

Experiments, Simulation and Smart Decisions

Grade 11 – Algebra 2 math · Test · Standards: S-IC.A.2, S-IC.B.5, S-IC.B.6, S-MD.B.6, S-MD.B.7

Name: _____ Date: _____ Class: _____

This 45-minute test covers simulations, re-randomization, evaluating reports, and expected value in decisions. A calculator is allowed. Support each conclusion with numbers from the data.

Standards: S-IC.A.2, S-IC.B.5, S-IC.B.6, S-MD.B.6, S-MD.B.7 · **Level:** Grade 11 Algebra 2

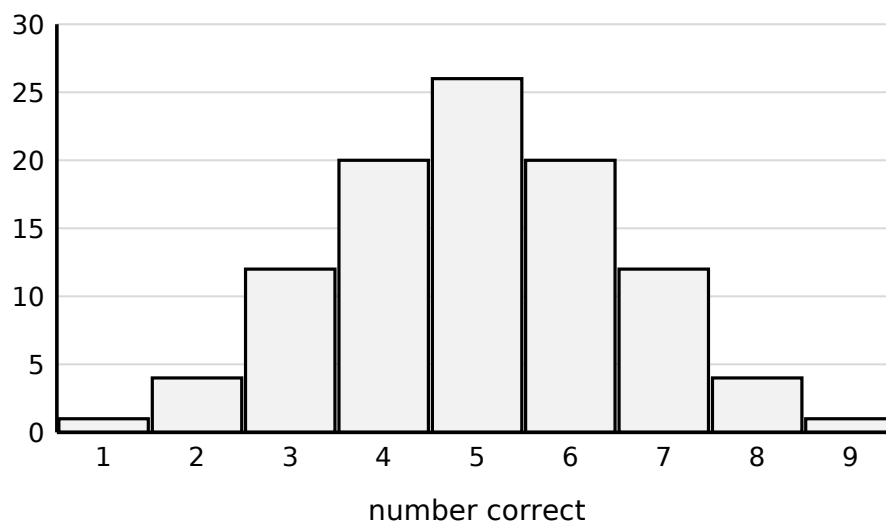
Time: 45 minutes · 9 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Design a simulation (2 points)

A spinner lands on blue 35% of the time. Describe how to use pairs of random digits 00–99 to simulate one spin, and how to estimate the chance of at least two blues in three spins.

Question 2 Guessing on a quiz (3 points)

A student gets 8 of 10 true-or-false questions right. The histogram shows the number correct in 100 simulated runs of guessing on 10 questions.



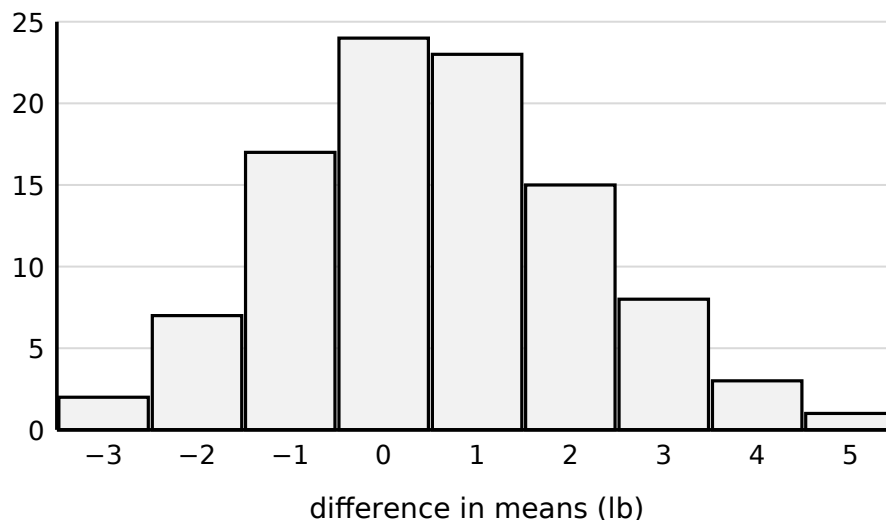
Correct answers in 100 simulated runs of 10 true-or-false guesses.

- How many runs had 8 or more correct? (1 point)
- Estimate the probability of getting 8 or more by guessing. (1 point)
- Using a 5% cutoff, is the result convincing evidence the student did not guess? (1 point)

Question 3 Two diets (3 points)

Twenty adults were randomly split into two diet groups. Diet A lost 3 pounds more on average.

The histogram shows the difference in means from 100 random re-assignments.



Differences in mean weight loss (lb) from 100 random re-assignments.

- How many runs showed a difference of 3 pounds or more? (1 point)
- Is the difference significant at the 5% level? Explain. (2 points)

Question 4 Evaluate a report (2 points)

A news site reports that 92% of readers love its new app, based on 60 reader e-mails. Give two criticisms.

Question 5 Is the game fair? (2 points)

A game costs \$3 to play. A spinner has five equal sectors and pays \$10 on one of them and \$0 on the others. Find the expected net value per play and decide if the game is fair.

Question 6 Choose a plan (3 points)

Plan A pays \$400 for sure. Plan B pays \$1,000 with probability 0.45 and \$0 otherwise.

Plan	Payoff	Probability
A	\$400	1
B	\$1,000	0.45
B	\$0	0.55

Table for Question 6.

- Find the expected value of each plan. (1 point)
- Which has the greater expected value? (1 point)
- Give one reason a person might still choose Plan A. (1 point)

Question 7 Estimate from trials (2 points)

In 250 trials of a simulation, a certain event occurred 35 times. Estimate its probability, and predict how many times it would occur in 1000 trials.

Question 8 Random assignment (2 points)

Describe how to randomly assign 20 plants to two groups of 10 using the numbers 1 to 20.

Question 9 Cause and effect (1 point)

A study finds that people who own dogs walk more each day. Can we conclude owning a dog makes people walk more? Why or why not?