Year 11 Mathematics Extension 1

Topic: Permutations & Combinations (2 of 2)
Review Questions: Mixed one-off exam questions
Term 3, 2026

How to use this set

These are real past-paper questions on permutations & combinations that do not fit any one recurring pattern: genuine one-offs. They are here so you also meet the rarer, less predictable exam questions. Work through them once you are solid on the patterns in the main review docs. Every question you get wrong or struggle with goes in your **Mistakes Log**.

Contents

Counting arrangements

1. Multiplication principle & basic counting
2. Basic arrangements (nPr, distinct)
3. Arrangements with identical objects
4. Basic circular arrangements

Arrangements with a restriction

5. Keeping a group together (block method)
6. Keeping objects apart (gap method)
7. Alternating arrangements
8. Fixed positions / relative order / numbers

Choosing (selections)

9. Basic selections (nCr)
10. Selections: at least / at most / cases
11. Grouping & splitting
12. Inclusion-exclusion

Specialised techniques & proofs

13. Geometric counting
14. Stars & bars / lattice paths
15. Solving nPr / nCr equations
16. nCr / factorial proofs

Probability

17. Arrangements, then a probability
18. Selections, then a probability

Mixed one-off exam questions

Q1 2022 Hurlstone Prelim Q8 · **1 mark**

After a sports tournament every player shakes hands with every other player once. If there are 36 handshakes in total, how many players are at the tournament?

(A) 18

(B) 8

(C) 10

(D) 9

Q2 2023 North Sydney Boys Prelim Q2 · **1 mark**

Four digit numbers are formed from the digits 1, 2, 3 and 4. Each digit is used once only. The sum of all the numbers that can be formed is?

(A) 6666

(B) 44440

(C) 66660

(D) 266640

Q3 2024 Baulkham Hills Prelim Q9 · **1 mark**

Lawrence is about to walk up a set of stairs with 8 steps. He can take either one or two steps at a time. In how many different ways can he walk up the set of stairs?

(A) 5

(B) 20

(C) 34

(D) 163

Q4 2024 Girraween Prelim Q10(c) · **2 marks**

In how many ways can 8 different gifts be distributed to two children so that each child receives an odd number of gifts?

Q5 2023 Knox Prelim Q13(c) · **2 marks**

In a school athletic carnival 77 students are randomly divided into 3 groups, where each group has a different number of students. What is the maximum number of students that the smallest group can have?

Q6 2024 James Ruse Prelim Q9(c) · **3 marks**

Shikung and Andrew are competing against each other in a competition in which the winner is the first to score five goals. The outcome is recorded by listing, in order, the initial of the person who scores each goal. For example, one possible outcome is recorded as $SAASSASS$.

(i) Explain why there are five different ways in which the outcome could be recorded if Andrew scores only one goal in the competition.

(ii) In how many different ways could the outcome of this competition be recorded?