Algebra II

Original exam A, full-length form B and three-week preparation

Why these demands were selected

June and August 2026 had exactly the same broad distribution of credits. Each final task used an applied function, asked for average rate of change with interpretation and included a threshold. The models differed: lung capacity was periodic; tea temperature decayed exponentially.

January 2027 is the first January under this design. Two repeated response demands warrant practice; they provide little information about the next specific function family.

Released forecast example **State design / administration guidance**

Original exam A

Four sets, 8 multiple-choice and 4 written responses. Suggested time: 35–50 min; adjust to local conditions. Each selected response earns one local point. Each written response earns one local point per numbered criterion on the key. Maximum 23 local points. Accept defensible alternative reasoning. Allow consistent follow-through where the local criterion assesses a new operation; annotate the originating error.

Full-length form B

Use the intact linked 2026-06 official booklet except 36. The insert preserves one response position and its maximum credit. Report the original-component subtotal and replacement result separately. State conversion charts are specific to the unmodified state form. Record prior exposure if students have used the released booklet in preparation.

Preparation and feedback

Use the six Studio sessions, then one new retrieval check per week. Use Form A as an independent transfer check after preparation. Form B is optional for full-length rehearsal. On return after absence, students can start with the re-entry line on the current week’s sheet. After testing, return to the first unsupported step in the student’s reasoning.

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Questions 1–6 • One point per selected response.

1 B • 2

The original denominator vanishes at 2.

2 D • (2,4)

The canceled factor leaves a hole at the input 2.

3 Written response / 3 local points

1. The numerator factors as $(x - 2)(x + 2)$.
2. Only -2 gives a zero in the domain.
3. The candidate 2 makes the original denominator zero, so it cannot be a solution.

4 B • 0.9^4

All four runs must succeed, so multiply their success probabilities.

5 A • Failures cluster immediately after a preceding failure

A preceding outcome predicting the next one challenges independence.

6 Written response / 3 local points

1. One particular ordering has probability $0.1(0.9)^3$.
2. There are four mutually exclusive choices for the position of the failure.
3. The probability is $4(0.1)(0.9)^3 = 0.2916$.

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Questions 7–12 • One point per selected response.

7 C • 12 hours
A full phase change of 2π takes 12 hours.

8 A • 6 hours
Cosine first reaches −1 at phase π.

9 Written response / 3 local points
1. cos(πt/6)=0 at t = 3 and 9 hours in the first cycle.
2. The temperature is decreasing through the midline at t = 3.
3. At t = 9 the temperature is increasing through the same value.

10 C • 18 °C
The exponential term approaches zero while the offset remains 18.

11 D • The difference between sample and ambient temperature
The exponential multiplier acts on temperature above the 18 °C baseline.

12 Written response / 6 local points
1. C(0) = 90 and C(16) = 36.
2. The average is (36 − 90)/16 = −3.375 °C/min.
3. The sample lost an average of 3.375 °C per minute over that interval.
4. Solve (1/2)
5. (t/8) ≤ 1/6, obtaining t ≥ 8 ln(6)/ln(2) ≈ 20.68.
6. The first eligible whole minute is 21; rounding down to 20 leaves the sample above 30 °C.

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Replacement scoring and retrieval-check keys

Form B replacement / 36 / 6 credits maximum

1. V(0)=72 and V(2)=44.
2. The average rate is −14 L/h.
3. The volume decreases by 14 liters per hour on average over those two hours.
4. Solve 0.75
5. t ≤ 17/64 or compare successive values.
6. V(4)=28.25 and V(5)=23.1875, so hour 5 is first.
7. The 8-liter offset is the limiting volume as the exponential term approaches zero.

Public scoring materials for base form

Week 1 / retrieval check

For q(t)=10+40(1/2)^t, interpret the 10 and calculate q(2).
10 is the asymptotic baseline; q(2)=20.

Week 2 / retrieval check

Independent trials have success probability 0.8. Find the chance of exactly one success in two trials.
Two orders yield 2(0.8)(0.2)=0.32.

Week 3 / retrieval check

A sinusoid reaches the same maximum at 2 h and 10 h with no intervening maximum. Find period and angular frequency.
Period 8 h; angular frequency 2π/8 = π/4 radians/h.

Department follow-up

ALG2-C1 Interpret a rate in context
What changes, per unit of what, over which interval in this model?

ALG2-C2 Connect a cycle to its parameter
Point to two consecutive matching phases. How does their separation determine B in radians?

ALG2-C3 Separate interpretation from precision
Repeat the threshold calculation with stored precision. Now explain the earlier rate without changing its numerical value.

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Use the independent exam only after practice, or document the order if using it diagnostically.

Which preparation sessions lead into each exam set?

A1 · Which expressions share a graph? / Studio session(s) 4

A2 · Trial runs at a station / Studio session(s) 5

A3 · Two representations of a cycle / Studio session(s) 2,6

A4 · Cooling between readings / Studio session(s) 1,3

Likely reading of a partial response to investigate

A correct decimal does not settle a whole-hour threshold. Ask the student to test each neighboring recorded time.

Bridge rehearsal / worked feedback

A 0.2-probability event is checked on two independent days. Compare exactly one occurrence with at least one.

Exactly one gives 0.32; at least one gives 0.36. The difference is the two-occurrence case, 0.04.

How to choose the next round

If the model or source was misread, return to the matching prep set and ask for a new representation. If the computation or claim is correct but support is missing, request one neutral explanation and give a parallel independent check. Keep the independent result separate from prompted work.