**Course Syllabus Pre – Calculus / Math 127**

**Instructor:** Susan McCauley **Elkins High School / Marshall University**

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**Textbook:** Pre – Calculus Enhanced with Graphing Utilities, 5e, Sullivan and Sullivan

**Calculator:** A scientific calculator is required. A graphing calculator is helpful, but not required.

**Course Prerequisites:** Students must have successfully completed Algebra I, Geometry, Algebra II, and Trigonometry with a B average or higher. To register for Dual Credit Math 127, high school students in the 11th or 12th grades must meet Marshall University’s admission requirements of a cumulative GPA of 3.0 on a 4.0 scale and an ACT Math score of 19 or higher or a SAT Math score of 460 or higher.

**Cost:** Math 127 is a 5 credit hour course offered through Marshall University. Students electing to take the Dual Credit option are responsible for the cost of the Bursar Fee associated with this course. The current rate is $25 per credit hour or $125 total for this course.

**Add/Drop:** Students that meet the admission requirements of Marshall University may add Math 127 during the first week of school and may drop Math 127 by mid-term.

**Pre – Calculus Course Description:** The course objectives extend students’ knowledge of functions and equations, including higher – order functions, exponential and logarithmic functions, as well as provide preparation for calculus. Available technology is used to investigate functions and to enhance learning.

**Math 127 Marshall University Course Description:** A brief but careful review of the main techniques of algebra. Polynomial, rational, exponential, and logarithmic functions. Graphs, equations and inequalities, sequences.

**Content Standards (from the West Virginia Content Standards and Objectives):**

* Investigate and sketch the graphs of polynomials and rational functions by analyzing and using the characteristics of zeros, upper and lower bounds, y – intercepts, symmetry, asymptotes and end behavior, maximum and minimum points, and domain and range.
* Solve higher order polynomial equations utilizing techniques such as Descartes’ Rule of Signs, upper and lower bounds, and the Rational Root Theorem.
* Relate Pascal’s Triangle and the Binomial Theorem; use both to expand binomials with positive integer exponents.
* Establish and explain the inverse relationship between exponential and logarithmic functions; graph related functions and include their domain and range using interval notation.
* Compare laws of exponents to properties of logarithms; solve equations and practical problems involving exponential and logarithmic expressions, including natural and common logarithms; confirm solutions graphically and numerically.
* Solve problems involving the sum of finite and infinite sequences and series, including sigma notation.
* Use tables of values, graphs, conjectures, algebraic methods, and numerical substitution to find or estimate the limit of a function, a sequence, or a series.
* Analyze and describe the geometry of vectors, perform mathematical operations with vectors, and use vectors to solve practical problems.
* Apply parametric methods to represent motion of objects.
* Use multiple representations, such as words, graphs, tables, and equations, to solve practical problems involving logarithmic, exponential, polynomial, rational, and radical functions; explain how the representations are related to each other, as well as to the problem.
* Graph functions and conic sections using transformations.
* Analyze and describe properties of conic sections; explain the interrelationship among the properties; solve practical problems involving conic sections.
* Identify and analyze a practical application of exponential or logistic growth or decay.

**Grading: Weighting:**

**A** 90 – 100% Informal Assignments: 20%

**B** 80 – 89% Formal Assignments: 80%

**C** 70 – 79%

**D** 60 – 69%

**F** below 60%

Grades can be accessed by students and parents at the website [www.livegrades.com](http://www.livegrades.com) .

**Attendance:**

This course meets for 90 minutes per day, five days per week for one semester. Pre – Calculus / College Algebra is a fast – paced and rigorous course. Good attendance is absolutely necessary for success in this course. It is important for the student to seriously attempt all homework, review lecture notes, and preview upcoming material. Students will be provided with an outline of assignments at the beginning of each unit. When school is missed due to student absence, weather related cancellations, or school holidays when Marshall University is still in session, students should continue to adhere to the provided unit outline schedule of assignments. Students should also check their Livegrades mailbox and calendar for assignment updates and important messages regarding the course, especially during inclement weather days. Students are expected to turn in missing assignments on the day that they return to school from an absence.

**Exams:**

All school and county policies will be adhered to in regards to 9 Weeks and Semester Exams. However, it is important to note that all students taking Pre – Calculus will be required to take a comprehensive end of course exam in addition to the Semester Exam. The End of Course Exam will be weighted 20% of the final grade for Math 127 through Marshall University, and it will count as regular test grade for the grade for EHS Pre - Calculus.

**Students with Disabilities:**

Accommodations will be made for all individuals with disabilities pursuant to federal law in regard to equal educational opportunities.

**Pre – Calculus/Math 127 Course Outline**

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| Week | Topic |
| 1 | Sequences, Arithmetic Sequences, Geometric Sequences, Geometric Series |
| 2 | Mathematical Induction, Binomial Theorem, Pascal’s Triangle |
| 3 | Interval Notation, Sets, Counting Principle, Permutations, Combinations, Probability |
| 4 | Functions, Graphs of Functions, Properties of Functions |
| 5 | Library of Functions, Piece-wise Functions, Graphing with Transformations, Applications – Building Functions |
| 6 – 7 | Polynomial Functions, Real Zeros of a Polynomial Function, Complex Zeros of a Polynomial Function, Graphing Polynomial Functions |
| 8 | Rational Functions, Properties and Asymptotes of Rational Functions, Graphing Rational Functions |
| 9 | Composite Functions, One – to – One Functions, Inverse Functions |
| 10 – 11 | Exponential Functions, Logarithmic Functions, Properties of Logarithms, Solving Exponential and Logarithmic Equations, Applications of Exponential and Logarithmic Functions |
| 12 | Polar Coordinates, Polar Equations and Graphs, Complex Plane, DeMoivre’s Theorem |
| 13 | Vectors, Dot Product, Vectors in Space, Cross Product |
| 14 – 15 | Conic Sections, Circle, Parabola, Ellipse, Hyperbola, General Form of Conic |
| 16 | Plane Curves and Parametric Equations |
| 17 | Finding Limits using Tables, Graphs, and Algebra |
| 18 | Review, Final Exam |