Sample Spaces for Compound Events

Apply the skill to decisions and designs

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

A table, tree, or systematic list can show outcomes. Keep the stage order unless the task says otherwise. If branches differ in size, add their counts: three branches with 2, 4, and 5 leaves give 11 outcomes.

Worked example

Choose an online O or in-person P class, then a day D or evening E time. List the ordered outcomes.

1. Format O gives 2 outcomes: (O, D) and (O, E).
2. Format P gives 2 outcomes: (P, D) and (P, E).
3. The format is first in each pair; $2 + 2 = 4$ outcomes.
Answer: $(O, D), (O, E), (P, D), (P, E)$.

Practice Problems

Show your thinking.

1. Pick wrap W or rice R, then tea T, juice J, or milk M. Milk is not served with W and juice is not served with R. Fill the menu table with allowed pairs, cross out forbidden cells, and count.

1st / 2nd	T	J	M
W			
R			

2. A robot takes exactly three one-unit moves, right R or up U. List the paths that finish two units right and one unit up, and give their count.

3. Every clip fits every shell. A kit uses one of 3 shells and one clip. Find the fewest clip styles that allow at least 15 kits. How many kits remain if one shell retires?

4. Form codes with letter M or N followed by digit 0, 1, or 2. Assign even-ending codes to one group and odd-ending codes to another. List both and say which group has more, and by how many.

5. Spin two spinners, each labeled $1, 2, 3$. Prize rule A uses sum at least 5; rule B uses sum exactly 4. List the ordered results for each and decide which rule allows more.

6. Pick two of students A, B, C. Compare choosing a captain and helper with choosing a team with no roles. List the role-free teams and say how many more choices roles allow.

Answer Key

1. 4 allowed choices; see menu table.
2. URR, RUR, RRU: 3 paths.
3. 5 clip styles; 10 kits after retirement.
4. Even: M0, M2, N0, N2. Odd: M1, N1. Even has 2 more.
5. A: $(2,3), (3,2), (3,3)$. B: $(1,3), (2,2), (3,1)$. Tie, 3 each.
6. Teams AB, AC, BC. Roles allow 6 choices instead of 3: 3 more.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Wrap pairs with tea or juice: row W has $3 - 1 = 2$ outcomes.

2. Rice pairs with tea or milk: row R also has $3 - 1 = 2$ outcomes.

3. Exclude (W, M) and (R, J): $6 - 2 = 4$ choices.

1st / 2nd	T	J	M
W	(W,T)	(W,J)	$\times$
R	(R,T)	$\times$	(R,M)

Problem 2

1. Of the $2^3 = 8$ possible paths, keep exactly 2 R moves and 1 U move.

2. Put U first, second, or third: URR, RUR, RRU.

3. Counting one path per U position gives $1 + 1 + 1 = 3$ paths.

Problem 3

1. With c styles the count is $3c$; need $3c \geq 15$.

2. Divide by 3: $c \geq 5$. Five styles give exactly 15 kits.

3. Retiring one shell leaves $2(5) = 10$ kits.

Problem 4

1. Even endings are 0 and 2; with either letter this gives $2(2) = 4$ codes.

2. Odd ending 1 gives M1 and N1, a count of 2.

3. The groups account for all $4 + 2 = 6$ codes. Difference: $4 - 2 = 2$.

Problem 5

1. Rule A has 2 outcomes of sum 5: $(2,3), (3,2)$, and one of sum 6: $(3,3)$.

2. Rule B has 3 outcomes of sum 4: $(1,3), (2,2), (3,1)$.

3. Rule A counts $2 + 1 = 3$ and B counts 3; neither is larger.

Problem 6

1. Roles: 3 choices of captain times 2 choices of helper gives 6.

2. Without roles each team has 2 equivalent orders. The teams AB, AC, BC give $6/2 = 3$.

3. The role assignment adds $6 - 3 = 3$ choices.

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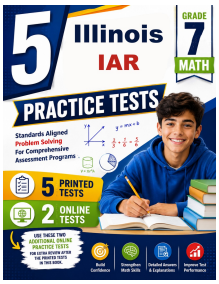

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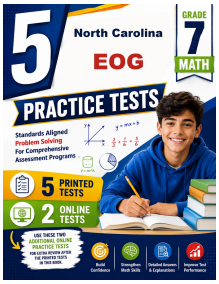

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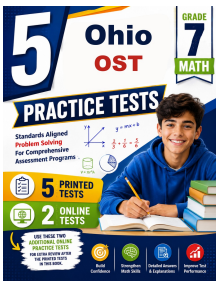

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