

Algebra 2 · Statistical Experiments, Simulation and Decisions · Quiz

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 quiz asks 10 multiple-choice questions on statistical experiments, simulation and decisions, and each answer comes with a short explanation.

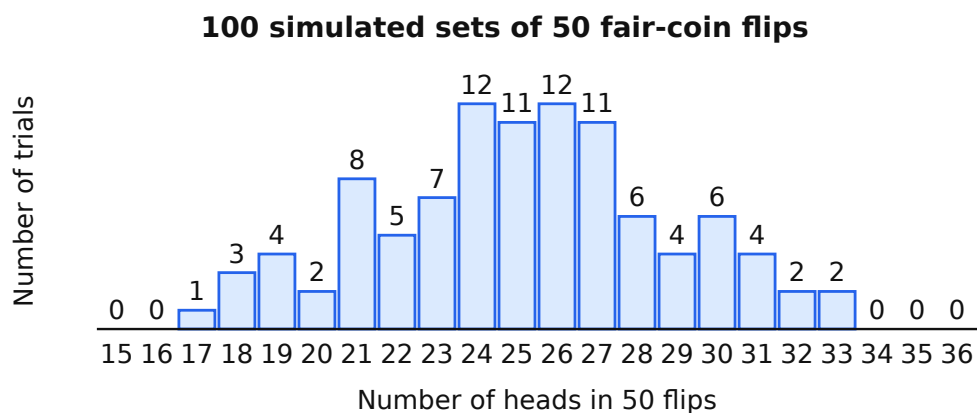
This quiz has ten multiple-choice questions on simulation, randomized experiments, evaluating reports, fair choices and expected value. Choose the one best answer for each question. Read any graph or table carefully before you answer, and use the explanation to learn from each miss.

Algebra 2 Common Core: S-IC.A.2 · S-IC.B.5 · S-IC.B.6 · S-MD.B.6 · S-MD.B.7

Questions

Question 1

Ben flipped a coin 50 times and got 34 heads. The histogram shows 100 simulated sets of 50 flips of a fair coin.



Simulation of a fair coin flipped 50 times, repeated 100 times.

Which conclusion fits best?

- A. The result is typical for a fair coin, so the coin is fair.
- B. The result is rare for a fair coin, so the coin is probably not fair.

- C. The result proves that the coin is biased.
- D. A simulation cannot say anything about one real result.

Question 2

A fair die is rolled 120 times. What is the expected number of fours?

- A. 24
- B. 30
- C. 40
- D. 20

Question 3

In 200 re-randomizations, 9 gave a difference at least as large as the observed difference. What is the estimated probability of such a difference by chance?

- A. 0.45
- B. 0.045
- C. 0.0045
- D. 0.955

Question 4

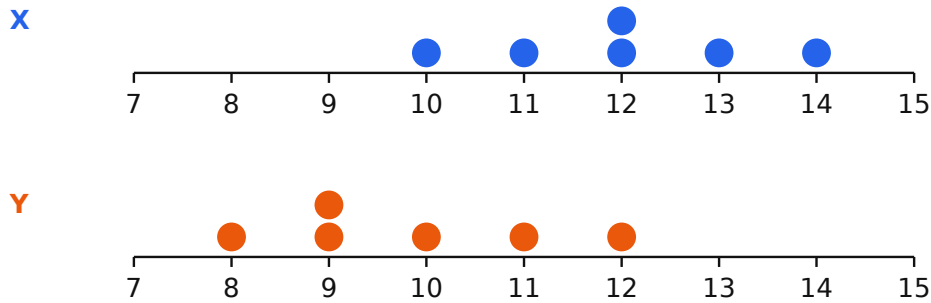
In a randomized experiment, the probability that chance alone gives a difference as large as the observed one is 0.02. Using the 5% guideline, what is the conclusion?

- A. The difference is not statistically significant.
- B. The treatment has no effect.
- C. The difference must be large and important.
- D. The difference is statistically significant.

Question 5

The dot plot shows plant heights for two randomly assigned groups. What is the difference of the means (X minus Y)?

Plant height (inches)



Six plants per group.

- A. 2.17 inches
- B. 2 inches
- C. 3 inches
- D. 1.5 inches

Question 6

A survey finds that students who eat breakfast have higher grades. Which conclusion is justified?

- A. Eating breakfast is associated with higher grades.
- B. Eating breakfast causes higher grades.
- C. Skipping breakfast lowers grades.
- D. Every student should eat breakfast to raise grades.

Question 7

Which plan chooses fairly among three people using one standard die?

- A. Face 1 for Ana, 2-3 for Ben, 4-6 for Cal
- B. Faces 1-2 for Ana, 3-5 for Ben, 6 for Cal
- C. Faces 1-2 for Ana, 3-4 for Ben, 5-6 for Cal
- D. Faces 1-3 for Ana, 4-5 for Ben, 6 for Cal

Question 8

A game costs \$5 to play and pays \$20 with probability 0.2 (otherwise nothing). What is the expected net result per play?

- A. \$3.00
- B. \$1.00
- C. -\$1.00
- D. -\$4.00

Question 9

The table shows results of a screening test on 1,000 people. A person tests positive. What is the probability the person has the condition?

	Condition	No condition	Total
Positive	8	99	107
Negative	2	891	893
Total	10	990	1,000

Results for 1,000 people.

- A. about 7.5%
- B. about 80%
- C. about 92.5%
- D. about 10.7%

Question 10

Which study design best supports a cause-and-effect conclusion about sleep and test scores?

- A. Survey 40 students about their sleep and scores.
- B. Compare scores of students who choose to sleep more.
- C. Record the scores of the first 40 students who volunteer.
- D. Randomly assign 40 volunteers to two different sleep schedules and compare scores.

Answer key

1. **B** – No simulated set reached 34 heads, so the result is rare for a fair coin. It is strong evidence, not proof.
2. **D** – $120 \cdot \frac{1}{6} = 20$. Dividing by 5, 4 or 3 instead of 6 gives 24, 30 or 40.
3. **B** – $\frac{9}{200} = 0.045$. The value 0.955 is the complement.
4. **D** – $0.02 < 0.05$, so the difference is significant. Significance does not measure size or importance.
5. **A** – Mean of X is $\frac{72}{6} = 12$. Mean of Y is $\frac{59}{6} \approx 9.83$. The difference is about 2.17 inches.
6. **A** – The survey observed students and did not assign breakfast at random, so it shows association only.
7. **C** – Each person gets two of six faces, so each has probability $\frac{1}{3}$. The other plans give unequal numbers of faces.
8. **C** – Net +\$15 with probability 0.2 and -\$5 with probability 0.8: $3 - 4 = -\$1.00$.
9. **A** – Of the 107 positive tests, only 8 have the condition: $\frac{8}{107} \approx 7.5\%$. The 80% is the share of sick people who test positive.
10. **D** – Only random assignment of treatments controls other factors, so only it supports a causal conclusion.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Standards S-IC.A.2, S-IC.B.5, S-IC.B.6, S-MD.B.6 and S-MD.B.7: simulation, experiments, reports and decisions.
- A result is inconsistent with a model when simulated sets rarely produce one that extreme (often under 5%).
- Random assignment lets a significant difference be credited to the treatment, not to luck.
- A choice is fair when every option has the same probability; expected value is the sum of payoff times probability.
- Check a report's sample, assignment, size and presentation before trusting its claim.

How to use this algebra 2 inference decisions quiz

Retake this algebra 2 inference decisions quiz until every answer is right, then move on to the worksheet and the test.

