**Precalculus MAT 430**

**Resource(s) used:**

**Primary: Glencoe/McGraw Hill Precalculus**

**Secondary:**

This course includes a study of angles and their trigonometric functions, trigonometry of right triangles, applications and graphs of trigonometric functions, coordinate geometry, functions and their graphs, conic sections, exponents, rational expressions, interval notation and an introduction to limits. It includes the use of the graphing calculator in the development of the topics of pre-calculus and differential calculus. District honors eligibility is required. College credit may be obtained through NCCC upon successful completion of this course.

 **Final Assessment:**  These students will be required to take a NFCSD final exam.

**Course Syllabus**

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| **Lesson** | **Topic(s)**  |
|  | **CHAPTER 0 – PREPARING FOR PRECALCULUS**  |
| **0 – 1** | Sets |
| **0 – 2** | Operations with Complex Numbers |
| **0 – 3**  | Quadratic Functions and Equations |
| **0 – 4**  | *n*th Roots and Real Exponents  |
| **0 – 5**  | Systems of Linear Equations and Inequalities |
| **0 – 6**  | Matrix Operations |
| **0 – 7**  | Probability with Permutations and Combinations |
| **0 – 8**  | Statistics  |
|  | **CHAPTER 1 – FUNCTIONS FROM A CALCULUS PERSPECTIVE** |
| **1 – 1** | Functions |
| **1 – 2** | Analyzing Graphs of Functions and Relations |
| **1 – 3**  | Continuity, End Behavior and Limits  |
| **1 – 4**  | Extrema and Average Rates of Change |
| **1 – 5**  | Parent Functions and Transformations |
| **1 – 6**  | Function Operations and Composition of Functions |
| **1 – 7**  | Inverse Relations and Functions |
|  | **CHAPTER 2 – POWER, POLYNOMIAL AND RATIONAL FUNCTIONS** |
| **2 – 1**  | Power and Radical Functions |
| **2 – 2**  | Polynomial Functions |
| **2 – 3**  | The Remainder and Factor Theorems |
| **2 – 4**  | Zeros of Polynomial Functions |
| **2 – 5**  | Rational Functions |
| **2 – 6**  | Nonlinear Inequalities |
|  | **CHAPTER 3 – EXPONENTIAL AND LOGARITHMIC FUNCTIONS** |
| **3 – 1**  | Exponential Functions |
| **3 – 2**  | Logarithmic Functions  |
| **3 – 3**  | Properties of Logarithms |
| **3 – 4**  | Exponential and Logarithmic Equations |
| **3 – 5**  | Modeling with Nonlinear Regression |
|  | **CHAPTER 4 – TRIGONOMETRIC FUNCTIONS** |
| **4 – 1**  | Right Triangle Trigonometry  |
| **4 – 2**  | Degrees and Radians  |
| **4 – 3**  | Trigonometric Functions on the Unit Circle |
| **4 – 4**  | Graphing Sine and Cosine Functions |
| **4 – 5**  | Graphing Other Trigonometric Functions |
| **4 – 6**  | Inverse Trigonometric Functions |
| **4 – 7**  | The Law of Sines and the Law of Cosines |
|  | **CHAPTER 5 – TRIGONOMETRIC IDENTITIES AND EQUATIONS** |
| **5 – 1**  | Trigonometric Identities  |
| **5 – 2**  | Verifying Trigonometric Identities  |
| **5 – 3**  | Solving Trigonometric Identities  |
| **5 – 4**  | Sum and Difference Identities  |
| **5 – 5**  | Multiple-Angle and Product-to-Sum Identities  |
|  | **CHAPTER 6 – SYSTEMS OF EQUATIONS AND MATRICES**  |
| **6 – 1**  | Multivariable Linear Systems and Row Operations |
| **6 – 2**  | Matrix Multiplication, Inverses and Determinants  |
| **6 – 3**  | Solving Linear Systems Using Inverses and Cramer’s Rule  |
| **6 – 4**  | Partial Fractions  |
| **6 – 5**  | Linear Optimization |
|  | **CHAPTER 7 – CONIC SECTIONS AND PARAMETRIC EQUATIONS** |
| **7 – 1**  | Parabolas |
| **7 – 2**  | Ellipses and Circles  |
| **7 – 3** | Hyperbolas |
| **7 – 4**  | Rotations of Conic Sections |
| **7 – 5**  | Parametric Equations |
|  | **CHAPTER 8 – VECTORS**  |
| **8 – 1**  | Introduction to Vectors  |
| **8 – 2**  | Vectors in the Coordinate Plane |
| **8 – 3**  | Dot Products and Vector Projections |
| **8 – 4**  | Vectors in Three-Dimensional Space |
| **8 – 5**  | Dot and Cross Products of Vectors in Space |
|  | **CHAPTER 9 – POLAR COORDINATES AND COMPLEX NUMBERS** |
| **9 – 1**  | Polar Coordinates  |
| **9 – 2**  | Graphs of Polar Equations |
| **9 – 3**  | Polar and Rectangular Forms of Equations |
| **9 – 4**  | Polar Forms of Conic Sections  |
| **9 – 5**  | Complex Numbers and DeMoivre’s Theorem |
|  | **CHAPTER 10 – SEQUENCES AND SERIES** |
| **10 – 1**  | Sequences, Series and Sigma Notation |
| **10 – 2**  | Arithmetic Sequences and Series |
| **10 – 3**  | Geometric Sequences and Series  |
| **10 – 4**  | Mathematical Induction |
| **10 – 5**  | The Binomial Theorem |
| **10 – 6**  | Functions as Infinite Series  |
|  | **CHAPTER 11 – INFERENTIAL STATISTICS**  |
| **11 – 1**  | Descriptive Statistics  |
| **11 – 2**  | Probability Distributions |
| **11 – 3**  | The Normal Distribution |
| **11 – 4**  | The Central Limit Theorem |
| **11 – 5**  | Confidence Intervals  |
| **11 – 6**  | Hypothesis Testing  |
| **11 – 7**  | Correlation and Linear Regression |
|  | **CHAPTER 12 – LIMITS AND DERIVATIVES**  |
| **12 – 1**  | Estimating Limits Graphically  |
| **12 – 2**  | Evaluating Limits Algebraically  |
| **12 – 3**  | Tangent Lines and Velocity  |
| **12 – 4**  | Derivatives  |
| **12 – 5**  | Area Under a Curve and Integration |
| **12 – 6**  | The Fundamental Theorem of Calculus  |