Contact Information: e-mail: li.ma@hcbe.net
Teacher Website: https://vhs.hcbe.net/lima
Major Text: Precalculus with Limits, 5th Ed. by Ron Larson and Paul Battaglia

Course Description:
        Precalculus centers on functions modeling dynamic phenomena. This research-based exploration of functions is designed to better prepare students for college-level calculus and provide grounding for other mathematics and science courses. In this course, students study a broad spectrum of function types that are foundational for careers in mathematics, physics, biology, health science, business, social science, and data science. Throughout this course, students develop and hone symbolic manipulation skills, including solving equations and manipulating expressions, for the many function types throughout the course. Students also learn that functions and their compositions, inverses, and transformations are understood through graphical, numerical, analytical, and verbal representations, which reveal different attributes of the functions and are useful for solving problems in mathematical and applied contexts. In turn, the skills learned in this course are widely applicable to situations that involve quantitative reasoning.
        Precalculus fosters the development of a deep conceptual understanding of functions. Students learn that a function is a mathematical relation that maps a set of input values—the domain—to a set of output values—the range—such that each input value is uniquely mapped to an output value. Students understand functions and their graphs as embodying dynamic covariation of quantities, a key idea in preparing for calculus. With each function type, students develop and validate function models based on the characteristics of a bivariate data set, characteristics of covarying quantities and their relative rates of change, or a set of characteristics such as zeros, asymptotes, and extrema. These models are used to interpolate, extrapolate, and interpret information with different degrees of accuracy for a given context or data set. Additionally, students also learn that every model is subject to assumptions and limitations related to the context. As a result of examining functions from many perspectives, students develop a conceptual understanding not only of specific function types but also of functions in general. This type of understanding helps students to engage with both familiar and novel contexts.

Course Outline:
        Unit 1: Exploring Rates of Change
        Unit 2: Polynomial and Rational Functions
        Unit 3: Constructing Functions
        Unit 4: Exponential Functions
        Unit 5: Logarithmic Functions
        Unit 6: Exploring Sine and Cosine Functions
        Unit 7: Working with Trigonometric Functions
        Unit 8: Polar Functions

Teaching Philosophy
        This course will focus not only on learning the necessary skills and operations but also on the mathematical theories and implications of the concepts. You will learn critical reading and thinking skills, how to express yourself both verbally and in writing, and how to manage your time and learn math effectively. You will be actively involved in creating your own knowledge. Tests will not be carbon copies of the review or practice test. In order to better assess students' understanding, students will be required to apply the information they have

learned in a new context on the tests. They will also be asked to explain and evaluate, in writing, various theories and mathematical concepts. Throughout the year, students will develop skills that will be valuable their entire lives: self-discipline, self-confidence, rigorous habits of mind, problem solving skills, and a love of learning. At the end of the course, students will be well prepared to take calculus, statistics, or any similar college mathematics course, and will be able to think and learn for himself and will have developed the ability to answer the questions that stem from his own curiosity.

Teaching Strategies

Daily Warm Up

At the beginning of each period, students are given up to 3 questions to complete. These questions may be review or a lead-in to the lesson. Differing methods of solution are shared and discussed.

Homework

There will be a homework worksheet that will be due the next school day. Students will not be allowed to "finish" their homework in class. Homework will be graded for completion and presentation only on a 4 point scale (1 = 25, 2 = 50, 3 = 75, 4 = 100). I will also occasionally give students an assignment similar to the homework that I will grade for accuracy rather than completion (this includes style, form, mathematical syntax, etc.) Assignments should be your own independent work. Students with questions from the previous assignment might have their questions answered by fellow "expert" students. These "expert" present the problems in a step-by-step manner and verbally explain the sequence and the rational. This usually leads to great peer discussion about alternate representations and approaches to a particular problem.

Test Review

On the day before the test, I will let students know the types of questions that will be on the test, both multiple choice and free response. Student questions regarding lack of understanding should be answered as soon as they arise. Waiting until the day of the test is a bad approach to successfully completing the test. Additionally, morning tutorials are crowded on test mornings, meaning I will possibly be unable to work with you exclusively if at all, as my attention is divided.

Exams and Quizzes

There will be at least two in-class exams each six weeks grading period and a comprehensive in-class final exam during finals exam week. All exams will consist of both a multiple-choice and free-response section. On some exams, calculators will NOT be permitted, and will be announced prior to the actual exam. Periodically (about 1-2 per week), there will be short (about 5-10 minutes) quizzes given in class. Quiz material may come from lecture, handouts, or the worksheet. Quizzes may or may not be announced. Students who miss a quiz due to an excused absence or excused tardy must make up the quiz before the following class meeting. Students whose absence or tardiness is unexcused, or do not take the makeup promptly, will not be able to make up the quiz. All exams and quizzes will be closed book/notes. Students who are absent the day of a test will take the test the following day (not during class). Students who are absent the class before a test will still take the test on the regularly scheduled day. There will be no points given back for test corrections, although it is always to a student's advantage to review and correct errors. No partial exams will be given.

Use of Graphing Calculator

Instruction will be given using TI-84. The graphing calculator will be used regularly in class as a learning tool. The graphing calculator allows the student to make calculations using tedious numbers, support their work graphically, make conjectures regarding the behavior of

functions and limits among other topics thus allowing students to view problems in a variety of ways. The calculator helps students develop a visual understanding of the material. Students will master the most basic skills on the calculator: graphing a function with an appropriate window, finding roots and points of intersection. Students are encouraged to purchase their own calculator, but a class set is also available during class. Most homework problems are clearly identified as being "calculator allowed" or "non-calculator" problems. Students are encouraged to develop a clear sense of when it is appropriate to use a calculator and when a calculator is not appropriate. Tests will sometimes be divided into calculator and non-calculator sections.

Grading Policy: Per Houston County Board of Education policy, each student's average will be calculated as follows:

        Major Assessments= 45%
        Minor Assessments= 20%
        Daily Work   = 15%
        Final Assessment* = 20%
                *This course includes a cumulative final exam at the end of each semester.

Infinite Campus: Student grades can be monitored by checking Infinite Campus regularly. Parents and students have access to Infinite Campus.

Test Retake Policy: Students will be allowed to retake two unit tests per semester. In order to be eligible for a retake, students will need to correct each missed problem on a separate sheet of paper accompanied by an explanation of the concept being assessed. Students must obtain a parent signature next to the grade on the test. I will review the test corrections to ensure they are correct and that the student is now prepared to demonstrate improved mastery of the content by taking the test retake. Retakes must be finished in a single sitting.

Chromebook: All students are issued a district-provided chrome book for instructional purposes, student engagement, and student learning. Chrome book use is at the direction and discretion of the classroom teacher.

Classroom Rules:
    1.   Students will show RESPECT for all people and property at all times.
    2.   Students will be punctual. The tardy policy in the VHS Student Handbook will be followed.
    3.   Students will be prepared for class and ready to learn when the tardy bell rings.
    4.   All rules, policies and procedures in the VHS Student Handbook will be upheld.
           I FOLLOW RULES!!!! I EXPECT YOU TO FOLLOW THEM AS WELL!!!!

Consequences if rule(s) are broken:
    1. Reminder of classroom expectations
    2. Parent Contact
    3. Office Referral

Google Classroom: To encourage blended learning, online assignments will be posted weekly through Google Classroom. At least one Google Classroom assignment per week will be graded and entered in Infinite Campus. Students should be familiar with how to navigate the online platform, communicate with their teacher, and submit assignments on time. If there are technology limitations, please notify the teacher.

Precalculus
Dr. Ma
2023-2024

By signing below I acknowledge that I received, read, and understand Dr. Ma's Precalculus Syllabus.

Student:

_____   _____
Student Name (Print)   Class Period

_____   _____
Student Signature   Student email

Parent/Guardian:

_____   _____
Parent/Guardian Name (Print)   Parent/Guardian Phone Number*
                                                             * Please include your email address and the <u>best</u> phone
                                                             number at which to contact you after 3:00 pm.

_____   _____
Parent/Guardian Signature   Parent email