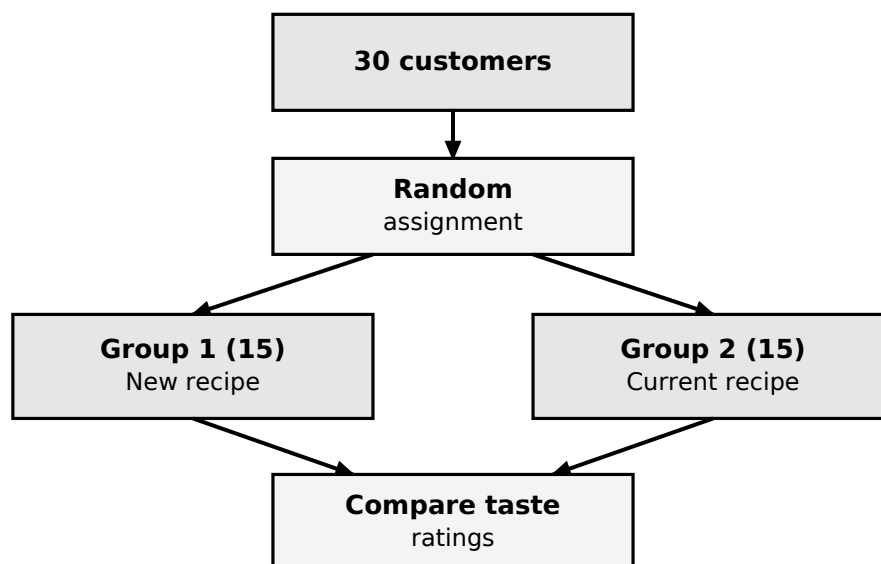
(a) No: participants chose their own treatment, so it is an observational study. (b) People who choose to take vitamins may also eat better or sleep more, and those habits could explain fewer colds.

Observational; possible confounder: healthy habits

Scoring: 1 point each part.

Question 6 Design a Randomized Experiment (3 points)

Number the customers 01 to 30 and use a random number generator to select 15 for the new recipe; the others taste the current recipe. Both samples look identical and customers are not told which recipe they have (blinding), so expectations do not affect ratings. Compare the distributions of ratings in the two groups (for example, with the mean).



Answer diagram.

Randomly assign 15 customers to each recipe, blind them, compare ratings

Scoring: 1 point random assignment described, 1 point blinding or other bias control, 1 point

comparison of the groups.

Question 7 Placebo and Blinding (2 points)

(a) It is a placebo. It gives both groups the experience of taking a pill so that expectations are balanced. (b) Neither the participants nor the people measuring the response know who is in which group.

(a) placebo; (b) participants and evaluators are both unaware of the treatment

Scoring: 1 point each part.

Question 8 Matched Pairs (2 points)

(a) A matched-pairs design (each runner is a block with two measurements). (b) If everyone used shoe A first, fatigue or learning could be confounded with the shoe brand; randomizing the order balances such effects.

(a) matched pairs; (b) balances order effects

Scoring: 1 point each part.

Question 9 Scope of Inference (2 points)

(a) Yes. Random assignment supports a cause-and-effect conclusion. (b) The sample was randomly selected from the district's teenagers, so the results can be generalized to all teenagers in that district.

(a) yes, cause and effect; (b) all teenagers in the district

Scoring: 1 point each part with justification.