

Geometry · Probability: Independence, Conditional Probability and Fair Decisions · 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, S-CP.B.8, S-CP.B.9, S-MD.B.6, S-MD.B.7 · mathovore.fr

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

This 45-minute test covers probability for Geometry: events and Venn diagrams, independence, two-way tables, conditional probability, counting, fair decisions and the analysis of a medical test. It has 9 questions worth 20 points. Calculators are allowed; show your work.

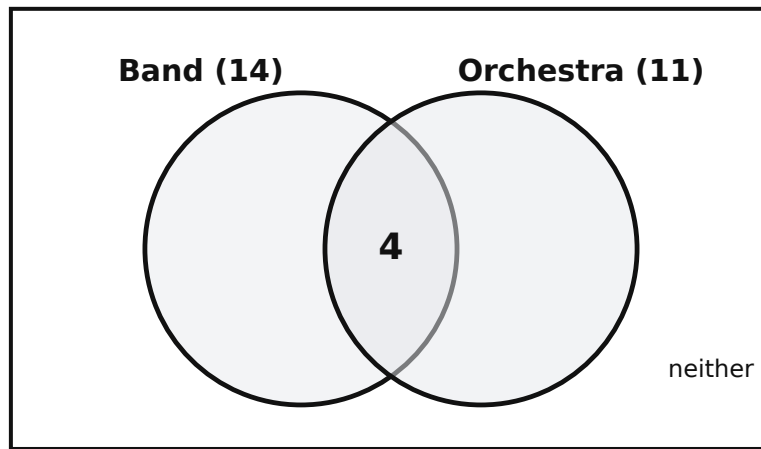
Test information

- **Grade:** Geometry
- **Chapter:** Probability: Independence, Conditional Probability and Fair Decisions
- **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, S-CP.B.8, S-CP.B.9, S-MD.B.6, S-MD.B.7
- **Time:** 45 minutes
- **Total:** 20 points (Question 1: 2 pts; Question 2: 2 pts; Question 3: 3 pts; Question 4: 2 pts; Question 5: 2 pts; Question 6: 3 pts; Question 7: 2 pts; Question 8: 3 pts; Question 9: 1 pt)

Question 1: Two clubs on a Venn diagram (2 points)

In a class of 30 students, 14 are in band, 11 are in orchestra and 4 are in both.

- How many students are in neither group? (1 point)
- Find the probability that a randomly chosen student is in band or orchestra. (1 point)



Class of 30 students.

Question 2: Independence and the addition rule (2 points)

For events A and B, $P(A)=0.35$, $P(B)=0.6$ and $P(A \text{ and } B)=0.21$.

- Are A and B independent? Justify. (1 point)
- Find $P(A \text{ or } B)$. (1 point)

Question 3: Honey sales and age (3 points)

At a farmers market, 200 shoppers were asked whether they bought honey.

Age \ Bought honey	Yes	No	Total
Under 30	36	64	100
30 and over	54	46	100
Total	90	110	200

Honey purchases by age group.

- Find $P(\text{bought honey given under 30})$. (1 point)
- Find $P(30 \text{ and over given bought honey})$. (1 point)
- Is buying honey independent of age group? Justify. (1 point)

Question 4: Two jellybeans (2 points)

A jar holds 6 red and 4 yellow jellybeans. Two are drawn at random without replacement.

- a. Find the probability that both are red. (1 point)
- b. Find the probability that they are different colors. (1 point)

Question 5: Swim meet counting (2 points)

Nine swimmers enter a race.

- a. In how many ways can first, second and third place be awarded? (1 point)
- b. In how many ways can 3 of the 9 swimmers be chosen for a relay team? (1 point)

Question 6: Choosing three students (3 points)

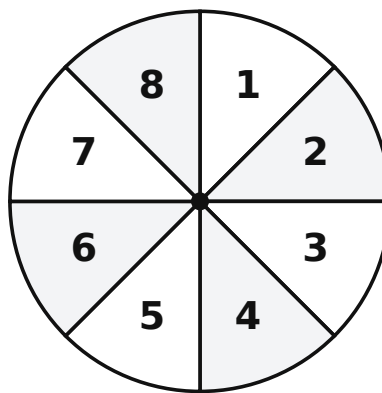
A teacher chooses 3 students at random from a group of 8 girls and 6 boys.

- a. Find the probability that all three are girls. (2 points)
- b. Find the probability that at least one is a boy. (1 point)

Question 7: Choosing with a spinner (2 points)

Mei and Noah decide who washes the dishes by spinning the fair spinner with 8 equal sectors. Rule 1: Mei washes if the result is prime; otherwise Noah washes. Rule 2: Mei washes if the result is greater than 5; otherwise Noah washes.

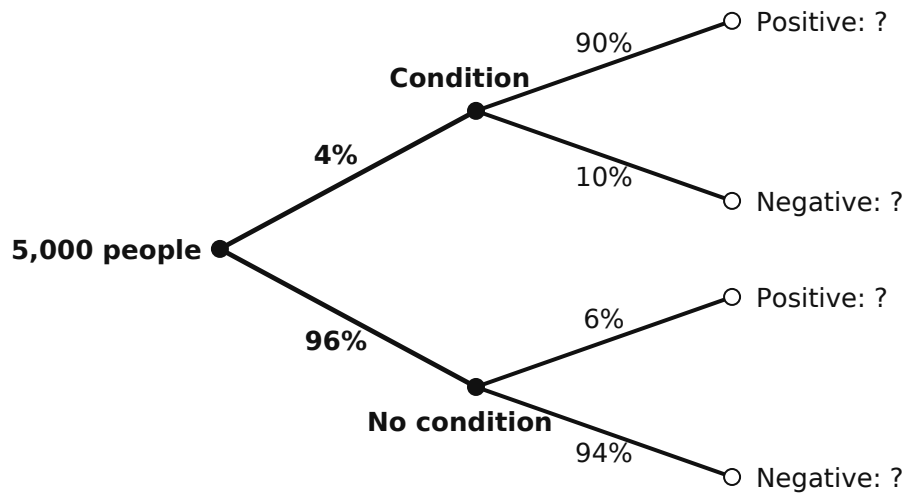
- a. Is Rule 1 fair? Justify. (1 point)
- b. Is Rule 2 fair? Justify. (1 point)



Fair spinner.

Question 8: Screening test (3 points)

A condition affects 4% of 5,000 people. The test is positive for 90% of people who have it and for 6% of people who do not.



Frequency tree.

- Find the two numbers of positive tests. (1 point)
- Find $P(\text{positive test})$. (1 point)
- Find $P(\text{condition given positive test})$. (1 point)

Question 9: Switching doors (1 point)

A car is hidden behind one of three doors and goats behind the other two. A contestant picks a door. The host, who knows where the car is, opens a different door with a goat and offers a chance to switch. Find the probability of winning the car by switching.