Algebra II Syllabus

Tillamook High School
Algebra II

Instructor Contact Information
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Course Description
Algebra 1I builds upon the concepts given in Algebra I and is a preparatory course for Pre- Calculus.

Course Objectives
Students will be able to solve non-linear algebra equations and be able to simplify and manipulate non-linear algebraic expressions.

Required Texts and Other Supplies
Eureka Math - handouts
Scientific calculator but a graphing calculator is preferred

Assignments

Major Assessments
Tests and projects will both be used to assess the student's achievement of learning goals. There will be a final given during finals week.

Homework/classroom assignments
Much of the work will be done in class. Whatever is not completed in class will be assigned as homework. The evaluation of the classwork/homework will be as follows: at the end of each week a short set of homework problems will be given in class. This assignment will be about ten minutes long and will contain the exact classwork/homework problems from that week. If you have done all of the class work correctly then you can copy that answer from your assignment on the sheet. If not then you have ten minutes to work out the problems.

Class Participation
Class participation is an expectation of all students and therefore is not included as part of the student's weighted grade.

Grading Policies

Grading Criteria:

80% of the total grade is tests and quizzes
20% of the total grade is homework/projects

Grading Scale:

100-90%	A
89-80%	B
79-70%	C
69-60%	D
59-0%	F

I don't round percentages up. (89.9% will be given a grade of B.)

Class Participation:

I expect students to be engaged in all activities and asking questions as needed.

Late Work or Missing Work:

I don't accept late work.

Extra Credit:

I don't give extra credit.

Classroom expectations

1) *Be Prompt*
2) *Do not interfere with the learning of fellow students*
3) *Treat others the way you would like to be treated*

Academic Support

I am available before and after school and during math intervention
Check the blog for notes and assignments.

Cell Phone Policy

In a nutshell, cell phones are not allowed at all. Actually if I see a cell phone then I will confiscate them for the period and place them in the bottom right drawer of my desk. You may pick up your cell phone at the end of the period. If there is some emergency that you may need your cell phone, then please talk to me about the situation. I have been known to be reasonable on occasion.

Parent or Guardian signature and phone number _____

Tillamook High School
AP Calculus
Instructor Contact Information
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CALCULUS AB COURSE SYLLABUS

Brief Description of the Course:
The first semester of AP Calculus is the study of limits, derivatives (which include instantaneous rates of change and the slope of the tangent line to a curve), and application of derivatives such as related rates and applied optimization. The second semester of AP Calculus is the study of the antiderivative or integration, slope fields, the fundamental theorem of Calculus, and the application of integration such as area, volume, and work.

Course Design, Philosophy, and Teaching Strategies
If students can understand the logic behind the mathematics of calculus, then the students will have a much easier time grasping the concepts of limits, derivatives, indefinite and definite integrals. For example when I teach the concept of a limit, I begin by giving the student a function in which the students graph the function and create a table of values using the graphing calculator. We then analyze the graph and the table and then discuss the value(s) the function approaches given a specified x-value. When we first discuss instantaneous rate of change, I first have them find the average rate of change for very small values of Δt. Then we discuss the mechanics and I derive the formula that the students will need to be successful in calculus.

For the start of most lessons, the students are engaged in discovery type learning and then, when I feel the students understand the general concept, the lesson evolves into a more analytical approach. It is imperative that the students understand that the theorems involved in calculus must be proven and that a graphical approach is not enough for them to fully understand calculus.

The vocabulary is also very important, and I will reinforce the vocabulary as I teach. The way that I approach the vocabulary is by first giving them time to write the definitions down, and then I either have them write the definitions in their own words or we discuss what exactly each definition means. I believe that if the students are able to read the textbook and understand the concepts and definitions they will be at an advantage. The vocabulary will be an integral part of each test that I give.

I will stress communication skills as well. The students will have to justify and give reasons for some of their answers on their test in well written sentences. AP type questions will also appear on each test.

Student Engagement Activities:

1) When the limit is introduced in the course, I have the students plug in their calculator a function such as f(x) = (x^2 – 4)/(x – 2), and then make a table of values using their graphing calculator. They set the table at 0.5 and then go by 0.1. I have them go down the table to 2 and ask them what the number approaches and why is their an error message at 2? What kind of graph does this function make and why? Next I have them graph the function (x^2 + 4)/(x – 2). I have them set up the same table and ask them what the number approaches both from the left and from the right.

2) In the beginning of the derivative, I have students graph a function on their calculator such as y = sin x and an algebraic function. I first ask them to tell me the slope of the tangent line at the maximum or minimum values. Next I have them choose several points of my choosing and to use the zoom in feature on the calculator until the curve looks like a straight line. And then I have them use the trace key on either side of the line and approximate the slope of the tangent. I have the students find several slopes including all of the zero slopes and the points of inflection. We graph the slope of the tangent and the x-values and soon the students realize that the derivative of a sine function is a cosine function.

3) Early when the derivate is first introduced, the students will be placed into three groups to work on a CBL velocity experiment so that they can be given some hands on experience that velocity is a rate of change. Each group will choose a hiker. Each hiker will be given a distance to walk. In one group the hiker will walk at a constant rate. In the other two groups, the hiker will walk at rates that are not constant but the same distance in the same amount of time. The motion detector will collect the data and the program "hiker" which will then graph the data. Each group will then be given a series of questions related to velocity as a rate of change. Where on the graph is the rate increasing? Where is the rate decreasing? What are the slopes of the secant at the various locations? Approximate the slope of the tangent at the various locations? Explain the relationship between the slope of the secant and the slope of the tangent. This experiment could extend to graphing a curve and having the different groups discuss how they can walk the curve that is given and then to experiment with the CBL device and the "hiker" program. This experiment will culminate in each group giving a presentation of their experiment. The full lesson is given in detail from this website. http://mste.illinois.edu/courses/ci336kt/garrison/cbl.html.

4) One writing assignment that I will give the students to better understand the derivative is called, "The Loan Formula and the Derivative." In this assignment I give the students a loan payment formula that calculates the monthly payments for a given loan. I begin by giving the students the following information. The loan is for a $250,000 home for 30 year fixed. The equation is given as y = 250,000(x/1200(1 + x/1200)^360)/((1 + x/1200)^360 – 1). The students are familiar with this formula as they have seen it in Algebra 2. Using their calculator I first have them graph it using the range as 0 to $3000, and the domain as 0 to 12%. They make a rough sketch on their paper and we analyze the shape of the curve. Next I have them find and interpret the monthly payments at 4.85%, 5.85%, and 6.85%. I then have them find and interpret the slope of the secant between 4.85% and 6.85%. Using the graphing calculator, I have then find and interpret dy/dx at x = 5.85% using nDeriv(f(x), x, 5.85). I have them compare their answer to the

slope of the secant. Finally I have them change the constants of the original loan formula to make the year as the independent variable instead of the interest rate. And then I have them write about the answers to similar questions except to compare the slope of the secant between a 14 year loan and a 16 year loan to the slope of the tangent of a 15 year loan.

5) There are a number of excellent activities that involve optimization. One such example involves having the students construct a 20 cm by 20 cm square, and then cutting out square corners of any dimension, folding up the sides and calculating the volume of the box. Each group fills in their data on a table given on the active board. Using the active board, a volume verses height graph is then constructed. A series of questions is then posed to the students. What is the maximum volume? What size squares cut gives the maximum volume? What type of function models your graph? Could we write a mathematical function representing your graph? How could our knowledge of derivatives be used to find the maximum volume?
This lesson and many more are given in more detail from
http://mathitude.perso.sfr.fr/PDF/optimisation%20full%20lesson.pdf.

6) When we begin the concept of definite integrals, I have the students work as a group to find the area under the curve of y = sqrt (4 – x^2) bounded in the first quadrant. They are to approximate the area of the curve by making a series of rectangles. One student in the group will use the left sum rule, another will use the right sum rule, and another will use the midpoint rule. I also have the students who used the right sum rule and the one who used the left sum rule to find the average called the trapezoidal rule. They use the table from the calculator to help them find each sum. I ask them to discuss in their group as to which of them has the more accurate estimate. I do not remind them at this time that they are finding the area of 1/4 circle with a radius of two. I want to find out if they will figure it out on their own and if they can come to an agreement that the area is pi square units. I then have each group give a series of arguments as to which method they think is more accurate and what they believe is the actual area.

7) The students work in groups of three for this project on numeric integration. I give them a function such as f(x) = sqrt (x^2 – 1). I have them calculate the area under the curve from x equals 1 to 5 using three different methods. First I have them graph the function in the graphing calculator and then I have one student from each group use the formula for the trapezoidal rule and another from each group use the Simpson's Rule, and a third student from each group use the fnInt(f(x), x, 1, 5) function in the calculator to find the area under the curve. They compare their answers. We repeat this process three times with three different functions so that all of the students can be familiar with the different methods for calculating the area under the curve.

8) When we begin discussing finding the volume of a solid of revolution, I bring in several cucumbers and then I pair up the students. I have them cut vertically each cucumber into many slices. I have them calculate the volume of the entire cucumber by finding the sum of the volume of all of the slices of cucumbers. Next I have them write down precisely how they found the volume of the entire cucumber. Once they have finished, I ask each group to write a method for calculating the volume of a solid of revolution. On the active board I have drawn a coordinate system with a graph that is being rotated about the x-axis. Once they have completed this assignment, we then

discuss the results and derive the formula for calculating the volume of a solid of revolution.

Major Text
Rogawski, Jon. *Single Variable Calculus.* New York: W.H, Freeman and Company, 2008. Third Printing.

AP Calculus AB Course Outline
After each Unit there will be a review for 1-2 days and then an exam that will take 1-2 days.

Unit 1 – Pre Calculus Review (2-3 weeks)
1. Real Numbers, Functions, and Graphs
2. Linear and Quadratic Functions
3. The Basic Classes of Functions
4. Trigonometric Functions
5. Technology: Calculators and Computers

Unit 2 – Limits (4-5 weeks)
1. Limits: Rates of Change, and Tangent Lines
2. Limits: A Numerical and Graphical Approach
3. Basic Limit Laws
4. Limits and Continuity
5. Evaluating Limits Algebraically
6. Trigonometric Limits
7. Intermediate Value Theorem
8. The Formal Definition of a Limit

Unit 3 – Differentiation (5-6 weeks)
1. Definition of the Derivative
2. The Definition as a Function
3. Product and Quotient Rule
4. Rates of Change
5. Higher Derivatives
6. Trigonometric Functions
7. The Chain Rule
8. Implicit Differentiation
9. Related Rates

Unit 4 – Applications of the Derivative (4-5 weeks)

1. Linear Approximation and Applications
2. Extreme Values
3. The Mean Value Theorem and Monotonicity
4. The Shape of a Graph
5. Graph Sketching and Asymptotes
6. Applied Optimization
7. Newton's Method
8. Antiderivatives

Final on Limits and Derivative

Unit 5 – The Integral (4 weeks)

1. Approximating and Computing Area
2. The Definite Integral
3. The Fundamental Theorem of Calculus, Part I
4. The Fundamental Theorem of Calculus, Part II
5. Net or Total Change as the integral of a Rate
6. Substitution Method

Unit 6 – Applications of the Integral (4 weeks)

1. Area between two curves
2. Setting up Integrals: Volume, Density, Average Value
3. Volumes of Revolution
4. The Method of Cylindrical Shells
5. Work and Energy

Unit 7 – The Exponential Function and Introduction to Differential Equations (6 weeks)

1. Derivative of $f(x) = b^x$ and the Number e
2. Inverse Functions
3. Logarithms and their Derivatives
4. Exponential Growth and Decay
5. Compound Interests and Present Value
6. Models Involving $y' = k(y - b)$
7. Solving Differential Equations
8. Graphical and Numerical Methods (which include Slope Fields)

AP Practice Exam
AP Exam

Grading:

Homework	**10%**
Tests	**90%**
-total-	**100%**

Geometry Syllabus

Tillamook High School
Geometry

Instructor Contact Information

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Room #6
(503)842-2566 ext 2035
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diasnumbers.blogspot.com

Course Description

Geometry is a course that acts as a bridge between the foundational knowledge of Algebra and the applications found in upper level mathematics. Students will learn new skills related to Geometry while practicing critical thinking skills, construction, and mathematical deduction.

Course Objectives

Students will be able to solve problems using knowledge of construction of geometric shapes and related formulas.

Required Texts and Other Supplies

Eureka Math - handouts
Scientific calculator preferred, compass, protractor

Assignments

Major Assessments

Tests and projects will both be used to assess the student's achievement of learning goals. There will be a final given during finals week.

Homework/classroom assignments

Much of the work will be done in class. Whatever is not completed in class will be assigned as homework. The evaluation of the classwork/homework will be as follows: at the end of each week a short set of homework problems will be given in class. This assignment will be about ten minutes long and will contain the exact classwork/homework problems from that week. If you have done all of the class work correctly then you can copy that answer from your assignment on the sheet. If not then you have ten minutes to work out the problems.

Class Participation

Class participation is an expectation of all students and therefore is not included as part of the student's weighted grade.

Grading Policies

Grading Criteria:

80% of the total grade is tests and quizzes
20% of the total grade is homework/projects

Grading Scale:

100-90%	A
89-80%	B
79-70%	C
69-60%	D
59-0%	F

I don't round percentages up. (89.9% will be given a grade of B.)

Class Participation:

I expect students to be engaged in all activities and asking questions as needed.

Late Work or Missing Work:

I don't accept late work.

Extra Credit:

I don't give extra credit.

Classroom expectations

1) *Be Prompt*
2) *Do not interfere with the learning of fellow students*
3) *Treat others the way you would like to be treated*

Academic Support

I am available before and after school and during math intervention
Check the blog for notes and assignments.

Cell Phone Policy

In a nutshell, cell phones are not allowed at all. Actually if I see a cell phone then I will confiscate them for the period and place them in the bottom right drawer of my desk. You may pick up your cell phone at the end of the period. If there is some emergency that you may need your cell phone, then please talk to me about the situation. I have been known to be reasonable on occasion.

Parent or Guardian signature and phone number _____

Tillamook High School

Honors Geometry

Instructor Contact Information *Paul*

Dias Room #6 (503)801-5605 or
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diasnumbers.blogspot.com

Course Description

▪ *College Prep Course designed to explore and expand student's knowledge in Euclidean Geometry beyond the level of the normal geometry course. The student will demonstrate proficient knowledge in basic Algebra skills which will be used when discussing Geometric properties represented by algebraic relationships.*

Course Objectives

▪ *The student will have a solid understanding of all aspects of Geometry (which include postulates, theorems, and formulas), and be able to apply them to a wide variety of problems. The student will be taught logical reasoning and problem solving skills by being introduced to mathematical proofs.*

Required texts and other supplies.

▪ *McDougall and Protractor and compass*

Assignments

▪ Major Assessments *Chapter tests and performance tasks*

▪ Daily Assignments and Homework Assignments will be given daily and some class time will be given to work on the assignments.

Grading Policies

▪ Grading Criteria:

Assignments 10%
Performance task 10%
Tests 80%

▪ Grading Scale:

A 90% and above
B [80%-90%)
C [70%-80%)
D [60%-70%)
F below 60%

▪ Late Work or Missing Work: *I will accept late work for full credit for one day late or a special arrangement by me. Otherwise late homework is not accepted.*

▪ Extra Credit: *Extra credit is designed to extend your math abilities beyond the text type problems. Extra credit will be given to those who solve the daily challenge problems during the time allotted.*

Class Policies

▪ Attendance: *see handbook*

▪ Promptness: *see handbook*

▪ Passes: *The instructor will sign the handbook and 5 minutes maximum for each non office hall pass. Please ask to use a pass during not lecture times.*

▪ Behavior Expectations:

1) *Be Prompt*
2) *Do not interfere with the learning of fellow students*
3) *Treat others the way you would like to be treated*

▪ Food/Drink in classroom: *You may bring a drink or food in class as long as you do not make a mess. If you do then clean it up.*

Academic Support

▪ Days and times teacher is available after school: *3:30-4:00 M-F* and Math Intervention of Thursdays.

Cell Phone Policy

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Parent or Guardian signature and Phone number

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