Advanced Algebra and Trigonometry

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Course Webpage

Course Overview: This course is designed for students who can benefit from learning at a slower pace and aims at developing an intuitive understanding of mathematics and its applications. Specifically, students will review concepts in algebra and will explore two major areas in math: algebra and trigonometry. They are also introduced to the different families of functions and are encouraged to use them in real world applications. Use of the graphing calculator is emphasized for discovery, problem solving and modeling.

A summary of the course content follows:

1st Semester

1. Algebra Review: This chapter provides a comprehensive algebra review including: order of operations, evaluating algebraic expressions, simplifying radicals, properties of exponents, solving linear equations, operations with polynomials, factoring polynomials, linear equations in two variables, solving systems of equations, solving and graphing one variable inequalities, and graphing two variable inequalities.

2. Relations, Functions and Graphs: In this chapter the students will determine whether a given relation is a function and perform operations with functions. They learn how to graph functions, relations, inverses, and inequalities, analyze families of graphs, and investigate symmetry, continuity, end behavior and transformations of graphs.

3. Exponential and Logarithmic Functions: This chapter introduces exponential and logarithmic functions. Students simplify and evaluate exponential expressions with rational and irrational exponents and graph exponential functions and inequalities. In addition they model real-world situations using common and natural logarithms.

4. Trigonometric Functions: This chapter reviews angles and angle measurement in degrees and builds on that knowledge to explore trigonometric functions. To begin their study of trigonometry, students examine trigonometric ratios defined using right triangles and investigate the trigonometric functions for an angle in standard position on the unit circle. Students then solve right triangles. Students also use the Law of Sines and the Law of Cosines to solve other triangles and to find the areas of triangles.

2nd Semester

5. Graphs of the Trigonometric Functions: This chapter reviews graphs of trigonometric functions and their inverses using radian and degree measure. Students also learn about amplitude, period, phase shift, and vertical shift. Applications include finding linear and angular velocity and writing trigonometric equations to model real life situations.

6. Trigonometric Identities and Equations: This chapter reviews the basic trigonometric identities. Students verify trigonometric identities, use sum and difference identities, and use double and half angles identities. Students then apply the identities to solve trigonometric equations.

Grade Calculation: Students are not given an "annual" grade for a year-long course. Instead, only the 1st semester and 2nd semester final grades will be reported. This reporting method has three (3) important implications:
1. Students will now have more options when scheduling semester electives.
2. To accommodate the increased number of elective scheduling possibilities, some students may need to take two different sections of the same course for the 1st and 2nd semesters of a year-long course. This would lead these students to change periods (or even teachers) at the winter break.
3. Students need to pass <u>both</u> semesters of a year-long course. A passing grade in high school is "60". If a student fails a semester, then he or she will need to attend summer school to remediate that semester. If a student fails both semesters, he or she will need to attend summer school to remediate both semesters.

First Semester Grade Calculation: Your first semester grade will be calculated according to:

<u>Aspect</u>	<u>Weight</u>
1st quarter grade	40%
2nd quarter grade	40%
Final semester exam	20%

Second Semester Grade Calculation: Your second semester grade will be calculated according to:

<u>Aspect</u>	<u>Weight</u>
3rd quarter grade	40%
4th quarter grade	40%
Final semester exam	20%

Quarter Grade Calculations: Your 1st, 2nd and 4th quarter grades will be calculated as shown below:

Aspect	Weight
Tests	50%
Quizzes	20%
Homework Quizzes	20%
Classwork	5%
Preparedness	5%

Your 3rd quarter grade includes the *Week Without Walls (WWW)* grade and will be calculated as:

Aspect	Weight
Tests	45%
Quizzes	18%
Homework Quizzes	18%
Classwork	4.5%
Preparedness	4.5%
Week Without Walls (WWW)	10%

N.B. It is the student's responsibility to save all returned graded material in case it is needed to settle any subsequent grade dispute. In other words, don't throw away any graded work (e.g. Homework Quizzes).

Exemption from Semester Final Examination: It is not possible to exempt a semester final examination in mathematics for the following reasons:
- Enhanced Learning and Retention: The spiral review that occurs during final exam preparation is crucial for deepening understanding and improving long-term retention of the content. This foundational knowledge is essential for successfully progressing to the next set of topics.
- Additional Demonstration of Proficiency: Semester Exams offer students another chance to demonstrate their mastery of newly learned material, especially if they could not do so on earlier assessments, such as unit tests.
- University Preparation: Many European universities evaluate student performance based on a single comprehensive examination administered at the end of the year.

Tests: There will be three tests per quarter.

Homework: Generally, homework will be assigned daily and is to be done on the associated worksheet or in the Advanced Algebra & Trigonometry Notebook. Work on loose sheets of paper is never acceptable. The more challenging problems will be solved on the board at the beginning of our next class as necessary. Student doubts will also be clarified, although questions will only be taken from students who can provide written documentation that they have attempted the relevant problem. Time does not permit us to work out all homework problems in full, but the "correct" answers to <u>all</u> assigned problems will always be given.

Note that there is no homework grade *per se*. Yes, you read this correctly - **There is no homework grade in *Advanced Algebra & Trigonometry*.** Students (and parents) frequently interpret this to mean that their teacher does not think homework is important; this is not true. A cursory review of a student's homework by the teacher only provides *indirect evidence* of learning. Students frequently have tutors, friends and/or artificial intelligence "help" them with their homework. The unauthorized use of calculators is also common. Given the opportunity, some students would even copy other students' work and submit it as their own. Thus, in ASFG high school math courses, homework grades are often a poor reflection of student learning and understanding. **<u>Your teacher believes that homework is so important that he prefers *direct evidence* of student learning and, for this reason, student knowledge will be assessed through frequent *Homework Quizzes* (see below).</u>**

Homework Quizzes: There will be at least one announced Homework Quiz administered in a typical week to determine whether students truly understand the problems they have solved during class and at home. These quizzes are of short duration (approximately 10 minutes) and typically consist of two mid-level homework exercises taken from a recent homework assignment. The exercises can be taken *verbatim*, but your teacher may change the quantities given.

Homework Quiz Re-takes: To lessen the punitive damage of "having a bad day", students will be allowed to re-take two (2) Homework Quizzes per quarter. The one-and-only re-take date and time for a particular Homework Quiz will be announced by your teacher, but it will generally be during his office hours the day immediately following the original Homework Quiz date. The better of the two grades (original vs. re-take) will count. Students who are absent on the date of the original administration of a Homework Quiz due to any excused absence (illness, ASOMEX, etc.) will not be permitted to re-take the associated Quiz.

Classwork/Participation: This is a semi-subjective grade given on the basis of a student's participation, attitude, conduct and ability to follow instructions. At the teacher's discretion, each time a student engages in significant low productivity, class misbehavior or disruption that interrupts the flow of the class (e.g. cell phone possession, asking for an AC adaptor, side conversations during didactic lecture, etc.), he or she will receive a one-point deduction from the quarter grade (out of ten). If a pattern develops, the student will be counseled. If no
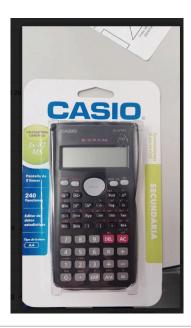
improvement is seen and the problem persists, the student will be referred to the Assistant Principal for other consequences she deems suitable.

Preparedness: This is an objective grade given on the basis of a student's ability to follow instructions and arrive prepared for class. At the teacher's discretion, each time a student arrives to class "unprepared" (see below), he or she will receive a one-point deduction from the quarter grade (out of ten). If a pattern develops, the student will be counseled. If no improvement is seen and the problem persists, the student will be referred to the Assistant Principal for other consequences she deems suitable.

Materials: To be "prepared" each day, each student needs to bring all of the following items to class every day. Your teacher refers to these things as *The Usual*. On occasion, you will need to bring "special" items that are not part of the standard list of materials. Always review the small whiteboard near the door, before class, to be sure you have all of the requested special items.

<u>The Usual</u>

1. Your school-issued MacBook, <u>fully-charged</u> and with recommended software installed (more on this later).

2. A Casio fx-82MS scientific calculator. The calculator can be purchased at the on-campus bookstore for under 200 pesos. A photograph of the calculator follows:

3. Your own fully-charged TI-Nspire CX CAS graphing calculator - your full name should be written in permanent marker (or engraved) on the back.

4. A pencil, an eraser, and a pencil sharpener (or extra lead). We never use ink in this course, even if it is erasable.

5. One spiral-bound notebook, 8 ½" x 11", graph-paper type, for notetaking and practice. Write your **full name** (first and last, no nicknames), **period**, and "**Advanced Algebra & Trigonometry Notebook**" neatly and prominently on the front cover. Only Advanced Algebra & Trigonometry work goes in this notebook. It cannot be "shared" with any other course.

6. One 2" three-ring folder. Write your **full name** (first and last, no nicknames), **period**, and "**Advanced Algebra & Trigonometry Lecture & Worksheet Binder**" neatly and prominently on the front cover. It cannot be "shared" with any other course.

7. A ruler and protractor.

8. An AC adaptor to facilitate MacBook charging from a floor outlet. Please put your name on it with a permanent marker to discourage theft.

TI-Nspire Calculators: Each student is obliged to use their own TI-Nspire calculator; the one exception are brothers and sisters who do not have math and/or science classes concurrently. To discourage theft and the loaning of calculators, any calculator found with a defaced serial number or nameplate will be confiscated by your teacher. The TI-Nspire calculator is a powerful piece of technology and can greatly facilitate student learning. Unfortunately, in the past, some students have attempted to use the calculator to gain an unfair academic advantage over their peers by storing formulas, exam answers, unauthorized software or entire problem solutions on them for use during an exam or quiz. The use of the calculator in this manner is in violation of the *Intellectual Integrity* policy contained in the ASFG Parent-Teacher Handbook and will not be tolerated. **It is important to understand that the person using the portable technology is responsible for ensuring that the device is not being used inappropriately. If a student is found to be using a calculator in an unauthorized manner, then the user will be referred for academic dishonesty, receive a "zero" on the evaluation, and will lose the right to use their graphing calculator on all subsequent evaluations for the remainder of the academic year.** The violating student will have the right to use a standard scientific calculator on these subsequent evaluations, however.

Sharing of implements: No implements of any kind (calculators, MacBooks. MATHbooks, pencils, erasers, sharpeners, rulers, etc.) shall be shared between students.

Extra Support:

Office hours: Everyday, 7:15 - 7:50 am in Room 112. Please be sure to fill out the Office Hours Attendance Form for each visit. Importantly, office hours are not held on Test Days.

Course expectations
- Respect your teacher, classmates, school and yourself. Use given names, not nicknames.

- MATHbook is a complete resource, but your teacher will frequently give brief didactic lectures to review related topics. Students should take notes in their spiral notebook in a dated, chronological, complete and orderly manner. If you miss class, get the lecture notes from a colleague. As a general guide, if something is written (or projected) on the board by your teacher, it should probably be written in your notebook.
- Be responsible by being prepared, studying conscientiously and practicing at home, even if this is no "assigned" homework.
- Be honest with yourself and everyone else. **Specifically, never discuss or ask about the content of a quiz, test or semester final examination (globally referred to as _evaluations_) with a colleague until the evaluation has been returned to you**. If you do, and it can be proven or logically inferred, you will be referred to the Assistant Principal for academic dishonesty and given a "zero" on the evaluation.
- Do your best at all times.
- Learn and enjoy math.