

Statistical Analysis: worked examples

HSC Mathematics Extension 1

These examples show assessable skills, not an official HSC topic weighting or prediction. The 2024 NSW syllabuses have their first HSC examination in 2027; students sitting the 2026 HSC continue under the applicable 2017 syllabus.

Worked example 1 | 2 marks

Catalog reference: ext1_cssa25_geometric_memoryless_identity | seed 41001 | mapping ext1-s1-1

Memoryless waiting time

For the first-win waiting time X , $P(X > j) = (1-p)^j$ with $p = 1/2$.

(a) Show that $P(X > 1+4 | X > 1) = P(X > 4)$ and evaluate the common probability. [2 marks]

Answer: $1/16$

Conditional Probability: $1/16$

Index Laws: $1/16$

Worked example 2 | 2 marks

Catalog reference: ext1_cssa25_at_least_two_dice_successes | seed 41001 | mapping ext1-s1-1

At least two matching dice

5 fair six-sided dice are rolled. Find the probability that at least two show a 3.

(a) Give the exact probability. [2 marks]

Answer: $763/3888$

Binomial Complement: $3125/3888$

Probability: $763/3888$

Worked example 3 | 3 marks

Catalog reference: ext1_ind_2025_q13a_binomial_vector_sum | seed 41001 | mapping ext1-s1-1

Random vector sum

Independently 4 times, choose with equal probability either $2i+3j$ or $3i+2j$. Find the probability that the total is $10i+10j$.

(a) Find the exact probability. [3 marks]

Answer: $\text{factorial}(4) / ((\text{factorial}(2) \text{ factorial}(2)) 16)$

Solve Vector Count: The target requires exactly 2 selections of each vector.

Binomial Probability: $\$ \text{binom}(22,2)/2^{(22)} \$$.

Source and methodology

Examples are deterministic curriq catalog generations from existing QDSL archetypes at the published fixed seed. The generator copies only student-facing prompts, mark allocations, topic mappings, display tables or options, checked answers and marking-path results into this resource.

Official syllabus source:

<https://curriculum.nsw.edu.au/learning-areas/mathematics/mathematics-extension-1-11-12-2024/overview/course>

Teacher verification note: check the mathematics, notation, permitted technology and syllabus fit for your cohort before classroom or assessment use.