

EXAM-DAY · 90-MIN REVISION CARD

Probability

Print this · Fold it · Carry to the exam-hall gate · Revise once · Then walk in.

FORMULAS & KEY RESULTS

Classical: $P(E) = n(E)/n(S)$ when outcomes are equally likely.

Axioms: $0 \leq P(E) \leq 1$; $P(S) = 1$; $P(\emptyset) = 0$.

Complement: $P(A') = 1 - P(A)$.

Addition (general): $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

Addition (mutually exclusive): $P(A \cup B) = P(A) + P(B)$; $P(A \cap B) = 0$.

Conditional: $P(A|B) = P(A \cap B)/P(B)$, provided $P(B) > 0$.

Multiplication: $P(A \cap B) = P(A|B) \cdot P(B) = P(B|A) \cdot P(A)$.

Independence test: A, B independent $\Leftrightarrow P(A \cap B) = P(A) \cdot P(B)$.

Bayes' theorem: $P(A_i|E) = [P(E|A_i)P(A_i)] / \sum_j P(E|A_j)P(A_j)$.

Two dice: $|S| = 36$; one die: $|S| = 6$; one coin: $|S| = 2$; pack of cards: $|S| = 52$.

Standard pack: 26 red, 26 black, 4 suits of 13, 12 face cards (J, Q, K), 4 aces.

TOP 5 PYQ PATTERNS

1 Two dice are thrown — find $P(\text{sum is 7 or 11})$.

2 marks · 70% of years

Count outcomes: sum 7 has 6 ways, sum 11 has 2 ways; mutually exclusive $\rightarrow 8/36 = 2/9$.

2 From a pack of 52 cards, one card is drawn — $P(\text{king or heart})$.

2 marks · 65% of years

Use $P(A \cup B) = P(A) + P(B) - P(A \cap B)$: $4/52 + 13/52 - 1/52 = 16/52 = 4/13$.

3 Bag with R red, B black — two drawn without replacement, $P(\text{both red})$.

3 marks · 60% of years

Multiplication rule: $P(\text{red1}) \cdot P(\text{red2}|\text{red1}) = R/(R+B) \cdot (R-1)/(R+B-1)$.

4 Verify A and B are independent given $P(A)$, $P(B)$, $P(A \cap B)$.

2 marks · 55% of years

Compute $P(A) \cdot P(B)$; if equal to $P(A \cap B) \rightarrow$ independent; else dependent.

5 Two factories / two urns Bayes problem.

5 marks · 80% of years

Define A_1, A_2, E ; write $P(E)$ by total probability; apply Bayes; report as simple fraction.

90-MIN REVISION FLOW

0-15 min

Re-read axioms + classical definition + sure/impossible/mutually exclusive vocabulary. Speak the definitions aloud.

15-35 min

Drill 6 single-event dice + cards + bag questions. Target 60 sec each — these MUST be reflex.

35-55 min

Practise the addition rule + complement: 4 PYQ pattern-matched questions, write $P(A \cup B)$ line explicitly.

55-75 min

Conditional + independence: 3 short questions + 1 table-based 3-mark question. Always state the restricted denominator.

75-90 min

ONE Bayes 5-mark question — write all 5 steps end-to-end. Cross-check final fraction against the prior.

Confidence, not anxiety. You've practised this all year. Trust your steps. Don't change strategy on exam morning.
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