

Algebra 2 · Statistical Experiments, Simulation and Decisions · Test

Common Core S-IC.A.2, S-IC.B.5, S-IC.B.6, S-MD.B.6, S-MD.B.7 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This algebra 2 inference decisions test checks statistical experiments, simulation and decisions in 45 minutes, with 9 questions for a total of 20 points.

This test checks simulations, randomized experiments, evaluating reports and decisions with probability. It has nine questions worth 20 points in total and should take about 45 minutes. A calculator is allowed. Show every step, and write each conclusion in a full sentence that refers to the context.

Test information

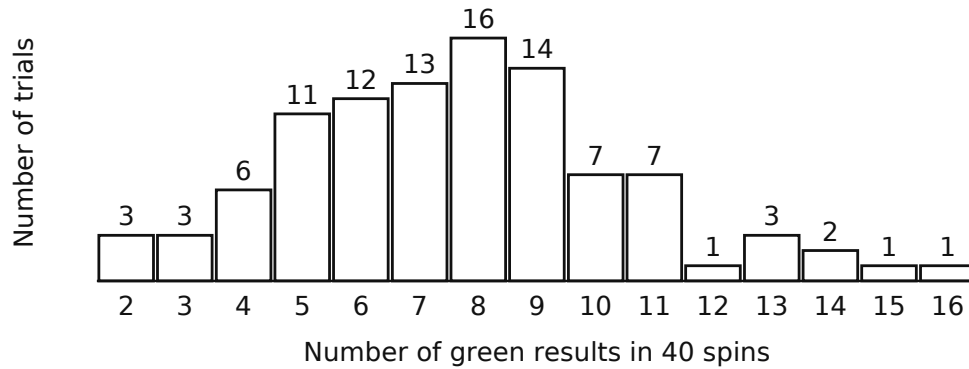
- **Grade:** Algebra 2
- **Chapter:** Statistical Experiments, Simulation and Decisions
- **Common Core:** S-IC.A.2, S-IC.B.5, S-IC.B.6, S-MD.B.6, S-MD.B.7
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 3 pts; Question 5: 2 pts; Question 6: 2 pts; Question 7: 2 pts; Question 8: 3 pts; Question 9: 2 pts)

Algebra 2 Inference Decisions Test: questions 1-5

Question 1: Spinner claim (2 points)

A spinner is labeled so that green should come up with probability 0.2. Ayla spins it 40 times and gets green 15 times. The histogram shows 100 simulated sets of 40 spins with $P(\text{green})=0.2$.

100 simulated sets of 40 spins



Each bar counts simulated sets with that many green results.

- Find the expected number of green results in 40 spins. (1 point)
- Use the simulation to decide whether Ayla's result is consistent with the claim. (1 point)

Question 2: Marbles with no red (2 points)

A bag is said to have 25% red marbles. A student draws 8 marbles one at a time, replacing each, and gets no red marbles.

- Assuming the claim is true, find the probability of no red marble in 8 draws. (1 point)
- Decide whether the result is consistent with the claim and justify the decision. (1 point)

Question 3: Assign groups at random (2 points)

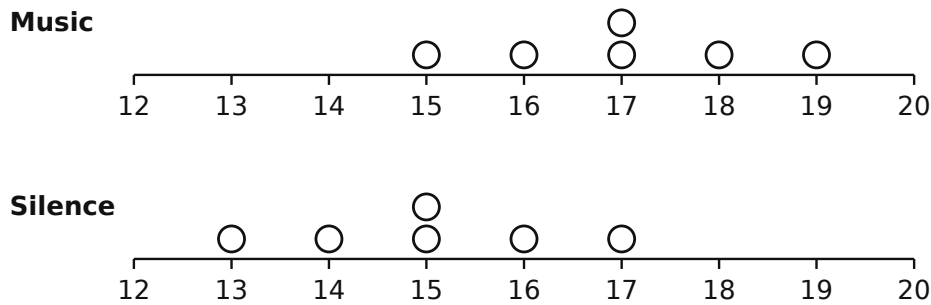
A teacher has 14 volunteers and wants 7 to take a quiz with music and 7 in silence.

- Describe a procedure that randomly assigns the volunteers. (1 point)
- Explain why random assignment makes a fair comparison. (1 point)

Question 4: Music and quiz scores (3 points)

The 12 volunteers in a study were randomly assigned, six to study with music and six in silence. Their quiz scores (out of 20) are shown. The scores were pooled and randomly split into two groups of six 1,000 times; 37 splits gave a difference of means of 2 or more (Music minus Silence).

Quiz scores out of 20



Each dot is one student. Six students were assigned to each group.

- Find each group's mean and the difference. (1 point)
- Estimate the probability of a difference at least this large by chance. (1 point)
- State whether the result is statistically significant at the 5% level and what it means. (1 point)

Question 5: Kinds of studies (2 points)

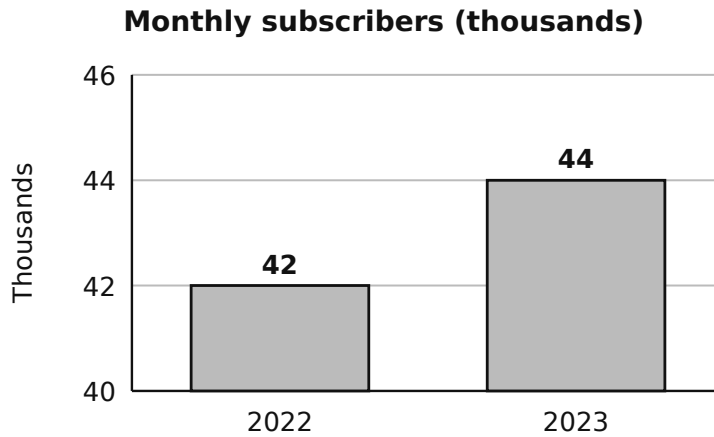
For each study, state whether it is an experiment or an observational study and whether it can show cause and effect.

- Fifty plots of land are randomly assigned to one of two fertilizers, and crop yields are compared. (1 point)
- A school compares grades of students who play an instrument with grades of students who do not. (1 point)

Algebra 2 Inference Decisions Test: questions 6-9

Question 6: Doubling headline (2 points)

A news site shows this graph.



Headline: "Subscribers double in one year!"

- Find the actual percent increase in subscribers from 2022 to 2023. (1 point)
- Explain why the graph is misleading. (1 point)

Question 7: Choose one of four (2 points)

Four friends want to use one standard die to choose a winner fairly, rolling again when needed.

- Describe how to assign the die faces. (1 point)
- Find the probability that the winner is decided on the first roll. (1 point)

Question 8: Carnival wheel (3 points)

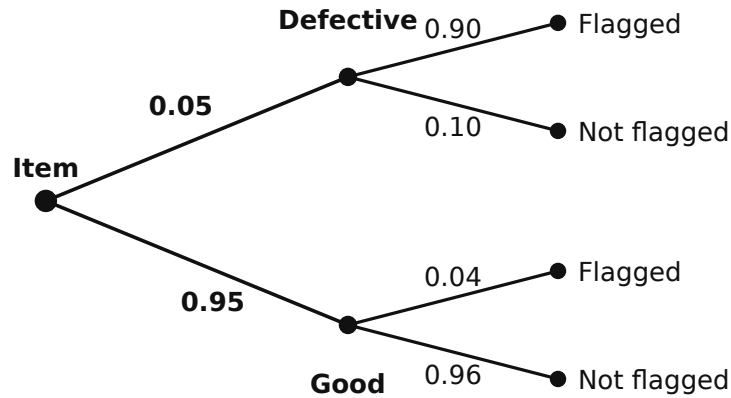
A carnival game costs \$2 to play. A wheel pays \$10 with probability 0.1, pays \$3 with probability 0.2, and pays nothing otherwise.

- Find the expected payout of one play. (1 point)
- Find the expected net result per play for the player. (1 point)
- Decide whether the game is fair and find a price that would make it fair. (1 point)

Question 9: Scanner flags (2 points)

A scanner checks items at a factory. The tree diagram shows the probabilities.

Items at a factory



Branch probabilities for the scanner.

- Find the probability that a random item is flagged. (1 point)
- Find the probability that a flagged item is defective. (1 point)

How to use this algebra 2 inference decisions test

Take this algebra 2 inference decisions test without notes, then grade it with the test answer key out of 20 points.

