Pre-Calculus

2019 - 2020
Mrs. Olson
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3 Trimesters / 1.5 credits
Prerequisites: Algebra 2

> "Unless you try to do something beyond what you have already mastered you will NEVER GROW."
> -Ronald E. Osborne

Course Overview

A student should be proficient in algebra skills to be successful in pre-calculus. This course is structured around investigations and problem solving. Students will explore concepts and develop mathematical relationships through observation, application, and both formal and informal proof. Lessons are designed to facilitate teamwork and encourage students to pose conjectures, justify solutions, and defend their thinking.

Course Outline

Below is an outline of topics along with a tentative timeline.

First Trimester:

I. Packing your Suitcase: Algebra 2 Review
   a. Function Transformation
   b. Programming and Formulas
   c. Triangles
   d. Radians
II. Area Under a Curve
   a. Piecewise Defined Functions
   b. Summation
III. Exponentials and Logarithms
   a. Transformations
   b. Inverses and Logarithms
   c. Laws of Logarithms
IV. Circular Functions
   a. Sine and Cosine
   b. Identities

2nd Trimester:

V. Limits
   a. Variation and Rational Functions
   b. Limits
VI. Extended Periodic Functions
   a. Solving Trig Equations
   b. Modeling with Periodic Functions
   c. More Complex Trig Equations
   d. Spring Problem
VII. Algebra for College Mathematics
   a. Functions
   b. Simplifying Techniques
   c. Finite Series
VIII. More Limits
   a. Limit Tools
   b. Applications of Limits

3rd Trimester:

IX. Rates of Change
   a. Average Rate of Change
   b. Instantaneous Rate of Change
   c. Slope & Area Under a Curve

X. Vectors & Parametric Equations

XI. Polar Equations & Complex Numbers

State Standards

9.2.1.1	Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain.
9.2.1.2	Distinguish between functions and other relations defined symbolically, graphically or in tabular form.
9.2.1.4	Obtain information and draw conclusions from graphs of functions and other relations.
9.2.1.6	Identify the intercepts, zeros, maxima, minima and intervals of increase and decrease from the graph of a function.
9.2.1.9	Determine how translations affect the symbolic and graphical forms of a function. Know how to use graphing technology to examine translations.
9.2.2.3	Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.
9.2.2.6	Sketch the graphs of common non-linear functions.
9.2.3.7	Justify steps in generating equivalent expression by identifying the properties used.
9.2.4.2	Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations.
9.2.4.3	Recognize that to solve certain equations, number systems need to be extended.
9.3.3.4	Apply the Pythagorean Theorem and its converse to solve problems and logically justify results.
9.3.3.5	Know and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems and logically justify results.
9.3.3.6	Know and apply properties of congruent and similar figures to solve problems and logically justify results.
9.3.4.1	Understand how the properties of similar right triangles allow the trigonometric ratios to be defined, and determine the sine, cosine and tangent of an acute angle in a right triangle.
9.3.4.2	Apply the trigonometric ratios sine, cosine and tangent to solve problems.
9.3.4.3	Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.
9.3.4.5	Know the equation for the graph of a circle with radius r and center (h, k).
9.4.1.3	Use scatterplots to analyze patterns and describe relationships between two variables.
9.4.3.1	Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
9.4.3.5	Apply probability concepts such as intersections, unions and complements of events, and conditional probabilities and independence, to calculate probabilities and solve problems.

Textbook / Resources

Precalculus with Trigonometry; College Preparatory Mathematics Curriculum

Recommended Materials:

- 3 ring binder with 4 sections (Homework, Classwork, Notes, Tests/Quizzes)
- Graph paper
- TI-83 Plus or higher graphing calculator

Homework

Although you are encouraged to work together on homework and seek the instructor's help during work time, your work must be your own. It will not help you to learn if you just copy another person's homework problems. If you are stuck on a problem ask others how they solved it, even look at their work, but then try it on your own, checking for understanding as you work through the steps. **Keep all of your homework in a separate section of a three ring binder.**

- Homework will be assigned most days
- Complete each problem assigned showing your work; justifying steps– visit website for help
  - http://cpm.org/pct
  - Choose Homework Help
  - Choose correct chapter and problem you need help with
- Ask questions about homework that you did not understand – it is preparation for exams
- **Late assignments will be awarded partial points until the day of the chapter test.**
- **Assignments will be accepted two days late for an excused absence.**
- Homework is 10% of your grade

Classwork/Participation

- Teamwork will be completed on most days and will provide you the opportunity to work with many different students through the course, this may include:
  - Working with cooperative groups to solve more complex problems
  - Presenting ideas or problems as a team on the board
- **Excused absence**: check in with Mrs. Olson as to what classwork needs to be made up. Students will receive two days to make up any excused absent work.
- **Unexcused absence will result in a zero.**
- Teamwork is 15% of your grade

Tests

- Team Tests
  - Taken in a small team setting
  - Challenging problems to preview individual test
  - Missing a team test misses the opportunity to collaborate with your peers in a strong learning environment. Team tests are excellent preparation for individual tests.
  - **Excused absence will result in the test being exempt.**
  - **Unexcused absences will result in a zero.**
- Individual Tests
  - Taken individually
  - Opportunity to show what you know
  - **Excused absence – please schedule a make-up test to take place when you return**
  - **Unexcused absences will result in a zero**
- Tests will comprise 75% of your grade.

Classroom Expectations

Students are expected to follow all school rules in the student handbook

- Be Respectful
- Be Responsible
- Be Safe
- Be Your Best
  #BE AFSA

Grading scale/criteria:

A+	100%	C+	78% - 79%
A	93% - 99%	C	73% - 77%
A-	90% - 92%	C-	70% - 72%
B+	88% - 89%	D+	68% - 69%
B	83% - 87%	D	63% - 67%
B-	80% - 82%	D-	60% - 62%
		F	59% and below

Questions: Please do not hesitate to ask questions either in or out of class. If any student needs extra help please set up a time to see me either before or after school.

I have read the entire pre-calculus syllabus and will contact Mrs. Olson with any questions or concerns I may have throughout the course.

Student Signature_____Date_____Student Name_____

Guardian Signature_____Date_____Guardian Name_____