MAT1200_202338_Staging_EMBR_TEM

MAT-1200

2023 05/01/2023 to 04/30/2024 Modified 03/22/2023

Course Description

This year-long course will begin with a review of essential algebraic concepts and expand to include more advanced algebraic and trigonometric concepts needed for calculus and higher mathematics. Students will review such topics as exponents, functions, radicals, polynomials, factoring, and complex numbers. The student will then study material related to trigonometric identities, systems of equations and matrices, and graphing everything from linear and quadratic functions to vectors and polar coordinates. Concepts such as absolute value, synthetic division, and radical expressions will be coupled with real-life applications of trigonometric functions, combinations, and probability. Students will have access to engaging multimedia video lectures, notes pages for each lesson summarizing the video content, practice problems, and assessments. All video lessons include a transcript and closed captioning in English and Spanish.

Rationale

This course takes the student beyond the rigors of geometry and Algebra 2 to new uses of math principles. It is important for students to learn how basic quadratics and functions can produce more complicated mathematical operations and calculations. By exploring the uses of sines and cosines, practical applications involving vectors and matrices can be used to make math a tool for solving problems beyond simple four-operation calculations.

Course Learning Outcomes

A. The student will review basic principles of algebra including exponents, factoring and solving algebraic equations.

B. The student will practice using algebraic principles to graph and solve problems involving points on the coordinate plane.

C. The student will find the solution sets for inverse functions, explore operations with complex numbers, and use exponential models and natural exponential functions.

D. The student will further study properties of logarithms and solve exponential and logarithmic equations using a variety of methods.

E. The student will explore the attributes and equations of conic sections and use proven algebraic principles to solve and graph conic sections.

F. The student will use trigonometric functions to solve problems across the coordinate plane including sines, cosines, tangents, cotangents, secants and cosecants.

G. The student will be introduced to a variety of trig identities and apply them in solving trigonometric problems including sums, differences, double and half angle formulas.

H. The student will explore and use the law of sines and the law of cosines, vectors and complex numbers, and solve systems of linear equations.

I. The student will investigate determinants, inverses of matrices, polar coordinates, and solve problems using principles of arithmetic and geometric sequences.

J. The student will calculate probability using the fundamental counting principle, permutations and combinations.

Course Resources

See Ember's Systems Requirements for computer specifications necessary to operate this curriculum.

- Note: Embedded YouTube videos may be utilized to supplement Ember's YouTube videos are the property of the respective content creator, licensed to YouTube for distribution and user access. As a non-profit educational institution, Ember is able to use YouTube video content under the YouTube Terms of Service. For additional information on copyright, please contact the Jerry Falwell Library

Course Policies

Types of Assessments

To simplify and clearly identify which policies apply to which assessment, each assessment has been categorized into one of four categories: Lesson, Assignment, Quiz, or Test. Each applicable item on the course Modules page has been designated with an identifier chosen from among these categories. Thus, a Quiz on the American Revolution may be designated by the title, "1.2.W *Quiz*: The American Revolution."

- **Lesson:** *Any item on the Modules page designated as a "Lesson"*

These include instructional content and sometimes an assessment of that content. Typically, a Lesson will be the day-to-day work that a student completes.

- **Assignment:** *Any item on the Modules page designated as an "Assignment"*

Typical examples of Assignments include, but are not limited to, papers, book reports, projects, labs, and speeches. Assignments are usually something that the student should do his or her best work on the first time.

- **Quiz:** *Any item on the Modules page designated as a "Quiz"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Quizzes cover a smaller amount of material than Tests.

- **Test:** *Any item on the Modules page designated as a "Test"*

This usually takes the form of a traditional assessment where the student will answer questions to demonstrate knowledge of the subject. Tests cover a larger amount of material than Quizzes.

Materials Selection Policy

Ember curates educational materials that are consistent with the school's philosophy; however, the fallen human condition depicted in literature (as in Scripture itself) is not always pleasant. Valuable works sometimes have objectionable or profane elements. Good books provide four (4) recognized values.

- They build godly attitudes and character traits.
- They deepen our social and cultural awareness.
- They strengthen our use of written language.
- They provide a lifelong source of enjoyment and relaxation.

In order to instill these values in students and fulfill the stated objectives of the school, all Ember students are expected to read and study good books on a regular basis. Recognizing that materials designed for one level may not be appropriate for another, three (3) levels of criteria are applied:

- Elementary materials must contain no objectionable material,
- Objectionable elements in sixth through eighth-grade materials must be limited and must serve a specific educational purpose, and
- Objectionable content may be included in high school materials but must be outweighed by positive literary, curricular, and/or Christian values.

The curriculum department has approved required educational materials for students.

Resubmission Policy

Students are expected to submit their best work on the first submission for every Lesson, Assignment, Quiz, and Test. However, resubmissions may be permitted in the following circumstances:

- **Lesson:** Students are automatically permitted two attempts on a lesson. Students may freely resubmit for their first two attempts without the need for teacher approval.

If a student feels that he or she deserves a resubmission on a Lesson, Assignment, Quiz, or Test due to a technical issue such as a computer malfunction, the student should message his or her teacher to make the request. With Ember, the teacher may be a physical school teacher or the student's parent/guardian. The teacher can give another attempt from his or her Canvas account. For more information on how to do this, please review the Ember orientation course.

Schedule

Module 1: Prerequisites

- Week 1: Prerequisites: Basic Algebra Review
- Week 2: Prerequisites: Rational Exponents, Radicals, and Polynomials
- Week 3: Prerequisites: Factoring and Rational Expressions
- Week 4: Prerequisites: Solving Equations, Complex Numbers, and Module 1 Assessments

Module 2: Relations and Functions

- Week 5: Coordinates, Intercepts, and Circles
- Week 6: Slope and Equations of Lines
- Week 7: Functions and Graphs of Functions
- Week 8: Transformations and Combinations of Functions
- Week 9: Module 2 and Quarter 1 Assessments

Module 3: Polynomial Functions

- Week 10: Inverse and Quadratic Functions
- Week 11: Polynomial Functions
- Week 12: Zeros and The Fundamental Theorem of Algebra
- Week 13: Exponential Functions

Module 4: Exponential & Logarithmic Functions

- Week 14: Logarithmic Functions
- Week 15: Properties of Logarithms, Solving Exponential and Logarithmic Equations
- Week 16: Exponential and Logarithmic Models
- Week 17: Rational Functions and Conics
- Week 18: Module 4 and Quarter 2 Assessments

Module 5: The Trigonometric Functions

- Week 19: Angles and Their Measure and Right Triangle Trigonometry
- Week 20: Trigonometric Functions in the Coordinate Plane and Unit Circle Trigonometry
- Week 21: Graphing Sine and Cosine Functions
- Week 22: Graphing Other Trigonometric Functions and Module 5 Assessment

Module 6: More with Trigonometric Functions

- Week 23: Inverse Trigonometric Functions and Applications of Trigonometric Functions
- Week 24: Fundamental Trigonometric Identities
- Week 25: Solving Trigonometric Equations

- Week 26: Trigonometric Formulas
- Week 27: Module 6 and Quarter 3 Assessments

Module 7: Applications of Trigonometry & Systems of Equations

- Week 28: The Law of Sines and The Law of Cosines
- Week 29: Vectors and Complex Numbers
- Week 30: Solving Systems of Linear Equations
- Week 31: Matrices, Systems of Equations, and Module 7 Assessment

Module 8: Additional Topics

- Week 32: Determinants and Inverses of Matrices
- Week 33: Analytic Geometry
- Week 34: Sequences and Series, Arithmetic Sequences
- Week 35: Geometric Sequences, Induction, and Probability
- Week 36: Module 8 and Quarter 4 Assessments