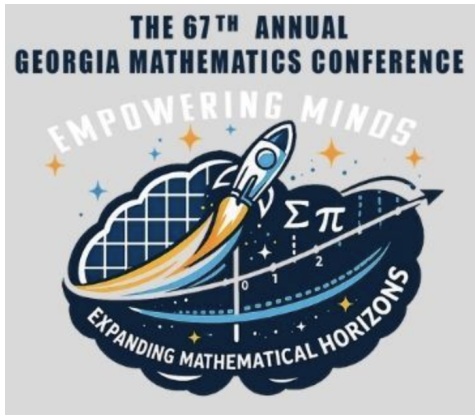
Writing the AP Precalculus Mock Exam
& Assessment Writing Tips

David Hornbeck
Gwinnett School for Math, Science, and Technology

October 16, 2026





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Introduction

We're going to discuss the AP Precalculus Practice Exam written last spring as well as some general item/assessment writing tips for AP Precalculus.

Below is a folder with this presentation as well as the practice exam, its scorling guidelines, and some additional item writing resources.



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Process

- October 2025: Exam is conceived at the GAAPMT board meeting.
- November 2025: Item matrix is created.
- November 2025 – March 2026: Items are written and contributed.
- March 2026: Initial proofread and second proofread.
- April 1, 2026: Exam is shared & posted in AP Classroom.

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Contributors

- Storie Atkins
- Josh Cook
- Julie Harrison (proofreading)
- Dorothy Rich
- Dennis Wilson
- Rand Wise

Matrix Snippet

Below is a snippet of the item matrix.

Item #	Topic	Function Type	LO/EK	Skill	Representation	Difficulty (E, P, A)*	Tentative Ide
1	1.9	PR	A.1	2A	A	P	Number of asymptotes (mult
2	2.13	EL	A.1	1A	A	P	Use log property (power t
3	3.6	TP	A.5	1C	V	P	Find expression for function with
4	3.2	TP	A.4	3A	V/G	E	easy, sign of sine/cos i
5	1.12	G	A.6	3A	A	P	
6	3.12	TP	B.2	1B	A	P	Subtract sine sum
7	2.4	EL	A.1	1B	V	A/P	give description of transformation, ask for expre
8	1.11	PR	A.2	2A	A	P	Find hole analyti
9	3.8	TP	B.2	1C	V	A	Give expression of function wit
10	2.9	EL	A.3	2A	V	E	log scale, find r
11	1.1	G	B.3	2B	G	P/E	Which graph matches description
12	3.9	TP	A.1	2B	T	P	Construct function passing thr
13	1.4	PR	A.3	1B	A	P	Which is equivalent form th
14	2.12	EL	A.3	1B	A	A	which is equivalent form (requi
15	3.3	TP	A.2	2A	G	A	measurements in triangle
16	3.14	TP	A.1	2B	G	P	give graph, ask for f
17	1.6	PR	A.3	3A	T	P	Give table with description of deg
18	2.10	EL	A.5	3C	V/A	P	Which is true about graph of inverse of
19	1.2	G	A.1	2A	T	E	Compute average rate of change
20	3.13	TP	A.4	2B	G	P	give graphed point in complex

Construction Guidelines

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From the Course & Exam Description beginning on p132.

Function Type	Units	Approximate Exam Weighting for Multiple-Choice Section
General Functions (non-analytical)	1, 2	15–25%
Polynomial and Rational Functions	1	20–25%
Exponential and Logarithmic Functions	2	20–30%
Trigonometric and Polar Functions	3	30–35%

Exam Weighting for Skills

	Exam Weighting
Practice 1: Procedural and Symbolic Fluency	**35–50%**
Practice 2: Multiple Representations	**20–30%**
Practice 3: Communication and Reasoning	**30–40%**

How the Matrix was Constructed

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- 40 questions (now 42 beginning in 2027), 40 topics: which 4 topics to omit?
- Consider which topics lend themselves well to calculator section
- How many of each skill (1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C)?
- How many of each function type (G, PR, EL, TP)?
  - General, Polynomial/Rational, Exponential/Logarithmics, Trigonometric/Polar
- How many of each representation (A, G, T, V)?
  - Analytical, Graphical, Tabular (Numerical), Verbal
- Roughly 15%-70%-15% of E-P-A
  - Emerging (easy), Proficient, Advanced

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Writing assessments is time consuming! Why do it?

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Why Write Your Own Assessments?

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- To write a good item, it helps to know what good items look like: looking through AP Classroom, official practice exams, and assessments of other prominent writers will increase your familiarity with the AP exam and the content.

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- Creating distractors will put you in the mind of your students – you'll be better prepared to understand common mistakes.

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- Creating distractors will put you in the mind of your students – you'll be better prepared to understand common mistakes.
- You'll beef up your ability to create diagrams and equations in your preferred softwares – or you might even be able to learn a new one.
  - "How do I make a polar graph in Desmos?"
  - "Can Geogebra make piecewise functions?"
  - "How did they make that symbol in Google Docs?"

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- Lastly... it's fun (or, at least, it can be)!

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Assessment Writing Resources

The following are in the folder shared at the beginning of this presentation.

- AP Precalculus Course and Exam Description (CED)
- "So You Want to Write a Test?" – assessment writing guide with many of the same ideas from this presentation
- "Maximizing Efficiency with Equation Editors" – tips for using Word and Google to increase efficiency and professionalism of appearance
- "Typesetting Beautiful Math" – presentation about learning & using LaTeX

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Disclaimer

We are going to discuss writing items that resemble AP exam items, or would be appropriate on an AP exam, but... **Not all classroom assessment items must or should resemble AP exam items!**

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How to Write Your Own Items

This could be its own presentation, but here's the TL;DR on how to write individual items.

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This could be its own presentation, but here's the TL;DR on how to write individual items.

- **Work every single practice AP exam item, including Topic Questions & Progress Checks.**
  - I find the T/PC items more challenging and targeted than "summative" (AP exam) items – this makes them better fits for isolated classroom assessments (unit quizzes, tests, etc.).

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- Mimic phase 2: Change more than just numbers (e.g. functions).

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- Mimic phase 3: Change representations, too (e.g. graph $\rightarrow$ table)

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- Mimic phase 4: stop mimicking, and start creating!

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- Mimic phase 3: Change representations, too (e.g. graph $\rightarrow$ table)
- Mimic phase 4: stop mimicking, and start creating!
- You can also modify old items to better reflect AP items, which we'll discuss next.

FRQ Construction

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Strangely, writing FRQs is actually the easiest part of mimicking an AP Precalculus exam. This is because the free response questions are **task models** that have prescriptive structure. See pp137 of the CED and the released practice exams in AP Classroom or your Course Audit page (for the PDFs).

Best Practices

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Let's discuss some best practices when it comes to writing items and assessments, whether for a cumulative summative exam or just a classroom assessment.

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Test Outlines

I like to make a test "skeleton", or outline, before I have written a single item. It generally follows this order.

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- Decide on whether you'll have a calculator section and how many items in each section (calc., no calc.).

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- Decide on whether you'll have a calculator section and how many items in each section (calc., no calc.).
- Determine how many items for each topic. Consider which topics lend themselves to calculator usage, if applicable. Then, each item is labeled ("**Topic 2.11**").

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- Determine how many items for each topic. Consider which topics lend themselves to calculator usage, if applicable. Then, each item is labeled ("**Topic 2.11**").
- Decide on representations to get a good mix of analytical, graphical, tabular, and verbal. Add to the label ("Topic 2.11 – **graphical**").

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- Decide on representations to get a good mix of analytical, graphical, tabular, and verbal. Add to the label ("Topic 2.11 – **graphical**").
  - If any good ideas come to you, jot them down. ("Topic 2.11 – graphical – **which graph matches function?**)

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- Decide on representations to get a good mix of analytical, graphical, tabular, and verbal. Add to the label ("Topic 2.11 – **graphical**").
  - If any good ideas come to you, jot them down. ("Topic 2.11 – graphical – **which graph matches function?**)
- Start writing, but keep track of difficulty and note it. ("Topic 2.11 – graphical – which graph matches function? – **emerging**)

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Vocabulary

Once you start writing, here are some vocabulary tidbits to keep in mind **if you want to maintain consistency with AP exam conventions**.

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Phrase as much as possible in terms of functions, inputs, and outputs. For example...

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"Solve $6\sin(2x) - 1 = 2$."

might become

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"Solve $6\sin(2x) - 1 = 2$."

might become

"Let $f(x) = 6\sin(2x) - 1$. Find all input values x in the domain of f such that $f(x) = 2$."

Vocabulary

For transformations, there is no "stretch" or "shrink" or "shift" (except phase shifts for sinusoidal functions)! Instead...

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- Stretches/shrinks become "dilate by a factor of..."

  and

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For transformations, there is no "stretch" or "shrink" or "shift" (except phase shifts for sinusoidal functions)! Instead...

- Stretches/shrinks become "dilate by a factor of..."

  and

- Shifts becomes "horizontal/vertical translation of $\pm k$"

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Basic trig questions are often wordy – and always in terms of *radians*. For instance...

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"Find the y-coordinate of where $45°$ intersects the unit circle."

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"Find the y-coordinate of where $45°$ intersects the unit circle."

might become

"In the xy-plane, circle O has a radius of 1 and is centered at the origin O. The angle AOB is in **standard position** and measures $\frac{\pi}{4}$ **radians**. The intersection of the **terminal ray** $\overline{OA}$ and circle O occurs at (x, y). What is the value of y?"

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Vocabulary

Familiarize yourself with certain language regarding end behavior and asymptotes. For instance...

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"... as $x \to \infty$"

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Familiarize yourself with certain language regarding end behavior and asymptotes. For instance...

"... as $x \to \infty$"

might become

"... as x increases without bound."

and you'll see language like

"... as x-values decrease and get arbitrarily close to 1" (2026 FRQ #1(B)(i))

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Service Opportunity

Would YOU like to practice writing AP items – for Precalculus, Calculus, or Statistics?

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Would YOU like to practice writing AP items – for Precalculus, Calculus, or Statistics?

Would YOU like to contribute to math education in Georgia?

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Would YOU like to practice writing AP items – for Precalculus, Calculus, or Statistics?

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Would YOU be willing to sacrifice a few hours' worth of your time?

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Would YOU like to practice writing AP items – for Precalculus, Calculus, or Statistics?

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Then might we have a future opportunity for you!

Please reach out to me after the session or shoot me an e-mail.

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Book Giveaway!

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Thank you!

Thank you so much for coming! Please fill out the feedback form at



The session number is 103.

Feel free to e-mail me any time at

david.hornbeck@gctm.org