

MAINE MARITIME ACADEMY

A College of Engineering, Management, Science, and Transportation

Students enrolling in Maine Maritime Academy come from approximately 30 states every year. Each bringing with them a diversity in their completion of secondary and post-secondary mathematics courses. Over the summer prior to checking in to Maine Maritime Academy we encourage all students to complete math refresher to prepare them for the STEM major they are about to enter.

Generally, all students can benefit from an Algebra Refresher to start and then increasing in difficulty to Trigonometry, Pre-calculus and Calculus. It is important to understand that you will be placed in your first mathematics course by a team of MMA Staff and Faculty. This collaborative group utilize all academic materials provide in the admissions and enrollment process to properly place you. Certain majors, such as Marine Systems Engineering, require students to start in courses such as Calculus.

We have put together this review sheet to assist you in preparing over the summer. There are several websites that are free and can provide you these topics, one regularly used by students is:

<https://www.khanacademy.org/math>

This is not requirement for your admissions, but to ensure you start your academic curriculum strong at Maine Maritime Academy.

ALGEBRA REFRESHER

1. Math – Fundamentals

Pre-Algebra

Order of Operations

Operations w/ Signed Numbers

The Real Number System

Overview of Fundamentals

Algebraic Expressions

Algebraic Expressions

Evaluating Algebraic Expressions

Overview of Polynomials

2. Algebraic Equations

Solving Linear Equations

Formula Manipulation

Solve Equations & Transform Formulas

Linear Inequalities (solve and graph)

Absolute Value Equations and Inequalities

3. Graphing Equations

Graphing Lines

Graphing Points

Graphing Linear Equations

Slope and Y-Intercept

Graphs of Equations

Parallel & Perpendicular Lines

Graphing Systems of Equations

Systems of Linear Equations

Solving Systems by Graphing

Graphs of Systems of Equations

Solving 2x2 Systems of Equations

4. Roots and Radicals

Powers and Roots of Natural Numbers

Simplifying Radicals (square & cube roots)

Addition of Radicals

MAINE MARITIME ACADEMY

A College of Engineering, Management, Science, and Transportation

5. Exponents and More
 - Exponents
 - Laws of Exponents
 - Exponents
 - Scientific Notation
 - Logarithms
 - Intro to Common Logarithms
 - Logarithms
 - Log Functions
7. Solving Real Problems
 - Learning to Translate English into
 - Algebraic Expressions
 - Symbolic Form
 - Word Problem Types
6. Operations with Polynomials
 - Identify, Add & Subtract
 - Multiply & Divide Monomials
 - Binomials Addition and Subtraction
 - Evaluate, Add and Subtract
 - Multiplying Polynomials
 - Factoring and Solving
 - Common Factors
 - Factoring Special Products
 - Factoring Trinomials
 - Learn to Solve Simple Quadratics

TRIGONOMETRY

1. Geometric Review
 - Angle terminology
 - Angles: Vocabulary
 - Angles: Type
 - Complementary & Supplementary
 - Triangles and Other Polygons
 - Classification of Triangles
 - Special Triangles
 - Similar Triangles
 - Polygons
 - Polygons: Angle Sums
 - Polygons: Finding the Perimeter
 - Heron's Formula
 - The Pythagorean Theorem
2. Angle Calculations
 - Angles
 - Angles: Degrees
 - Angles: Protractor
 - Measurement of Angles
 - Circles
 - Circumference, Arc, Areas
 - Circles, Sectors, and Segments
3. Right Angle Trigonometry
 - Intro to Vectors & vector Algebra
 - Sine Functions
 - Laws of sines
 - Cosine & Tangent Functions
 - Laws of cosines
 - Solving Right Angles
 - Word Problems with Trig
 - Graphing Trig Problems
 - Graph of $a \cdot \sin(x)$
 - Graph of $a \cdot \cos(x)$
 - Graph of $\tan(x)$
4. Any Angle Trig
 - Signs of the Trig function
 - Trig functions of any angle

MAINE MARITIME ACADEMY

A College of Engineering, Management, Science, and Transportation

TECHNICAL CALCULUS

1. Analytic Geometry
 - The Cartesian Coordinate System
 - The Slope
 - Lines
 - Curve Sketching
 - Parabolas
 - Cubics
2. Introduction to Calculus
 - Functions and Intervals
 - Limits
3. The Derivative
 - The Derivative as a Limit
 - The Power Rule
 - Instantaneous Rates of Change
 - Differentiation Formulas
 - Product Rule
 - Quotient Rule
 - Chain Rule
 - Implicit Differentiation
 - Higher Derivatives
4. Applications of the Derivative
 - Minima and Maxima
 - The First-Derivative Test
 - The Second-Derivative Test
 - Applications of Minima and Maxima
 - Optimization Problems
 - Related Rates
 - Differentials
5. The Integral
 - Antiderivatives
 - The Area Problem
 - The Integral: Definition and Notation
 - Basic Integration Formulas
 - The Fundamental Theorem of Calculus
 - Definite Integrals
 - The Constant of Integration
6. Applications of Integration
 - Area Between Curves
 - Volumes of Revolution
 - Disk Method
 - Washer Method
 - Shell Method
 - Centroids
 - Moments of Inertia
 - Work and Fluid Pressure