

# Gateway STEM High School

*Learners Today, Leaders Tomorrow!*



## PRE-CALCULUS

### COURSE SYLLABUS

2022-2023

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**PLANNING PERIOD:** 8<sup>th</sup>

**ROOM:** 201 south

### COURSE FRAMEWORK:

Honors Algebra 2 is course for accelerated students. In this course students will extend understanding of variables, algebraic expressions, equations, functions, inequalities, and their multiple representations. Additionally, course will introduce to new concepts, needed for future careers, such as logarithmic and trigonometric functions, conic sections, probability and statistics. Students will further develop their ability to explore and solve real-world application problems, demonstrate the appropriate use of graphing calculators, and communicate mathematical ideas clearly. Students are expected to study and tackle problems that are more challenging and explore advanced topics. Good discipline and completing practice is a must in order to pass this course

Unit 0 – Review	<ul style="list-style-type: none"><li>• Fractions</li><li>• Exponents</li><li>• Roots/Radical</li><li>• Polynomial operations</li><li>• Factoring, polynomial division, matrix arithmetic</li><li>• Simplify algebraic expressions involving all of the above</li></ul>
Unit 1 – Functions and their Properties	<ol style="list-style-type: none"><li>1. Determine whether a given relation is a function using tables, the vertical line test, and by identifying domain and range</li><li>2. Graph polynomial, absolute value, logarithmic, exponential, rational, and radical functions and families of their equations.</li><li>3. Write linear equations, lines, quadratic, and equations of conics.</li><li>4. Determine the inverse of a function and graph the inverse function.</li></ol>
Unit 2 – Function Analysis (Continuity and Infinity)	<ol style="list-style-type: none"><li>5. Discuss the continuity and end behavior of a function.</li><li>6. Find the extrema of a function and determine whether a function is increasing or decreasing.</li><li>7. Find arithmetic and geometric sequences</li><li>8. Analyze piecewise functions</li><li>9. Find limits from the graph</li></ol>
Unit 3 – Polynomial & Rational Functions	<ol style="list-style-type: none"><li>10. Determine the roots, both positive and negative, of a polynomial equation through algebraic techniques and using the discriminant of quadratic equations.</li><li>11. Find factors of polynomials using various theorems.</li></ol>
Unit 4 – Complex Plane Analysis	<ol style="list-style-type: none"><li>12. Complex numbers arithmetic</li><li>13. Polar representation of complex numbers (De’Moivre’s Formula)</li></ol>
Unit 5 – Analytic Geometry	<ol style="list-style-type: none"><li>14. Conic sections</li><li>15. Area and volume problems.</li><li>16. Solids of revolution</li></ol>
Unit 6 – Trigonometric Functions	<ol style="list-style-type: none"><li>17. Find the values of the six trigonometric functions using trigonometric ratios and the unit circle.</li><li>18. Solve triangles using trigonometric functions and Law of Sines and Law of Cosines</li></ol>
Unit 7 – Graphs of Trigonometric Functions	<ol style="list-style-type: none"><li>19. Graph sine, cosine, tangent, cotangent, secant, and cosecant functions.</li><li>20. Write equations of sine and cosine functions given the amplitude, period, phase shift, and vertical translation.</li></ol>
Unit 8 – Trigonometric Identities & Equations	<ol style="list-style-type: none"><li>21. Solve trigonometric equations using various identities.</li><li>22. Use the basic trigonometric identities to verify other identities.</li><li>23. Solve advanced equations using logs and complex numbers</li></ol>
Unit 9 – Sequences and Series	<ol style="list-style-type: none"><li>24. Geometric and Arithmetic sequences and series</li><li>25. Summation notation/factorials</li><li>26. Combinations and permutations</li></ol>
Unit 10 – Intro to Calculus - Limits and Derivatives	<ol style="list-style-type: none"><li>27. Estimate limits using a numerical or graphical approach</li><li>28. Derive derivative formula from slope formula and limit at a point</li><li>29. Compute derivatives using product, quotient and chain rule</li><li>30. Use derivatives to write an equation of tangent line</li></ol>

- Depending on needs, order of topics may be adjusted at any time during the semester based on teacher's decision. We may mix and match similar topics into one unit

### REQUIRED MATERIALS:

- Notebooks
- Pencil and mechanical pencil
- 2 Pocket Folder
- mechanical pencil, ruler, compass and graphing paper
- small calculator (for exams only)

### CLASSROOM EXPECTATIONS/POLICIES:

- 1. AWARE-** Listen and follow directions. You are in school! Listen, watch, write and learn! Use this opportunity.
- 2. EFFICIENT** – Keep hands, feet and objects to yourself. Drivers use signal lights, we raise our hand.
- 3. KIND** - Be polite. Wait until person finishes the sentence. Don't yell, scream, interrupt, or use profanity.
- 4. CONFIDENT** - Don't be embarrassed, or hide if you don't understand something. This is YOUR time to learn. Communicate what you need clarified at appropriate time.

### GRADING SCALE/POLICY:

#### Semester Grade

Assignments	Descriptions	Value
Summative	<u>Topic tests, Examination at the board, Projects, Unit Tests</u> Tests 54%, Final Exam 10%	= 64%
Formative	Classwork, Homework, Exit Tickets, Quizzes, Verbal response Homework 14.4%, Classwork and Quizzes 21.6%	= 36%
		<b>TOTAL = 100%</b>

#### Grading Scale (issued by the district)

A—90-100	The student's work is exemplary and is completed in a timely and independent manner. The work shows a high level of understanding or performance.
B—80-89	The student's work is above average and has been completed in a timely and independent manner. The work shows a clear level of understanding or performance.
C—70-79	The student's work is satisfactory and may or may not be completed in a timely/independent manner.
D—60-69	The student's work barely meets requirements and work is not completed in a timely or independent manner.
F—0-59	The student's work does not meet the minimum standards of understanding or performance or work is not the student's personal best.

Parents may have internet access to their student's grades and assignments, upon Administrative approval at

<https://sis.slps.org/SLPS/Default.aspx>

### RE-TAKE POLICY:

If student is absent student is eligible to retake only summative tests if absence can be verified. Students who do not provide reason for absence will not be eligible for retake. Student must retake test immediately upon return and no later than one week after the original test date. There are no retakes on any quizzes, homework or exit tickets.

### LATE ASSIGNMENTS:

Late homework and assignments will not be accepted unless student was sick or . In special cases, teacher may decide to not count missing homework if student can make it up in class.

## **STUDYING AND NOTE-TAKING:**

It is entirely student's responsibility to study notes, materials, books or online resources including videos assigned by teacher. There will be times where teacher will assign certain notes to be completed as homework or assign an online video to watch or chapter to read. In such cases teacher may skip notes altogether and use entire class period for practice only. Teacher will not waste time writing notes from the book if student did not copy notes that were assigned for the homework.

## **ONLINE TOOLS AND REMIND APP:**

Since most of the students have reliable internet connection and phones teacher will send notifications directly through the app called Remind. If teacher assigns homework online students will be graded and expected to complete the work. In case that student does not have access to internet at home, students can use school library to finish online assignments. After school buses are generally available throughout the school year.

## **HOMEWORK:**

Homework will be assigned every class period and can be in different forms and lengths. Teacher will not always grade the homework for accuracy but more for completion because this is students' responsibility and part of the review. Students should correct their mistakes during the homework review in class and come prepared to ask a question about the problem. Students are expected to try all problems and no credit will be given if student comes with blank homework or excuse "I did not know what to do" because teacher will always assign types of problems discussed in class. Most of the problems will have answer but it is students' responsibility to study and show work. No credit will be given for copying down correct answers without work shown.

## **ACADEMIC INTERVENTION:**

Any student who is lacking basic mathematical skills will be referred to administration and counselors and parents will be notified in case that student does not meet standards for the class. Remedial assignments will be offered within first few weeks of school. If student does not catch up with material teacher will contact counselors with recommendation for class change.

## **ASSIGNMENT DESCRIPTIONS**

### **Do now:**

Every morning, students will have some type of problem on the board. Once the bell rings, students should work quietly for approximately 5 minutes while teacher takes attendance. Teacher does not provide any help for the assignment during that time. After do-now is done, teacher will pick student to go to the board and explain the problem. Students who do not work or attempt to finish will not receive any credit for do-now. Do now counts in the same category as quiz.

### **Exit ticket:**

Exit ticket is a small quiz usually given right after the new lesson in order to check student's understanding of the new material. Exit tickets are given frequently and can take different forms but usually are short assignments that take 5 to 10 minutes to complete. Exit ticket has a weight of a mini quiz.

### **Quiz:**

Quiz is given weekly to check student's progress after new lesson and practice. Some quizzes will be open-book quizzes and some not. Quizzes usually take around 15-30 minutes and prepare students for tests.

### **Test**

Test are different in lengths and count for the 60% of overall grade. Test may be given in the middle of the chapter or at the end of the chapter. In general, notes are not allowed on the tests unless teacher approves it. Tests typically take from 30 minutes to 60 minutes

### **Unit test**

Unit test is usually a midterm test that covers material from several chapters and takes entire class period to complete. Students should take this type of test as the most serious test that impacts their grade.

### Verbal (on board) exams:

Students will have at least one random “pop” summative exam whereby teacher calls student to the board and assigns type of a problem similar to what has been covered in the class. Exam will usually be anywhere from 5-10 minutes long and may include oral examination where student has to justify the work as well as written exam on the board. This exam will have weight of the test. Students are expected to study and be ready to be called on any given day. Students who refuse the exam will receive 0%. Students who receive poor grade will have one opportunity to retake verbal exam but it will not be announced so students need to be prepared all the time. Any attempts to get help from class will result in failing grade.

### Work in class/Participation/Presentation/Group Work/Extra Work

Occasionally there may be projects or problems to be presented by group of students. Grades given for this type of work and for general participation can count as additional bonus. Teacher will take note of such work and then add extra percentage when giving grade in case students miss few percent. This grade is completely up to the teacher and not subject to discussion.

### Grade Adjustments

Earned grade is always recorded accurately. In certain cases, where teacher determines that alternative assessments is necessary in order to ensure equity and respond to student readiness, teacher may adjust grade according to his discretion and it will be recorded in SIS as such.

### **ACADEMIC INTEGRITY/ PLAGIARISM:**

The integrity of the academic program and the evaluation of each student’s achievement are of primary concern to educational institutions. Cheating on an educational exercise not only reflects dishonesty on the part of the student, but also diminishes the value of the work done by his/her classmates. Students who cheat or plagiarize (using another’s words, ideas or writing as one’s own) shall be subject to the following: a zero recorded for the exercise and if behavior continues, a referral to administration.

### **OTHER RULES AND PROCEDURES:**

#### **1. BEFORE ENTERING THE CLASSROOM**

- a. Arrive on time. Lesson starts when the bell rings and there will be no extensions due to the late arrival.
- b. Be in your uniform and have no electronic devices or headphones while you are entering the class
- c. Have your textbook, notebook and pencil or pen ready and in your hands while you are coming inside. It will help you be more efficient.

#### **2. ENTERING THE CLASSROOM**

- a. Enter the room without making any unnecessary noises. Be aware you are in school!
- b. Get your notebook, head to your assigned seat and start working on the Do-now
- c. Do not place any bags on the desks or in between desks because it may block movement.
- d. The moment the bell rings, all conversations stop. There should be silence during the Do now, so everyone can concentrate.

#### **3. LATE ARRIVAL**

- a. Tardiness for student is defined by students who are not seated in their assigned seats by the time the bell stops ringing. If the door is closed, you are tardy. Tardy students must have a pass to enter the classroom.
- b. If you are late and have a pass, sign the tardy sheet, take your notebook and start working quietly and do not talk to anyone. If you missed any of the activities do not interrupt any students who are working. There will be no extension of time for students who came in late.

#### **4. ASSIGNED SEATS**

- a. Assigned seats are necessary to ensure effective instruction.
- b. Teacher will assign seats to every student and can change decision at any time without the notice

- c. We have limited space and assigned seating ensures that everyone is placed so it is best for the classroom
- d. Teacher decides where students sits. Any argument or refusal to sit in an assigned seat that results in disruption or loss of instructional time is discipline related issue, and will be referred to the administration

## 5. TRANSITIONS

Switching from one activity to another should be done as fast as possible. We will practice this with timers. Listen to teacher's instructions and be efficient. The faster we transition, the more time is left for practice

## 6. SOUND LEVELS AND ASKING FOR "HELP"

Students, please be aware that you are not the only one in the classroom and that teacher may not be always available to provide one-on-one attention. If we have 90 minutes of time and if lesson takes 30 minutes that leaves us with about 1-2 minutes of time for each student so make sure to ask questions during review and practice and not during the lecture.

To ensure good learning environment, teacher decided to limit sound level for each type of instruction as follows:

Do-now, Instruction, Exit ticket, Quiz, Tests – complete silence, no questions

Review, Guided Practice – questions OK in orderly manner, no shouting or talking over others

Group practice – low talking OK if it is about the content, keeping noise level low enough so that everyone can still hear the teacher

Individual practice – once students are assigned independent work teacher will not help with the content. It is student's responsibility to develop persistence and struggle with the problem in order to find solution independently. Teacher will help only during instruction and guided practice and all questions should be asked during that time

Any student who repeatedly interrupts instruction by loud voice will be subject to disciplinary action, even if question is about math.

## 7. DISMISSAL

- a. Teacher dismisses the class, not the bell.
- b. Every student will clean up their area, straighten the desk, turn in all materials, put away notebooks and folders and sit in their seat until teacher dismisses the class.
- c. Students are not allowed to stand by the door before the bell rings. If you are repeatedly at the door before the bell, it is considered discipline issue and will be referred to the administration.

## 8. HALL PASS

As a rule, hall passes for restroom and drinking water will **NOT** be issued. Students should use restroom between classes and during lunch. Students **who participate** will have **2 free passes each semester**, issued at teacher's discretion. Students who do not participate (not working, sleeping, tardy, no materials required for class etc.) will not be permitted to use the pass. Students may not leave the room first or last 10 minutes of the class. Exception: students with documented medical condition by a physician

## 9. NURSE'S OFFICE

Whenever it becomes necessary for a student to go to the nurse's office teachers will issue a pass according to the policy for issuing hall passes stated above. The nurse will not dispense Tylenol or aspirin. Students are to store their prescription medication with the nurse and should take that medicine between classes or at lunch.

## 10. ABSENCE

1. Students are responsible for the work they missed due to the absence.
2. If your absence was excused, missed work will be accepted. If your absence was not excused, late work will not be accepted.
3. If you missed a test it is your responsibility to schedule the time for makeup. Quizzes are not eligible for retakes