Advanced Placement Precalculus

2026-2027 Syllabus

Instructor

Bridget Kyi
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Available help:

- Before class T/Th by appointment
- After class T/Th
- On zoom M/W 5:30 pm-8:30 pm by appointment
- If there are other times that you would like, feel free to ask or email me and I will try to be flexible where I can.

Course Description

AP Precalculus tells a story about functions, starting with the common functions that all students encounter in Algebra, building up to and culminating with advanced functions that can help students see why math is important and how it relates to the world around them. The course includes two essential components: mathematical practices and course content. Students develop and repeatedly apply the mathematical practices of procedural and symbolic fluency, multiple representations, and communication and reasoning to different elements of content over the course of the year. AP Precalculus deepens students' conceptual understandings of functions, trigonometry, and real-world mathematical contexts as they cover characteristics, transformations, and applications of polynomial, rational, exponential, logarithmic, sinusoidal, and polar functions.

Course Objectives

By the end of Unit 1 Students should be able to:

- Describe how the input and output values of a function vary together, and construct a graph representing two quantities that vary with respect to each other in a contextual scenario.
- Compare rates of change at different points, and describe how two quantities vary together over different intervals.
- Determine average rates of change and how those rates themselves change for linear, quadratic, and other function types.
- Identify key characteristics of polynomial functions related to rates of change (extrema, points of inflection).
- Identify key characteristics of a polynomial function related to its zeros, and determine whether the function is even or odd.

- Describe the end behavior of polynomial functions and rational functions.
- Determine the zeros, vertical asymptotes and holes in the graphs of rational functions.
- Rewrite polynomial and rational expressions in equivalent forms, including through long division and the binomial theorem.
- Construct additive and multiplicative transformations of a function.
- Identify an appropriate function type for a given scenario, and describe the assumptions and restrictions involved in building the model.
- Construct polynomial, piecewise, or rational function models, and apply them to answer questions about a data set or scenario.

By the end of Unit 2 Students should be able to:

- Express arithmetic and geometric sequences as functions of the whole numbers.
- Construct functions comparable to arithmetic and geometric sequences, and describe the similarities and differences between linear and exponential functions.
- Identify key characteristics of exponential functions and rewrite exponential expressions in equivalent forms.
- Construct and apply exponential models for situations involving proportional change.
- Construct and validate linear, quadratic, and exponential models based on a data set.
- Evaluate, construct, and decompose the composition of two or more functions.
- Determine the input-output pairs and construct the inverse of a function on an invertible domain.
- Evaluate logarithmic expressions.
- Construct representations of the inverse of an exponential function with an initial value of 1.
- Identify key characteristics of logarithmic functions.
- Rewrite logarithmic expressions in equivalent forms.
- Solve exponential and logarithmic equations and inequalities, and construct their inverse functions.
- Construct a logarithmic function model for a data set or scenario.
- Determine whether an exponential model fits a data set using a semi-log plot, and construct its linearization.

By the end of Unit 3 Students should be able to:

- Construct graphs of periodic relationships and describe the key characteristics of a periodic function from a verbal description.
- Determine the sine, cosine, and tangent of an angle using the unit circle.
- Determine coordinates of points on a circle centered at the origin.
- Construct representations of the sine and cosine functions using the unit circle.
- Identify key characteristics of the sine and cosine functions.
- Identify the amplitude, vertical shift, period, and phase shift of a sinusoidal function.
- Construct sinusoidal function models of periodic phenomena by estimating key values.
- Construct representations of the tangent function, and describe its key characteristics and transformations.

- Construct analytical and graphical representations of the inverse sine, cosine, and tangent functions over a restricted domain.
- Solve equations and inequalities involving trigonometric functions.
- Identify key characteristics of functions that involve quotients of the sine and cosine functions.
- Rewrite trigonometric expressions using the Pythagorean and sum identities, and use equivalent forms to solve equations.
- Determine the location of a point using both rectangular and polar coordinates.
- Construct graphs of polar functions.
- Describe characteristics of the graph of a polar function.

Textbooks and Materials

Textbooks (available online)

Abramson, Jay et al. *PreCalculus 2e*. OpenStax

https://openstax.org/details/books/precalculus-2e

Bean, Spencer et al. *Flipped Math — AP Precalculus*. Flippedmath.com

https://precalculus.flippedmath.com/

Materials

- Binder or folder for notes and assignments
- Graph paper
- Pencils
- Calculator (see options below)
- Laptop (to access AP Classroom)

Optional materials

- colored pens, colored pencils or highlighters (whatever you like) for guided notes
- ruler or straight edge for graphing

Calculator

The AP Precalculus exam requires the use of an approved graphing calculator. Students can purchase a graphing calculator like the TI-84 or another approved graphing calculator from the College Board list. For class you can use the web-based or app-based Desmos graphing calculator, but **only the built-in Desmos graphing calculator through Bluebook can be used during an AP Exam, not the web-based or app-based calculator.** You may use Desmos on a personal laptop or other device in class as long as you remain focused and on task. You will lose that option if you are unable to maintain your focus on the work we are doing and will then need a dedicated graphing calculator. Students who want to use a dedicated

graphing calculator for the AP Exam should have it with them from the beginning of the class - learning to use a graphing calculator effectively and efficiently takes time and practice on the specific model you intend to use. I have a TI-84 Plus CE which I will be using and modeling in class regularly.

Course Content at a Glance

Unit Number and Title	Instructional Weeks
Unit 1: Polynomial and Rational Functions	9–9.5 weeks
Unit 2: Exponential and Logarithmic Functions	10–10.5 weeks
Unit 3: Trigonometric and Polar Functions	9–9.5 weeks
AP Exam Review	1–2 weeks
Unit 4: Functions Involving Parameters, Vectors, and Matrices (NOT REQUIRED for AP EXAM)	1–2 weeks

Grading and Assessment

Guided Course Notes 5%
Group Work / Quizzes 15%
Homework 15%
Tests 45%
Midterm (1st semester) /Final (second semester) 20%

Group work is intended to support your learning and will generally be collected at the end of class. My focus is on your effort and engagement, not that you have every problem completed.

I will replace your lowest test grade with your midterm (1st semester) or your final (2nd semester) if it is higher.

TEST CORRECTIONS - Every test will have test corrections due one week after the test is returned to you. You can get up to half of the points you missed back by completing the test corrections thoroughly. We will go over how to do this in class after the first test. That means that if you get 75% correct on the test and you complete the test corrections correctly, your final test grade would be 87.5%. My intention is to support and encourage your growth. When we attempt something new and challenging we are often not fully successful on our first try. My goal is that you learn from your mistakes, and your grade will reflect the knowledge gained and effort made, not just the first attempt you make. The AP Exam will be challenging enough on its own -

this class will be a constant scaffold to get you to the point where you can demonstrate your knowledge with confidence.

Class Expectations

Be prepared. Arrive on time with a graphing calculator (using Desmos as an app or web based is okay), binder/folder of notes, completed homework, etc.
Take notes. Complete the guided notes during the lesson.
Be attentive. There is a lot of content in this class, and each day builds on the work done previously.
Participate. Group work and partner work will happen regularly.
Be respectful. We are a supportive learning community that values every member.
Take responsibility for your learning. Ask questions, form study groups, seek help from classmates or me.

Attendance

Being in class will be incredibly important as we cover new material in each meeting. If you have a planned absence, communicate with me as soon as possible so that I can support you in choosing what videos and notes will best help you keep up with what you will miss. If you have an unplanned absence, communicate with me as soon as you can and we will create a plan to get you caught up. Most absences will require you to watch videos and take notes in addition to any assignments that need to be made up. Missed tests need to be made up within one week of a student's return to class. Students are responsible for communicating with me to find out about missed work and for making up missed work.

Homework Policy

Homework is generally due at the beginning of the next class after it is assigned. Any student may have an extension to turn work in at the beginning of the second class after it is assigned (one extra class meeting) without any penalty. In general, if a student is absent, any work assigned prior to the absence is due when they return, and any missed work is due within two class periods of their return. Exceptions can be made for specific circumstances.

Academic Integrity & AI Policy

Honesty and integrity are core values in this course. Students are expected to complete their own work, however, study groups and collaboration are encouraged.

Specific AI tools may be used when permitted by the instructor for a particular task like checking answers, much like a calculator can be used for this purpose. AI may not replace a student's own mathematical reasoning or problem-solving. When AI use is permitted, students may be

required to disclose and explain how it was used, and to show all the steps of the corrected solution.