

## Syllabus—Pre-Calculus

### Introduction/Philosophy

I am excited to work with your son/daughter this year. I believe strongly that every student can master math given the proper tools and instruction. Your student will be working with a group of peers at approximately the same level. They will work as a team to encourage and motivate each other to move down the “field of math.”

I believe strongly in teaching students how to learn and to think critically. It is important to think of math, as you would think of learning to ride a bike. When you learn a new math concept, the student will first be a little unsure. With practice, they will become confident. With mastery, they will be fluent and will not have to think of “balancing on the bike.” This is my goal...to promote fluency, confidence, and excitement about learning math.

### Class Times

Fridays 8:00-10:30

You can sign up for the class alone or sign up for the class plus homework help. Homework Help will be offered on Tuesdays from 12:30-3:00.

If you need to contact me, I will be available to parents from 3:00-4:00 on Tuesdays. You can text me or call during this time. My cell phone number is 832-562-1969.

### Materials

#### **Teacher provided:**

Binder (Notes/Hmwk/Other copies)

Yellow Folder

#### **Parents will purchase:**

Supply Fee: \$50

*Glencoe Advanced Mathematical Concepts Textbook* ISBN-13: 978-0078608612

Texas Instruments TI-84 CE Graphing Calculator

Pencil/Eraser/3 Highlighters/Spiral for extra paper (It does not matter what type)

## **Concepts Covered (Students must have passed both Algebra 2 and Geometry)**

This class is designed to help students excel in all of Pre-Calculus skills and to prepare them to excel in AP Calculus the following year. Students will continue mastering nonlinear patterns, learning to analyze triangles through trigonometry and dig into data analysis in statistics and probability.

In Pre-Calculus our focus of study is on:

1. Real and Complex Numbers, Complex Plane (Add/Subtract/Graph, Absolute Value, Midpoints, Distance)
2. Functions and the Nature of Graphs – Domain, Range, Family of Functions, Transformations (Translations, Reflections, Dilations), Describe the Function Transformation, Evaluating, Table of values, Composition of functions, Inverse Functions, Equations vs. Inequalities, Continuity and End Behavior, Critical Points, Extremes, Direct/Indirect/Joint Variation
3. Linear Functions – Slope, x and y intercepts, Graph, Find the equation, Families of Linears - Parallel/Perpendicular/Piecewise, Equ/Inequ., Word Problems, Regression
4. Systems – Review 2x2 and 3x3 and Matrices (Add/Subtract/Multiply/Properties/Solve/Inverse/Transformation Matrices), Linear Programming, Graph equ/inequ, Word Problems
5. Polynomial and Radical Functions – Domain, Range, Solve, Quadratics (max/min, roots, line of symmetry, equ/inequ, factoring/quadratic formula, discriminant), Polynomials (Divide-Long/Synthetic, Factor/Roots, Remainder/Factor/Rational Root Thms, Fundamental Thm of Algebra, Zeros, Quadratic Patterns, Given roots find polynomial, Pascal's Triangle, Binomial Thm, Partial Fractions, Word Problems, Regression, Rational Exponents
6. Rational Functions – Asymptotes, Excluded Values, Solve, Word Problems
7. Trigonometric Functions – Converting between radians and degrees, Radians and Arc Length, Quadrants, Coterminal/Reference Angles, Rt Triangle Trig – ratios, unit circle, reference angles, Inverse, Solve, Solving a Right Triangle-sides/angles, Solving Triangles-Law of Sines/Cosines, Area of a Triangle – Sine/Heron's Formula
8. Trigonometry Graphs – Linear and Angular Velocity, Graphing – Amplitude, Period, Translations, Inverse Graphs, Writing the Equation
9. Trigonometric Identities – Complementary, Symmetry and Periodicity, Verifying, Sum and Difference, Double and Half-Angle, Solving Trig, Normal Form of a Linear Equation, Distance from a Point to a line
10. Vectors (2 dimensional) – Component Form and Coordinate Form, Magnitude, Direction, Resultant Vector (Triangle Method and Parallelogram Method), Add/Subtract/Multiply, Unit Vector, Linear Combinations, Application
11. Vectors (3 dimensional) – Component Form, Magnitude, Add/Subtract/Multiply, Linear Combinations, Parametric Equations
12. Polar Coordinates and Complex Numbers – Modulus and argument of a Complex Number, Rectangular to Polar, Match Polar Equations and Graphs, Simplifying Complex Numbers, Products/Quotients/Powers/Roots
13. Conics – Circles/Ellipses/Hyperbolas/Parabolas (Properties/Equations/Graphs), Rectangular and Parametric Forms, Transformations, Systems Equ/Inequ
14. Exponential and Logarithmic Functions – Domain, Range, Convert btw, Solve, Evaluate, Change of base, Properties (Product/Quotient/Power), Solving with multiple logs, Exponential functions over unit intervals, Growth and Decay, Compound Interest
15. Sequences and Series – Arithmetic/Geometric, Infinite, Explicit/Recursive (Convert), Convergent/Divergent, Sigma Notation, nth Term, Binomial Thm, Special/Iteration/Induction, Sum/Partial Sum
16. Probability – Combinations/Permutations, 2 way frequency tables, Permutations with Repetitions and Circular Permutations, Independent Events, Compound Events, Conditional Probability, Probability Distributions (Discrete, Binomial), Central Limit Theorem
17. Statistics – Central Tendency, Variability, Outlier, Correlation Coefficients, Regression Analysis, Confidence Intervals

### **Drop Off/Class Structure**

Please try to be on time. I will start promptly at the scheduled time and all class time is needed to make sure students learn all information needed for homework completion.

Students should bring to class all materials. They will turn in yellow folder with homework in it and will take a quiz on notecards each week when they enter the class. We will then take all new notes and if time permits, go through a sampling of homework.

Participation is key to success. Strong character is incredibly important. Students are expected to respect each other and the teacher at all times. We are a team and students are expected to encourage classmates and work together.

I will try to video classes for kids who might be absent, however I can not guarantee that there might not be technical issues. So, students who are absent can get notes from another student in class, or they can read their textbook, if needed.

### **Grading System**

A 90-100

B 80-89

C 70-79

D 60-69

F 59-below

### **Grade Breakdown**

25% Homework Completion

25% Quiz

25% Midterm

25% Final

### **Parent Meeting**

There will be a mandatory meeting the first Friday of classes at 5:00pm. It is important that all attend. This will be a parent only meeting.

### **Pick-up and Homework**

It is extremely important that the students do their homework and study each week....practice is key to success! The notecards they are studying each week are the “sight words” of math. You cannot solve (read) a harder math problem (novel) without having these memorized. The homework helps their brains to learn how to problem solve. Without doing the homework, students are watching the game, but not learning how to play. They must wrestle with the process to learn it. I encourage students to have a set time and place to work math each week. They should set aside 5 hours to work homework and study each week.

Homework should be neat, organized, easy to follow with all work shown. Credit will not be given if work is not shown. Students should check that answers are accurate and should ask questions if unable to get to the correct answer.

### **Late to pick-up/Emergency**

If there is an emergency, please text me. I will either have my phone videoing class or off during teaching, but if there is a student whose mom/dad is not there, I will check my phone to see if there is a problem.

### **Missing class**

Please try not to miss class. If you will be missing class, let me know. Watch the video (if available) and take notes OR get notes from another student OR read and take notes from your textbook. Follow your scope and sequence and make sure you are ready for the quiz and that homework is completed.