

Precalculus · Counting, Permutations, Combinations and Probability · Test

Common Core S-CP.B.8, S-CP.B.9, S-MD.A.1, S-MD.A.2 · mathovore.fr

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

This precalculus counting probability test checks counting, permutations, combinations and probability in 45 minutes, with 8 questions for a total of 20 points.

This 45-minute test has 8 questions worth 20 points. It covers counting, permutations, combinations, probability with counting, the multiplication rule and expected value. Show all work, and leave probabilities as exact fractions unless a decimal is requested.

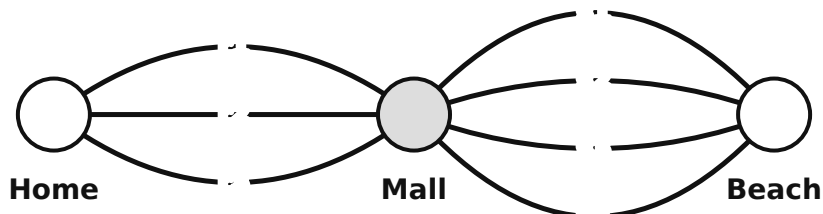
Test information

- **Grade:** Precalculus
- **Chapter:** Counting, Permutations, Combinations and Probability
- **Common Core:** S-CP.B.8, S-CP.B.9, S-MD.A.1, S-MD.A.2
- **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: 3 pts; Question 7: 3 pts; Question 8: 3 pts)

Precalculus Counting Probability Test: questions 1-5

Question 1: Counting routes (2 points)

A road map shows 3 roads from Home to the Mall and 4 roads from the Mall to the Beach.



Roads r1 to r3 join the first two towns; roads s1 to s4 join the last two.

- How many one-way routes lead from Home to the Beach through the Mall? (1 point)
- How many round trips are possible if any road may be used in either direction? (1 point)

Question 2: Permutations and combinations (2 points)

Evaluate each expression.

- ${}_9P_3$ (1 point)
- ${}_9C_3$ (1 point)

Question 3: Arranging letters (2 points)

Find the number of distinct arrangements of all the letters in BOOKKEEPER.

Question 4: Forming a team (3 points)

A club has 7 boys and 5 girls. A team of 4 is chosen.

- How many teams are possible? (1 point)
- How many teams have exactly 2 girls? (1 point)
- If the team is chosen at random, what is the probability that it has exactly 2 girls? (1 point)

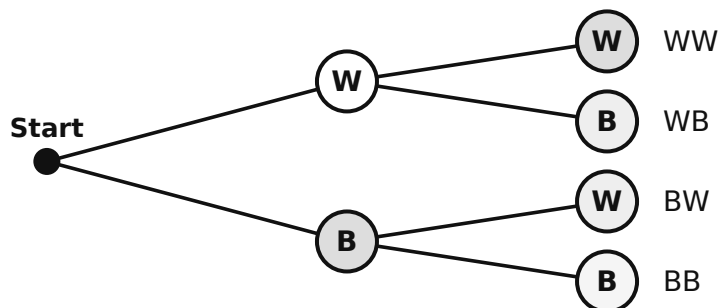
Question 5: Three spades (2 points)

Three cards are dealt from a standard 52-card deck. Find the probability that all three are spades.

Precalculus Counting Probability Test: questions 6-8

Question 6: Two draws (3 points)

A bag holds 6 white and 4 black marbles. Two marbles are drawn without replacement, as shown in the incomplete tree.

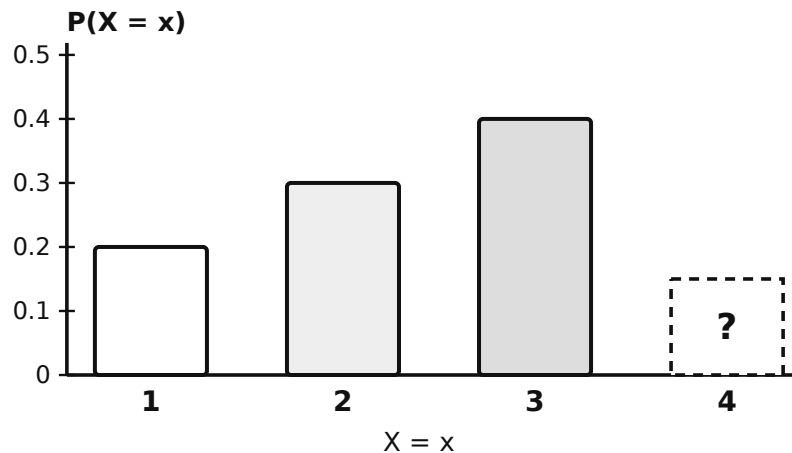


Multiply along the branches to get the probability of each outcome.

- Find the probability that both marbles are white. (1 point)
- Find the probability that the marbles are different colors. (2 points)

Question 7: Expected value (3 points)

The bar graph shows the probability distribution of a random variable X . The probability for $x=4$ is missing.



Bar heights are probabilities and add to 1.

- Find $P(X=4)$. (1 point)
- Find $E(X)$. (2 points)

Question 8: Carnival game (3 points)

Liam pays \$4 to draw one card from 20 cards. One card pays \$30, four cards pay \$5 each, and the other cards pay nothing. Find the expected net result per play and interpret it.

How to use this precalculus counting probability test

Take this precalculus counting probability test without notes, then grade it with the test answer key out of 20 points.

