

Algebra 2 · Probability: Sample Spaces, Independence and Conditional Probability · Test

Common Core S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7 · mathovore.fr

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

This test covers sample spaces, events, the addition rule, independence, conditional probability, two-way tables and tree diagrams in Algebra 2. It has 9 questions worth 20 points. Allow 45 minutes, write fractions in lowest terms, and show your work for every answer.

Test information

- **Grade:** Algebra 2
- **Chapter:** Probability: Sample Spaces, Independence and Conditional Probability
- **Common Core:** S-CP.A.1, S-CP.A.2, S-CP.A.3, S-CP.A.4, S-CP.A.5, S-CP.B.6, S-CP.B.7
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 2 pts; Question 4: 2 pts; Question 5: 3 pts; Question 6: 3 pts; Question 7: 3 pts; Question 8: 2 pts; Question 9: 1 pt)

Question 1: Sample space of coin flips (2 points)

A fair coin is flipped three times.

- List all outcomes in the sample space. (1 point)
- Let A be "exactly two heads". List the outcomes in A and find $P(A)$. (1 point)

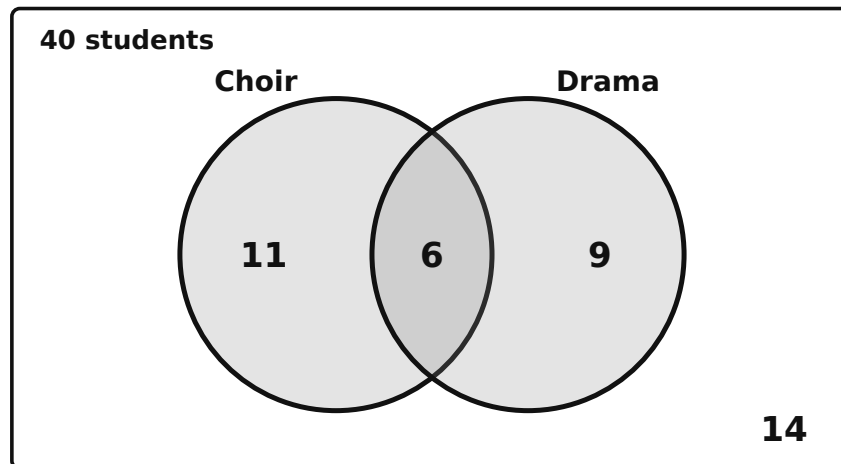
Question 2: Events from a set of numbers (2 points)

A number is chosen at random from 1,2,3,...,12 written on slips. Let A be "even number" and B be "multiple of 3".

- List the outcomes in " A and B " and in " A or B ". (1 point)
- Find $P(A \text{ or } B)$ and $P(\text{not } A)$. (1 point)

Question 3: Addition rule with a Venn diagram (2 points)

The Venn diagram shows 40 students in choir and drama. One student is chosen at random.



Venn diagram for Question 3.

- Find $P(\text{choir})$, $P(\text{drama})$ and $P(\text{choir and drama})$. (1 point)
- Use the addition rule to find $P(\text{choir or drama})$, then find $P(\text{neither})$. (1 point)

Question 4: Independent or not (2 points)

Events A and B have $P(A)=0.3$ and $P(B)=0.6$.

- If $P(A \text{ and } B)=0.18$, are A and B independent? Justify your answer. (1 point)
- If instead $P(A \text{ and } B)=0.2$, find $P(A|B)$. (1 point)

Question 5: Two-way table of lunches (3 points)

The table shows 120 students by grade and lunch type. One student is chosen at random.

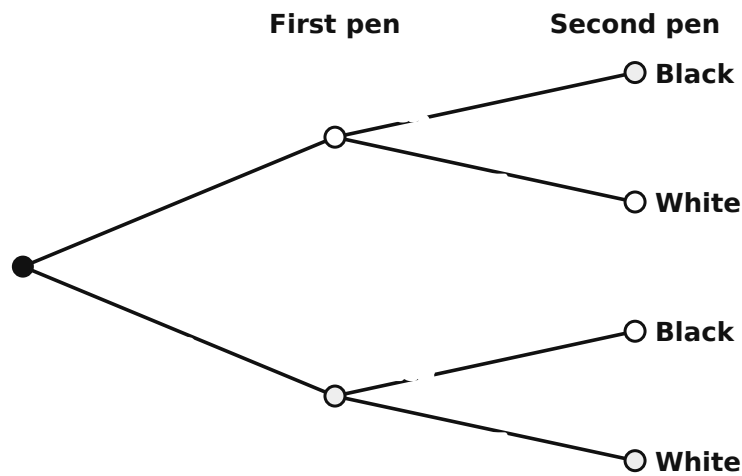
	9th	10th	Total
School lunch	36	28	64
Packed lunch	24	32	56
Total	60	60	120

Table for Question 5.

- Find $P(\text{school lunch})$. (1 point)
- Find $P(10\text{th}|\text{packed lunch})$. (1 point)
- Are "9th grade" and "school lunch" independent? Justify your answer. (1 point)

Question 6: Pens without replacement (3 points)

A box holds 4 black pens and 2 white pens. Two pens are drawn without replacement. The tree shows the probabilities.



Tree for Question 6.

- Find the probability that both pens are black. (1 point)
- Find the probability that the pens have different colors. (1 point)
- Find the probability that the first pen is black, given that the second pen is white. (1 point)

Question 7: Free throws in a row (3 points)

Jamal makes 80% of his free throws, and his shots are independent. He takes two shots.

- Find the probability that he makes both. (1 point)
- Find the probability that he misses both. (1 point)
- Find the probability that he makes at least one. (1 point)

Question 8: Conditional probability formula (2 points)

In a town, 60% of households have a dog (D), 40% have a cat (C), and 25% have both.

- Find $P(C|D)$. (1 point)
- Find $P(D|C)$. (1 point)

Question 9: At least one six (1 point)

A fair die is rolled twice. Find the probability of getting at least one 6.