

Precalculus · Counting, Permutations, Combinations and Probability · Test Answer Key

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

This precalculus counting probability test answer key gives the full solution and the scoring guide for each of the 8 test questions on counting, permutations, combinations and probability.

Worked solutions with a point-by-point scoring guide for the 20-point counting and probability test. Award partial credit for a correct setup, such as the right combinations or the right tree paths, even if the final arithmetic is off.

Precalculus Common Core: S-CP.B.8 · S-CP.B.9 · S-MD.A.1 · S-MD.A.2

Precalculus Counting Probability Test Answer Key: questions 1-5

Question 1: Counting routes (2 points)

- a. $3 \times 4 = 12$
- b. Out and back are each 12 choices: $12 \times 12 = 144$

Scoring: 1 point for each part.

Question 2: Permutations and combinations (2 points)

- a. $9 \cdot 8 \cdot 7 = 504$
- b. $\frac{504}{6} = 84$

Scoring: 1 point for each correct value.

Question 3: Arranging letters (2 points)

10 letters: O twice, K twice, E three times. $\frac{10!}{2! 2! 3!} = \frac{3628800}{24} = 151,200$

Scoring: 1 point for the correct repeated-letter denominator; 1 point for the final value.

Question 4: Forming a team (3 points)

- a. ${}_{12}C_4 = 495$
- b. ${}_5C_2 \cdot {}_7C_2 = 10 \cdot 21 = 210$

c. $\frac{210}{495} = \mathbf{14/33}$

Scoring: 1 point for each part.

Question 5: Three spades (2 points)

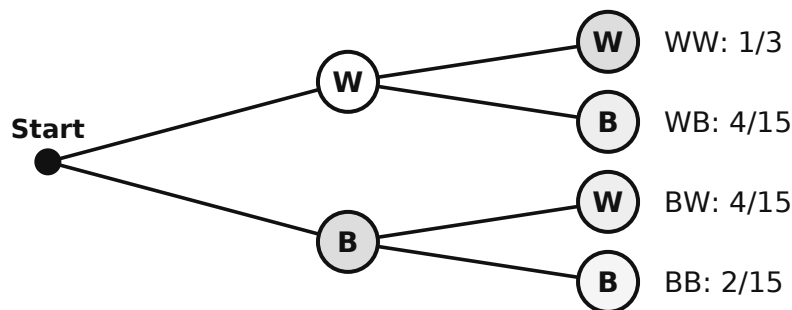
$$\frac{{}_{13}C_3}{{}_{52}C_3} = \frac{286}{22100} = \mathbf{11/850}$$

Scoring: 1 point for the two combinations 286 and 22,100; 1 point for the simplified fraction.

Precalculus Counting Probability Test Answer Key: questions 6-8

Question 6: Two draws (3 points)

The first-draw probabilities are $\frac{6}{10} = \frac{3}{5}$ and $\frac{4}{10} = \frac{2}{5}$.



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

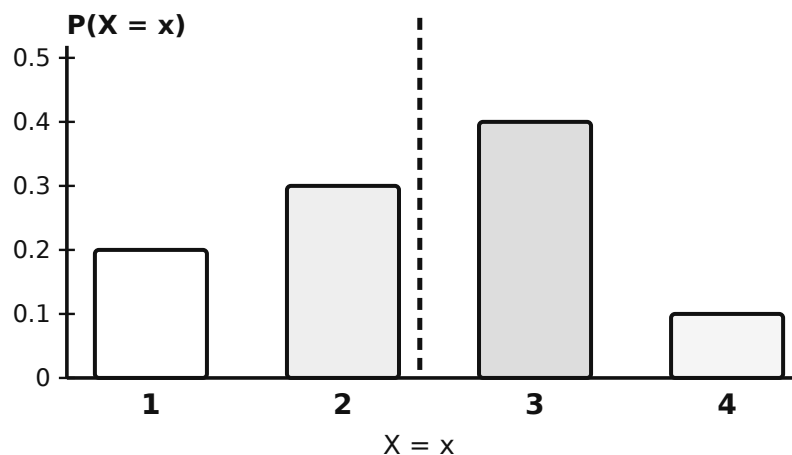
a. $\frac{3}{5} \cdot \frac{5}{9} = \mathbf{1/3}$

b. $\frac{3}{5} \cdot \frac{4}{9} + \frac{2}{5} \cdot \frac{2}{3} = \frac{12}{45} + \frac{12}{45} = \frac{24}{45} = \mathbf{8/15}$

Scoring: 1 point for part (a); in part (b), 1 point for identifying the two paths WB and BW and 1 point for the correct sum.

Question 7: Expected value (3 points)

Probabilities add to 1: $1 - 0.2 - 0.3 - 0.4 = 0.1$.



Bar heights are probabilities and add to 1.

a. $P(X=4)=\mathbf{0.1}$

b. $E(X)=1(0.2)+2(0.3)+3(0.4)+4(0.1)=0.2+0.6+1.2+0.4=\mathbf{2.4}$

Scoring: 1 point for part (a); in part (b), 1 point for the correct products and 1 point for the sum.

Question 8: Carnival game (3 points)

Expected payout: $30 \cdot \frac{1}{20} + 5 \cdot \frac{4}{20} = 1.5 + 1 = 2.5$.

Net: $2.50 - 4 = \mathbf{-\$1.50}$. On average Liam loses \$1.50 per play, so the game favors the house.

Scoring: 1 point for the probabilities $1/20$ and $4/20$; 1 point for the expected payout \$2.50; 1 point for the net result with interpretation.

Scoring summary

Total
20 points: add the points of every question of this precalculus counting probability test answer key.

How to use this precalculus counting probability test answer key

Use this precalculus counting probability test answer key to score the test fairly and to see which skills need more practice.

