Evergreen Valley High School

MATH ANALYSIS GREEN SHEET

(Distance Learning Edition: 2020–2021)

Teacher

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Distance Learning Math Page

Curriculum

This is a yearlong, 2 – semester, Math Analysis course based on the textbook, *Precalculus with Limits: A Graphing Approach* by Larson. The goal of this course is to prepare you to be successful as you continue your math education, whether you decide to enroll in AP Calculus or AP Statistics. You are encouraged and expected to ask questions, collaborate when appropriate, participate in classroom discussions and turn-in required assignments. This is a year we will cover Chapters 1–5 in first semester, & in the second semester we will cover Chapter 6, Chapter 9, Chapter 7, & we will finish the year with Chapter 11 on Limits (*up to 11.4*).

Schoolloop, Zoom, and my website are going to be the three main places we will be living for math until we return to school*. Schoolloop will be where the grades and assignments are posted. Zoom is how we will meet virtually, links will be given via schoolloop. And my website, you can think of it as a "home-base" for class, is where all of our resources can be found. On my website there will be links to the Unit Calendars, copies of this Green Sheet/Syllabus, pdfs of the slides we will go over in class, video clips of me explaining the "board notes," & pdfs of my notebook with the warm-ups, board notes, and class notes fully worked out.*

During the online class session, we will go over the warm-ups and any questions you have homework. We will work on the practice problems from the slide pdfs together & there will be a time to check-in with how things are going and answer any questions you have. Some of the time will be more structured learning, sometimes you will get a chance to start homework early, & some days we will use some of that time for quizzes or tests.

Materials

- **Internet access:** *access to Schoolloop, my website (see above), edmodo.com, & Zoom.*
- **Pencils** (I use a lot of color, so if you like to color code too I would recommend getting colored pens)
- Graphing notebook (for note-taking)
- **Graphing** Calculator (**HIGHLY recommend** the **TI-83** or ANY **TI-84**, *Desmos.com provides a decent free online calculator, but it cannot do everything we will use a calculator for. The school does check out graphing calculators for students who need them.* ***Disclaimer:*** *If you get the* **TI-89, TI-Inspire, or a CASIO I do NOT know how to use them** *so you will need to figure it out for yourself.*)

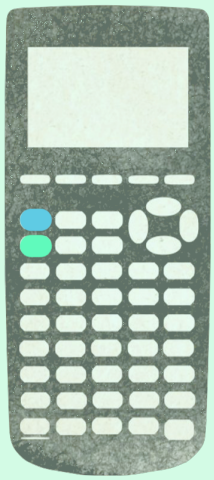
Grading Scale

Percentage	*Letter Grade*
≥ 97	A+
≥ 93	A
≥ 90	A-
≥ 87	B+
≥ 83	B
≥ 80	B-
≥ 77	C+
≥ 73	C
≥ 70	C-
≥ 67	D+
≥ 63	D
≥ 50	D-
< 50	F

Weighting by Category

45% – Homework/Classwork/Projects
25% – Quizzes
20% – Tests
10% – Final

NOTE: my Schoolloop Gradebook is already weighted



Behavioral Expectations

1. You are required to maintain an environment that is conductive to learning. Disruptive behavior will not be tolerated.
2. You are encouraged to participate through
   - Zoom meetings
   - Tutorial/Advisory Periods (*as needed*)
   - & intellectual dialogues with your teacher during lectures (asking/answering questions).
3. During Zoom sessions please be present, ask questions, take notes as needed and be respectful of everyone's time. **Log into the Zoom meeting** with your **Video ON & Mics OFF**.
4. **Attendance will be taken at the beginning of class** and again at some point during the class, just in case you come in a little late & I missed you.
   - Please mark tests/quizzes on your calendar as soon as the dates are announced to ensure you are not absent on these days. *Vision, medical, and dental appointments should not be scheduled on quiz/test days. If you must be absent because of athletics or another school related activity, you must arrange to take the quiz/test ahead of time.*
   - If you miss because of medical/family emergency, it is your responsibility to notify the teacher & make arrangements to make up the quiz/test when you get back at school. *Should you fail to do so, your grade for that assessment will be recorded as a zero*.

Assignments & Grading Practices

1. Work will still be assigned on a regular basis, and the Unit Calendar will have all of the assignments, quizzes & tests included, and they will be posted on schoolloop. Even though we will only be in class together twice a week, I will be available during the tutorial/advisory periods if you need/want extra help.
2. **Homework** is graded on completion. It must be complete & turned in/submitted on time to receive full credit. Students will lose one point for incomplete homework (missing problems) & one point if it is late. *I care that you are at least attempting each problem, if you don't fully understand it I don't want to penalize you for trying. So, I expect you to make a note of what you don't get & then we can go over it in class or during tutorial to work through the confusion*.
   - **Submitting HW**: Homework needs to be *submitted through the dropbox on Schoolloop* which will put a time-stamp on the assignment to let me know if it was turned in on time. Submitting work can be done by either (1) uploading photos or pdfs of your work to google docs, and submitting a link to the doc in the drop box (make sure it is *shareable to farrom@esuhsd.org*) or (2) directly submitting a pdf of your work into the dropbox on Schoolloop (*GeniusScan* is a good & easy FREE app for creating pdfs).
3. **Zero tolerance for cheating on all forms of tests and quizzes.** If at any time I find out that you have cheated you will (1) be made aware of the situation and receive a ZERO on the assessment, (2) your parents will be notified, & (3) as per school policy, an academic discipline referral will be made to the office about the incident.
4. If you miss a quiz or test, there will be **no make-up** quiz/test **without prior discussion** with your teacher **and** must be made-up **within a week** upon your return to class.

Tutorial/Advisory Links

- **Tuesday/Friday** @ 2:30 – 4:00pm**:** https://esuhsd.zoom.us/j/81057582271
- **Wednesday** @ 12:50 – 4:00pm**:** https://esuhsd.zoom.us/j/81925838875

Class Zoom Link & Edmodo Class Code:

- **Class Zoom Link:** _____
- **Edmodo Class Code:** _____ (for quizzes & tests)

Course-Load & Standards

First Semester will cover Chapters 1–5, which include: functions and their graphs, simplifying rational expressions, imaginary numbers, exponential and logarithmic functions, and we end the semester with our first couple chapters on trigonometry.

Unit 1 – Chapter 1: Functions and Their Graphs & Chapter 2: Polynomial and Rational Functions
& Unit 2 – Chapter 3: Exponential & Logarithmic Functions

Interpreting Functions F-IF

Interpret functions that arise in applications in terms of the context.

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*★
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function gives the number of person-hours it takes to assemble engines in a factory, then the positive integers would be an appropriate domain for the function.*★

Analyze functions using different representations.

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★
   d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.★
   e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.★

Building Functions F-BF

Build new functions from existing functions.

3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. *Include recognizing even and odd functions from their graphs and algebraic expressions for them.*
4. Find inverse functions.
   b. (+) Verify by composition that one function is the inverse of another.
   c. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.
   d. (+) Produce an invertible function from a non-invertible function by restricting the domain.

The Complex Number System N-CN

Perform arithmetic operations with complex numbers.

3. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers.

Represent complex numbers and their operations on the complex plane.

4. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number repre- sent the same number.
5. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. *For example,* $(-1 + \sqrt{3}i)^3 = 8$ *because* $(-1 + \sqrt{3}i)$ *has modulus 2 and argument 120°.*
6. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints.

Seeing Structure in Expressions A-SSE

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.★
   a. Interpret parts of an expression, such as terms, factors, and coefficients.★
   b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret* $P(1 + r)^n$ *as the product of P and a factor not depending on P.*★
2. Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$*, thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.

Creating Equations — A-CED

Create equations that describe numbers or relationships.

1. Create equations and inequalities in one variable including ones with absolute value and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.* CA★
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. ★
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.* ★
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.* ★

Arithmetic with Polynomials and Rational Expressions — A-APR

Rewrite rational expressions.

6. Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$ using inspection, long division, or, for the more complicated examples, a computer algebra system.
7. (+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a non-zero rational expression; add, subtract, multi- ply, and divide rational expressions.

Unit 3 – Chapter 4: Trigonometric Functions & Chapter 5: Analytic Trigonometry

Trigonometric Functions — F-TF

Extend the domain of trigonometric functions using the unit circle.

4. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions.

Model periodic phenomena with trigonometric functions.

6. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed.
7. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.★

Prove and apply trigonometric identities.

9. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent and use them to solve problems.
10. (+) Prove the half angle and double angle identities for sine and cosine and use them to solve problems. CA

Second semester will cover Chapters 6, 9, 7, & 11 (*up to 11.4*). These include applications of trigonometry, like using the Law of Sines and Law of Cosines to find bearings, distances, area, and angles of elevation/depression. We will cover vectors, polar functions, parametric equations, conic sections, matrices, and introduce limits.

Unit 4 – Chapter 6: Additional Topics in Trigonometry & Chapter 9: Topics in Analytic Geometry

Similarity, Right Triangles, and Trigonometry — G-SRT

Apply trigonometry to general triangles.

9. (+) Derive the formula $A = 1/2ab\sin(C)$ for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.
10. (+) Prove the Laws of Sines and Cosines and use them to solve problems.
11. (+) Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces)

Vector and Matrix Quantities — N-VM

Represent and model with vector quantities.

1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., $\boldsymbol{v}, |\boldsymbol{v}|, \|\boldsymbol{v}\|, v$).
2. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point.
3. (+) Solve problems involving velocity and other quantities that can be represented by vectors.

Perform operations on vectors.

4. (+) Add and subtract vectors.
   a. Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes.
   b. Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum.
   c. Understand vector subtraction $\boldsymbol{v} - \boldsymbol{w}$ as $\boldsymbol{v} + (-\boldsymbol{w})$, where $-\boldsymbol{w}$ is the additive inverse of $\boldsymbol{w}$, with the same magnitude as $\boldsymbol{w}$ and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise.
5. (+) Multiply a vector by a scalar.
   a. Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$.
   b. Compute the magnitude of a scalar multiple $c\boldsymbol{v}$ using $\|c\boldsymbol{v}\| = |c|\boldsymbol{v}$. Compute the direction of $c\boldsymbol{v}$ knowing that when $|c|\boldsymbol{v} \neq 0$, the direction of $c\boldsymbol{v}$ is either along $\boldsymbol{v}$ (for $c > 0$) or against $\boldsymbol{v}$ (for $c < 0$).

Expressing Geometric Properties with Equations — G-GPE

Translate between the geometric description and the equation for a conic section.

3. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant.

3.1 Given a quadratic equation of the form $ax^2 + by^2 + cx + dy + e = 0$, use the method for completing the square to put the equation into standard form; identify whether the graph of the equation is a circle, ellipse, parabola, or hyperbola and graph the equation. CA

Interpreting Functions — F-IF

Analyze functions using different representations.

10. (+) Demonstrate an understanding of functions and equations defined parametrically and graph them. CA★
11. (+) Graph polar coordinates and curves. Convert between polar and rectangular coordinate systems. CA

Unit 5 – Chapter 7: Linear Systems & Matrices

Vector and Matrix Quantities — N-VM

Perform operations on matrices and use matrices in applications.

6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network.
7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled.
8. (+) Add, subtract, and multiply matrices of appropriate dimensions.
9. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties.
10. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is non-zero if and only if the matrix has a multiplicative inverse.
11. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to pro- duce another vector. Work with matrices as transformations of vectors.
12. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area.

Reasoning with Equations and Inequalities — A-REI

Solve systems of equations.

8. (+) Represent a system of linear equations as a single matrix equation in a vector variable.
9. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater).

Unit 6 – Chapter 11: Limits (*up to 11.4*)

You have read the green sheet!
Please let me know if you have any questions.

– Ms. Farro

Please sign below to acknowledge that you will abide with the rules listed above.

Student's Name: _____ Signature: _____

Parent/Guardian's Name: _____ Signature: _____