

## A SUMMARY OF MATH 4 (Math Analysis)

- This course covers both trigonometry and Pre-Calculus concepts.
  - Approximately 95% of the concepts in a traditional Trigonometry class are covered.
  - The Analysis/Pre-Calculus concepts are similar to other text including limits, vectors, polar and parametric equations, conic sections, matrices, and series.
  - Calculus concepts are studied in more depth than traditional Analysis/Pre-Calculus courses.
- The use of mathematical models is a reoccurring theme throughout the course. The use of statistical concepts is also applied in the use of the models.
  - Unit 1 Introduces models beginning with Linear models and using a median-median line to find a line of best fit. Other models, particularly exponential, are also introduced.
  - Unit 3 and Unit 5 look extensive trigonometric models and applications.
  - Unit 6 uses statistical methods to investigate non-linear data by using regression lines. Use of logarithms to linearize data is also applied.
  - Polar coordinates are investigated between Units 8 and 9 and Unit 12's focus is on parametric equations.
- Concepts of Calculus are investigated with considerably more depth than other Pre-Calculus courses.
  - Unit 2 focus is on area under a curve. Riemann Sums are used to approximate the area under a curve. Methods include left endpoint rectangles, right endpoint rectangles, and trapezoids. Transformations of graphs including piecewise defined functions are also studied.
  - Unit 8 and 9 focus on limits and rates of change. Students look at limits to infinity and at a point, apply concepts of continuity and extend these ideas to include the definition of the derivative. The relationship between rates of change and area under a curve is also explored.
- Additional algebraic techniques that are necessary for calculus and other advanced mathematics courses are explored including rationalization, properties of logarithms, and use of substitution. Extensive understanding of functions and inverses is also developed throughout the course.
- Use of graphing/programmable calculators is extensive. Students will write several programs at different times during the course.
- Units 1-9 are the core units covering all trig concepts and key pre-calculus concepts.
- Unit 10 is designed to teach students to read a college textbook. The material used in on conic sections.
- Units 11-13 as well as Appendix A and B can be chosen from depending on the needs of individual schools. These include matrices, parametric equations, one variable statistics and series.
- Extra problems and skills review are also provided in the appendices.
- Earlier concepts are reviewed and practiced throughout the course.