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A-Math Distinction Checklist

For O-Level Additional Mathematics (Syllabus 4049) — a 2-page, high-impact checklist to build speed, accuracy, and problem-solving maturity.

Exam snapshot (4049 • 2026)

Paper 1	2h 15m • 12-14 Q • up to 10 marks	90 (50%)
Paper 2	2h 15m • 9-11 Q • up to 12 marks	90 (50%)

- Approved calculator may be used in both papers.
- Show essential working — omission can lose marks.
- Use 3 s.f. for non-exact values (unless stated).

What markers reward

AO2 (50%) — Solve in context: choose methods, connect topics, model problems.

AO1 (35%) — Clean technique: algebra, trig, calculus routines with accuracy.

AO3 (15%) — Reasoning: justify identities, geometry proofs, explain steps.

Rule: Train mixed questions early — most marks come from applying skills in context.

High-value topics checklist

Algebra

- ☐ Quadratic functions (complete the square; always + / - conditions).
- ☐ Equations & inequalities (discriminant; tangency/intersections).
- ☐ Surds (rationalise; solve surd equations).
- ☐ Polynomials + partial fractions (factor/remainder; decomposition).
- ☐ Binomial expansions (general term; coefficient).
- ☐ Exponential & log functions (laws; change of base; modelling).

Geometry & Trig

- ☐ Trig functions & graphs (amplitude, period, shifts).
- ☐ Identities (Pythagorean; compound/double-angle; R-form).
- ☐ Trig equations (restricted intervals; principal values).
- ☐ Coordinate geometry (lines; midpoint; areas).
- ☐ Circles (standard + general form; tangents).
- ☐ Proofs in plane geometry (triangles, circles; tangent-chord).

Calculus

- ☐ Differentiation basics (gradients; rates of change).
- ☐ Techniques (product/quotient/chain rule).
- ☐ Stationary points (max/min; second derivative test).
- ☐ Tangents & normals; connected rates; optimisation.
- ☐ Integration (standard + (ax+b) forms).
- ☐ Definite integrals (area; kinematics).

Weekly training loop (evidence-backed)

- **1) Worked examples -> fade.** Copy once, then redo without looking.
- **2) Practice testing.** Close notes and attempt from memory.
- **3) Spaced + interleaved sets.** Mix topics across days (not blocks).
- **4) Mistake journal.** Error type + correct trigger (one line).
- **5) Timed finish.** End with 10-15 minutes under exam timing.

Evidence base: Dunlosky et al. (2013) on practice testing & spacing; Rohrer et al. (2015) on interleaving; Karpicke & Roediger (2008) on retrieval practice; worked examples (cognitive load).

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Mistake-proofing (fastest way to jump grades)

- ☐ **Algebra signs**: expand / factor carefully; track negative brackets.
- ☐ **Domain traps**: logs need x>0; square roots need inside >=0.
- ☐ **Log laws**: write laws before simplifying; avoid 'adding logs'.
- ☐ **Surd rationalising**: rationalise fully; simplify before solving.
- ☐ **Binomial general term**: check r indexing; coefficient vs term.
- ☐ **Graph reading**: label intercepts; note max/min from completed square.
- ☐ **Radians vs degrees**: be consistent in trig questions and calculator mode.
- ☐ **Identity proofs**: start from one side; keep it legal; don't assume result.
- ☐ **Chain rule**: underline inner function; write dy/dx = dy/du * du/dx.
- ☐ **Stationary points**: solve dy/dx=0 then classify (2nd derivative).
- ☐ **Integration constant**: include +C (indefinite) and limits (definite).
- ☐ **Answer accuracy**: 3 s.f. (unless exact / specified), angle 1 d.p.

One-line fix: After every timed set, write: *'My error type -> my new trigger.'* Example: 'Forgot log domain -> always state x>0 before solving.'

Timed paper strategy (2h15)

- **Scan (3 min)**: mark banker questions vs time-sinks.
- **Time by marks**: ~1.4 min per mark; move if stuck.
- **Show method marks**: write equations first, then compute.
- **Answer check**: sign, domain, units/angles; quick substitution.
- **Last 8 min**: redo one hard question OR clean up workings.

Tip: neat, logical steps often earn marks even if arithmetic slips.

If you have 6 weeks

- **Weeks 1-2:** Patch core skills (algebra + logs + trig identities).
- **Weeks 3-4:** Mixed topical sets + mistake journal; start full papers.
- **Weeks 5-6:** 2-3 timed papers/week, review deeply, repeat weak types.

Always: interleave topics; don't 'finish chapters' in blocks.

Need a personalised plan? **3-pax small-group A-Math coaching** with targeted drills, past-paper timing, and error-proofing.

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