

VALENCIA HIGH SCHOOL

“Learning for Life”

Algebra 2/Trig A/B

Ms. Harris

Introduction to Course

This is a two-semester Algebra II/Trigonometry course. The following is a list of topics covered as put forth from the California Content Standards for Public Schools. You may find definitions of standards at

<http://www.cde.ca.gov/be/st/ss/mthalgebra2.asp>

- 1.0 Students solve equations and inequalities involving absolute value.
- 2.0 Students solve systems of linear equations and inequalities (in two or three variables) by substitution, with graphs, or with matrices.
- 3.0 Students are adept at operations on polynomials, including long division.
- 4.0 Students factor polynomials representing the difference of squares, perfect square trinomials, and the sum and difference of two cubes.
- 5.0 Students demonstrate knowledge of how real and complex numbers are related both arithmetically and graphically. In particular, they can plot complex numbers as points in the plane.
- 6.0 Students add, subtract, multiply, and divide complex numbers.
- 7.0 Students add, subtract, multiply, divide, reduce, and evaluate rational expressions with monomial and polynomial denominators and simplify complicated rational expressions, including those with negative exponents in the denominator.
- 8.0 Students solve and graph quadratic equations by factoring, completing the square, or using the quadratic formula. Students apply these techniques in solving word problems. They also solve quadratic equations in the complex number system.
- 9.0 Students demonstrate and explain the effect that changing a coefficient has on the graph of quadratic functions; that is, students can determine how the graph of a parabola changes as a , b , and c vary in the equation $y = a(x-b)^2 + c$.
- 10.0 Students graph quadratic functions and determine the maxima, minima, and zeros of the function.
- 11.0 Students prove simple laws of logarithms.
 - 11.1 Students understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.
 - 11.2 Students judge the validity of an argument according to whether the properties of real numbers, exponents, and logarithms have been applied correctly at each step.
- 12.0 Students know the laws of fractional exponents, understand exponential functions, and use these functions in problems involving exponential growth and decay.
- 13.0 Students use the definition of logarithms to translate between logarithms in any base.
- 14.0 Students understand and use the properties of logarithms to simplify logarithmic numeric expressions and to identify their approximate values.

15.0 Students determine whether a specific algebraic statement involving rational expressions, radical expressions, or logarithmic or exponential functions is sometimes true, always true, or never true.

16.0 Students demonstrate and explain how the geometry of the graph of a conic section (e.g., asymptotes, foci, eccentricity) depends on the coefficients of the quadratic equation representing it.

17.0 Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, students can use the method for completing the square to put the equation into standard form and can recognize whether the graph of the equation is a circle, ellipse, parabola, or hyperbola. Students can then graph the equation.

18.0 Students use fundamental counting principles to compute combinations and permutations.

19.0 Students use combinations and permutations to compute probabilities.

20.0 Students know the binomial theorem and use it to expand binomial expressions that are raised to positive integer powers.

21.0 Students apply the method of mathematical induction to prove general statements about the positive integers.

22.0 Students find the general term and the sums of arithmetic series and of both finite and infinite geometric series.

23.0 Students derive the summation formulas for arithmetic series and for both finite and infinite geometric series.

24.0 Students solve problems involving functional concepts, such as composition, defining the inverse function and performing arithmetic operations on functions.

25.0 Students use properties from number systems to justify steps in combining and simplifying functions.

TRIGONOMETRY

1.0 Students understand the notion of angle and how to measure it, in both degrees and radians. They can convert between degrees and radians.

2.0 Students know the definition of sine and cosine as y - and x -coordinates of points on the unit circle and are familiar with the graphs of the sine and cosine functions.

3.0 Students know the identity $\cos^2(x) + \sin^2(x) = 1$:

3.1 Students prove that this identity is equivalent to the Pythagorean theorem (i.e., students can prove this identity by using the Pythagorean theorem and, conversely, they can prove the Pythagorean theorem as a consequence of this identity).

3.2 Students prove other trigonometric identities and simplify others by using the identity $\cos^2(x) + \sin^2(x) = 1$. For example, students use this identity to prove that $\sec^2(x) = \tan^2(x) + 1$.

4.0 Students graph functions of the form $f(t) = A \sin(Bt + C)$ or $f(t) = A \cos(Bt + C)$ and interpret A , B , and C in terms of amplitude, frequency, period, and phase shift.

5.0 Students know the definitions of the tangent and cotangent functions and can graph them.

6.0 Students know the definitions of the secant and cosecant functions and can graph them.

7.0 Students know that the tangent of the angle that a line makes with the x -axis is equal to the slope of the line.

8.0 Students know the definitions of the inverse trigonometric functions and can graph the functions.

9.0 Students compute, by hand, the values of the trigonometric functions and the inverse trigonometric functions at various standard points.

10.0 Students demonstrate an understanding of the addition formulas for sines and cosines and their proofs and can use those formulas to prove and/or simplify other trigonometric identities.

11.0 Students demonstrate an understanding of half-angle and double-angle formulas for sines and cosines and can use those formulas to prove and/or simplify other trigonometric identities.

12.0 Students use trigonometry to determine unknown sides or angles in right triangles.

13.0 Students know the law of sines and the law of cosines and apply those laws to solve problems.

14.0 Students determine the area of a triangle, given one angle and the two adjacent sides.

15.0 Students are familiar with polar coordinates. In particular, they can determine polar coordinates of a point given in rectangular coordinates and vice versa.

16.0 Students represent equations given in rectangular coordinates in terms of polar coordinates.

17.0 Students are familiar with complex numbers. They can represent a complex number in polar form and know how to multiply complex numbers in their polar form.

18.0 Students know DeMoivre's theorem and can give n th roots of a complex number given in polar form.

19.0 Students are adept at using trigonometry in a variety of applications and word problems.

TEXTBOOK AND MATERIALS:

Please bring the following to class every day:

- Algebra and Trigonometry by Ron Larson – replacement cost is \$80)
- sharpened pencils
- notebook paper for notes and homework
- graph paper (optional, but recommended)
- any assignments that are due
- scientific or graphing calculator TI 84 Plus (TI 89, 92, and Explorer not allowed)

HOMEWORK POLICY:

Homework is due the day after it is assigned. Homework will be graded on the basis of completion and a reasonable attempt at problems assigned. Students are responsible for attempting all problems and making the appropriate corrections when we review them the next day in class to receive full credit.

NO LATE HOMEWORK ACCEPTED

GRADING SYSTEM:

- Homework will be worth 20% of the overall grade.
- There will be a final exam worth 20% of the overall grade.
- Tests and quizzes will be worth 60% of the overall grade.
- Grading scale: A = 90-100%, B = 80-89%, C = 70-79%, D = 60-69%,
F = below 60%

CLASSROOM EXPECTATIONS

- Be prepared for class. This means being in your seat when the tardy bell rings, ready to begin immediately.
- Be respectful of others. This includes not talking while other students or the teacher are talking.
- No food or drink during class (water is allowed).
- Stay in your seat until the final bell rings.
- Cell phones must be turned off and put away at all times.

ACADEMIC INTEGRITY:

Any student involved in dishonesty on any work will be subject to one or more of the following consequences: an automatic zero on the work, suspension from class, referral to an assistant principal, or a conference between the AP, parents, and the teacher.

ATTENDANCE/TARDY POLICY:

Attendance is important and is directly related to your success. To be successful, students need to be in class and on time each day. The school tardy policy and district attendance policy will be enforced. Students who are absent will be allowed as many days as they were gone to make up assignments. If you know you must be absent the day of a test or quiz, please inform the instructor ahead of time. Students will be expected to be prepared to make up the test or quiz the day they return to school.

WEBSITE:

My website is http://staff.hartdistrict.org/dlharris/www/mathintro/math_home/mathhome.php. Information on the website includes syllabus, homework, and grades.

TEACHER COMMUNICATION:

- The best way to reach me is by email: dlharris@hartdistrict.org
- I will be available for extra help at lunch most days.

Please print and fill out this page, indicating that you have read and understand the information.

Student Name (please print): _____ Period: _____

Student Signature: _____ Date: _____

Student Email: _____

Mother's Name(s): _____

Work phone number _____ Cell number _____

Email Address: _____

Father's Name: _____

Work phone number _____ Cell number _____

Email Address: _____

Home phone: _____

Parent Signature: _____