

PreCalculus Syllabus

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Course Description

PreCalculus is an honors-level math course intended to prepare students for AP Calculus. PreCalculus begins with a rigorous and in-depth review of Algebra 2 topics. The course then shifts to a comprehensive investigation of trigonometry. Trigonometry will lead into discussions of vectors, polar equations, conic sections, and even imaginary numbers. Students will learn to graph in two new planes (the polar and imaginary planes), and they will investigate the graphing of sets of parametric equations. By the end of the course students will have a thorough understanding of both the graphs and equations of algebraic and transcendental functions needed for AP Calculus.

Course Goals

Students will be able to identify families of functions and use the properties of each family to make mathematical models, predict data values, construct basic graphs, and interpret mathematical situations. Students will employ trigonometry to solve triangles, complete vector operations, and represent points, complex numbers, and equations in polar form. Students will learn about the character of God through the study and application of the mathematical concepts in this course.

Mission Connection

LCCS exists to glorify God as a community of faith and learning dedicated to forming disciples of Jesus Christ, pursuing goodness, truth, and beauty, cultivating wisdom and virtue, and furthering the highest ideals and practices of human flourishing. This course supports the LCCS mission by providing students with an opportunity to expand their understanding of the natural and man-made world through mathematical observation and analysis. A firm understanding of the patterns found in nature provides a window into the creative power, superior intellect, and masterful order making of our Lord and Creator. The ability to see patterns in data and make valid predictions based on mathematical reasoning enables students to be faithful stewards of God's natural creation and daily provision. As students learn how numbers tell stories, they will become more informed citizens who can choose to challenge falsehoods that threaten to lead the public astray and affirm truths which will lead those willing to listen toward Christ and the best way of living.

Textbook and Required Materials

- *Advanced Mathematical Concepts: Precalculus with Applications* (Glencoe, 2006)
Holliday, Cuevas, McClure, Carter, and Marks
 - A TI-84 graphing calculator is required.
 - Google Classroom: 2020-2021 class code 7vnnc4d
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Classroom Procedures

Whether math is a favorite subject of a student or not, I expect effort from each of my students. This includes participating in class discussions and activities; doing homework thoroughly, completely, and punctually; seeking out guidance or aid when they need it; and showing work or explaining the thought process when solving problems or completing mathematical tasks. Problems that are answered incorrectly without work shown will be given zero points.

At the beginning of class each day, students will check their student mailbox and then go to their seats. Students will then engage in a math warm-up activity for the first three to five minutes of class. After a prayer is said to open class, students will have time to ask questions about the warm-up activity or about the homework assignment from the previous class. Once the homework discussion is over, students will be led through an interactive dialogue about the topic for the day. A note sheet will be provided that will offer in class practice problems as well as launching points for class discussion or class activities. At the end of the period, any adjustments that need to be made to the homework assignment will be announced, and the students will be dismissed.

Students are encouraged to collaborate when solving problems. Working collaboratively does not mean that one person does the work and the rest of the group members take the credit. Collaborative work is about communicating ideas, making hypotheses, testing theories, and ultimately seeking to find consensus on an idea generated by the group. Many times the solution to a problem will not be immediately apparent, and students will have to struggle together to find a working solution.

Students should plan to use the bathroom and go to their lockers before or after class, but I will issue up to three bathroom/locker passes per quarter for each student.

Food is not allowed in the classroom, however drinks in a closed container are allowed.

I do not offer extra credit assignments. However, I do offer a few grade boosting options.

1. Test/Project/Quiz Corrections: Each correction must be done three times to get credit. Corrections neat and clearly show the correct work and the correct answer for each problem corrected. One-third of the points lost on non-extra credit problems.
2. At the end of quizzes or tests I generally give an extra credit problem.
3. Reward incentives may be given out which can be traded for various classroom benefits (e.g. a point on a test, turning in homework a day late with no penalty, etc.)

Classroom Expectations (Student Learning Agreement)

God has created us each uniquely. He has also created us to worship Him with our efforts in everything that we do. Seeking to perform at the highest level of excellence is an act of worship to our Creator. As such, I agree to the following:

- I will be **ON TIME** for all classes every day.
I understand that a total of three unexcused tardies to any and all of my classes will result in an immediate before or after-school detention.
- I will be **PREPARED** for class every day.
I will have a writing utensil, paper, my textbook, and any other necessary resources for success

in the classroom. Not being prepared for class may result in a deduction of points from my class participation grade.

- I will **COMPLETE** all assignments on time.
I understand that late assignments will result in a deduction of 10% of the assignment grade *per day* that the assignment is late up to 50%. After 5 days, the grade becomes a zero for the assignment. Late work will not be accepted for credit but may still be required to be completed.
 - I will **RESPECT** my instructor(s), any LCCS staff member, volunteer(s), classmates, and other students in other grades.
Profanity, rude gestures, cruel teasing or put downs will not be tolerated. Such behavior(s) will first be addressed and managed by the instructor. If such behavior(s) continue students may be referred to the Dean of Students.
 - I will keep my **CELL PHONE OFF** and away at all times during the school day (8 am-3:10 pm).
I understand that if my cell phone is visible or on, the instructor will confiscate the device and the Student Handbook Cell Phone Policy will be followed.
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Discipline

To instruct and govern; to teach rules and practice, and accustom to order and subordination (Noah Webster 1828). Discipline is done in the classroom as necessary to maintain a safe, orderly and conducive-to-learning environment for all students. Students whose behavior is deemed by the teacher to be disrespectful and/or disruptive to the teaching and learning processes by any means will serve the following consequences:

- 1st offense – verbal warning. (seating may be changed)
- 2nd offense – The student will have a meeting with the instructor and parent(s) will be contacted.
- 3rd offense – The student will be given a detention and will be referred to the Dean of Students.

Students removed from class due to disciplinary problems are responsible to acquire any missed work or notes.

Course Outline

Unit 1: Relations and Functions (Relations and functions, compositions of functions, family of linear equations, parallel and perpendicular lines, linear inequalities, piecewise functions)

Unit 2: Systems of Linear Equations and Inequalities (solving systems in two variables, solving systems in three variables, solving systems using matrices, linear programming)

Unit 3: The Nature of Graphs (Symmetry in graphs, families of functions, nonlinear inequalities, inverse functions and relations, continuity, end behavior, critical points, asymptotes, variation)

Unit 4: Polynomials and Rational Functions (properties of polynomials, remainder and factor theorem, rational root theorem and Descartes rule, locating zeros, partial fractions, solving rational and radical equations and inequalities)

Unit 5 Introduction to Trigonometry (Angles and degrees, right triangle trigonometry, unit circle, solving triangles: law of Sines, law of Cosines, ambiguous case)

Unit 6: Radians and Graphs of Trigonometric Functions (converting to radians and back, linear and angular velocity, graphs of all six trigonometric functions and their transformations, inverse trigonometry, graphs of inverse trigonometric functions)

Unit 7: Trigonometric Identities and Equations (verifying trigonometric identities, sum and difference formulas, double and half angle formulas, solving trigonometric equations)

Unit 8: Vectors (standard form of vectors, magnitude and direction of vectors, dot products, cross products, finding resultant vectors, applications of vectors, parametric equations and vectors)

Unit 9: Polar Coordinates, Polar Equations, and Complex Numbers (relationship between polar coordinates and rectangular coordinates, polar graphs, linear equations in polar form, complex numbers in polar form, complex plane, products and quotients of complex numbers in polar form)

Unit 10: Conic Sections (Circles, ellipses, hyperbolas, parabolas)

Unit 11: Logarithms (exponential functions, logarithmic functions, solving using properties of exponential and logarithmic functions)

Major Assignments

There will be two to three unit tests per quarter to help assess summative skills. Once per semester, a project will be offered in place of a unit test.

The tests are designed to make students identify information from figures, employ the use of definitions and theorems to assert a mathematical truth, and perform the necessary calculations to find indicated values. Tests will not usually directly test vocabulary, but students will be expected to have a working definition of all vocabulary from the unit.

In PreCalculus students may be permitted to create a reference sheet for use on certain tests. The reference sheet will be allowed only for units with large amounts of material or formulas, and I will communicate reference sheet use explicitly in class and on Family Portal. Reference sheets must be made on a 3 inch by 5 inch index card. All reference materials must be handwritten. Students may write on both sides of the index card. Reference sheets that are not on a 3 inch by 5 inch index card will not be permitted for use.

Projects ask students to engage with unit materials in a way that results in students creating original content. Projects will be assigned two weeks before they are due, and students will be given some class time and homework time to devote to the completion of unit projects. As long as students are focused and on task much of the project should be finished during these allotted times, but projects may require some additional time beyond what is programmed into the lesson plans.

All tests and projects may be corrected for restoration of up to one-third of the credit lost. All corrections must be completed three times to be eligible for credit. Corrections must be neat and must clearly show the correct work or explanation in addition to the correct answer for each problem corrected. Extra Credit problems may not be corrected for credit. Corrections are due one week after the test or project is returned.

Homework

Homework will be assigned for every section, and every homework will be graded for accuracy.

Each homework assignment that is turned in needs to have a heading with these four items:

1. Student's name
2. The class name
3. The page and problem numbers
4. The due date

Assignments with no name will be considered missing, since I will not know to whom I should give the credit. A nameless papers area will be accessible to students so that they can write their name and resubmit the paper.

Assignments with a name but without a proper heading will have 5 points taken off the grade.

Assignments that are not complete will be entered into the grade book based on the percentage of the assignment that is completed. Students can resubmit the homework fully completed and it will be accepted according to the late assignments policy in the student handbook.

Assignments that are late will be treated in accordance to the student handbook.

Assignments can all be found on Family Portal. Please let me know ASAP if you are unable to find the lesson plans and assignments on Family Portal.

Assessments:

Students will be assessed through the major assignments mentioned above as well as through quizzes, homework, and class work/class discussion.

There will be two to three quizzes per quarter. Quizzes will assess students on smaller chunks of material in a unit and will serve as check-in points for overall comprehension and retention of the material.

Homework will be used to assess students in two ways. Homework marked for completion will be used to provide a regular informal assessment of dedication to daily practice, problem solving grit, and comprehension of the material. Homework marked for accuracy will be used to provide a formal assessment of deeper reasoning and calculation skill in regards to unit materials.

Class work and class discussion will provide an informal assessment of comprehension, mathematical techniques, and problem solving skills.

All quizzes may be corrected for restoration of up to one-third of the credit lost. All corrections must be completed three times to be eligible for credit. Corrections must be neat and must clearly show the correct work or explanation in addition to the correct answer for each problem corrected. Extra Credit problems may not be corrected for credit. Corrections are due one week after the quiz is returned.

Field Trips

There are no field trips for this class.

Grading Overview

- 40% Tests
- 30% Quizzes
- 20% Homework
- 10% Class Participation

Grading Scale

4.0 = A = 93-100	2.0 = C = 73-76
3.7 = A- = 90-92	1.7 = C- = 70-72
3.3 = B+ = 87-89	1.3 = D+ = 67-69
3.0 = B = 83-86	1.0 = D = 63-66
2.7 = B- = 80-82	0.7 = D- = 60-62
2.3 = C+ = 77-79	0 = F = 0-59

Class Participation and Attendance

In my classes, all students start with a 100% class participation grade. As long as students are actively engaged in class activities and class discussions without being disruptive, they will keep the 100%. However, when students break the class expectations referenced above, class participation will be lowered as mentioned.

Make-up Work

Students will be given one day per day absent to make up work. Students can find the summary of the lesson learned in class and the homework assignment for each day on Family Portal and/or Google Classroom.

When absence prevents a student from submitting work that is due, an A for absent will be placed in the grade book in Family Portal until the work is submitted or until the allotted make up time has passed.

If the allotted make up time has passed and the assignment is not submitted, an M will be placed in the grade book. The assignment will then be considered late. Assignments that are late will be treated in accordance to the Parent/Student Handbook.

STUDENT: I have read this syllabus and understand what is expected of me.

Signature _____ Date_____

PARENTS: My child has discussed the syllabus with me. I understand it and will support it.

Signature _____ Date_____