Algebra II | North Dakota Mathematics K–12 Standards Correlation to *Eureka Math*®

About *Eureka Math*

Created by Great Minds®, a mission-driven Public Benefit Corporation, *Eureka Math*® helps teachers deliver unparalleled math instruction that provides students with a deep understanding and fluency in math. Crafted by teachers and math scholars, the curriculum carefully sequences the mathematical progressions to maximize coherence from Prekindergarten through Precalculus—a principle tested and proven to be essential in students' mastery of math.

Teachers and students using *Eureka Math* find the trademark "Aha!" moments in *Eureka Math* to be a source of joy and inspiration, lesson after lesson, year after year.

Aligned

Great Minds offers detailed analyses that demonstrate how each grade of *Eureka Math* aligns with specific state standards. Access these free alignment studies at greatminds.org/state-studies.

Data

Schools and districts nationwide are experiencing student growth and impressive test scores after using *Eureka Math*. See their stories and data at greatminds.org/data.

Full Suite of Resources

Great Minds offers the *Eureka Math* curriculum as PDF downloads for free, noncommercial use. Access the free PDFs at greatminds.org/math/curriculum.

The teacher–writers who created the curriculum have also developed essential resources, available only from Great Minds, including the following:

- Printed material in English and Spanish
- Digital resources
- Professional development
- Classroom tools and manipulatives
- Teacher support materials
- Parent resources

Math Attributes	Aligned Components of *Eureka Math*
9–12.MA.P Learners can analyze, execute, critique, and adapt approaches and solutions when problem-solving in novel situations.	Lessons in every module engage students in math attributes. These are indicated in margin notes included with every lesson.
9–12.MA.C Learners can create connections within and across concepts, using supporting evidence to interpret how they originate, extend, and relate to other learning, ideas, and life experiences.	Lessons in every module engage students in math attributes. These are indicated in margin notes included with every lesson.
9–12.MA.R Learners can reason logically, citing evidence to critique and explain what they see, think, and conclude through exploration, generalization, and validation.	Lessons in every module engage students in math attributes. These are indicated in margin notes included with every lesson.

Number and Operations: Learners will develop a foundational understanding of the number system, operations, and computational fluency to create connections and solve problems within and across concepts.

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.NO.1 Rewrite complex expressions involving radicals and rational exponents using the properties of exponents.	Algebra II M3 Lesson 1: Integer Exponents Algebra II M3 Lesson 2: Base 10 and Scientific Notation Algebra II M3 Lesson 3: Rational Exponents Algebra II M3 Lesson 4: Properties of Exponents and Radicals
11-12.NO.2 Perform operations on complex radical expressions and simplify radicals to write equivalent expressions.	Algebra II M1 Lesson 9: Radicals and Conjugates Algebra II M3 Lesson 3: Rational Exponents Algebra II M3 Lesson 4: Properties of Exponents and Radicals
11-12.NO.3 Demonstrate that the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational.	Algebra I M4 Lesson 13: Solving Quadratic Equations by Completing the Square Algebra II M3 Lesson 16: Rational and Irrational Numbers
11-12.NO.4 Use units to understand problems and to guide the solution of multi-step problems (e.g., unit analysis). Choose and interpret units consistently in formulas. Choose and interpret the scale and the units in graphs and data displays.	Algebra I M1 Topic A: Introduction to Functions Studied This Year—Graphing Stories Algebra I M1 Lesson 25: Solving Problems in Two Ways—Rates and Algebra Algebra I M1 Lesson 28: Federal Income Tax

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.NO.5 Choose a level of accuracy or precision appropriate to limitations on measurement when reporting quantities.	Algebra I M1 Topic A: Introduction to Functions Studied This Year—Graphing Stories Algebra I M5 Lesson 6: Modeling a Context from Data Algebra I M5 Lesson 7: Modeling a Context from Data Algebra I M5 Lesson 9: Modeling a Context from a Verbal Description Algebra II M3 Lesson 9: Logarithms—How Many Digits Do You Need?
11-12.NO.6 Know there is a complex number i such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real. Understand the hierarchal relationships among subsets of the complex number system.	Algebra II M1 Lesson 37: A Surprising Boost from Geometry
11-12.NO.7 Use the definition $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.	Algebra II M1 Lesson 37: A Surprising Boost from Geometry
11-12.NO.9 Apply the Fundamental Theorem of Algebra to determine the number of zeros for polynomial functions. Find all solutions to a polynomial equation.	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring Algebra II M1 Lesson 14: Graphing Factored Polynomials Algebra II M1 Lesson 38: Complex Numbers as Solutions to Equations Algebra II M1 Lesson 39: Factoring Extended to the Complex Realm Algebra II M1 Lesson 40: Obstacles Resolved—A Surprising Result

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.NO.13 Apply the Fundamental Theorem of Algebra to find all roots of a polynomial equation and determine the nature (i.e., integer, rational, irrational, real, complex) of the roots.	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring Algebra II M1 Lesson 14: Graphing Factored Polynomials Algebra II M1 Lesson 38: Complex Numbers as Solutions to Equations Algebra II M1 Lesson 39: Factoring Extended to the Complex Realm Algebra II M1 Lesson 40: Obstacles Resolved—A Surprising Result

Algebraic Reasoning: Learners will look for, generate, and make sense of patterns, relationships, and algebraic symbols to represent mathematical models while adopting approaches and solutions in novel situations.

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.1 Rearrange multi-variable formulas to highlight a quantity of interest.	Algebra I M1 Lesson 19: Rearranging Formulas
11-12.AR.2 Use the structure of an expression (to extend to polynomial and rational expressions) to identify ways to rewrite it.	Algebra II M1 Lesson 2: The Multiplication of Polynomials Algebra II M1 Lesson 3: The Division of Polynomials Algebra II M1 Lesson 5: Putting It All Together Algebra II M1 Lesson 6: Dividing by $x - a$ and by $x + a$ Algebra II M1 Lesson 7: Mental Math Algebra II M1 Lesson 10: The Power of Algebra—Finding Pythagorean Triples Algebra II M1 Lesson 12: Overcoming Obstacles in Factoring Algebra II M1 Lesson 13: Mastering Factoring

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.2 ***continued***	Algebra II M1 Lesson 18: Overcoming a Second Obstacle in Factoring—What If There Is a Remainder? Algebra II M1 Lesson 19: The Remainder Theorem Algebra II M1 Lesson 22: Equivalent Rational Expressions Algebra II M1 Lesson 23: Comparing Rational Expressions Algebra II M1 Lesson 24: Multiplying and Dividing Rational Expressions Algebra II M1 Lesson 25: Adding and Subtracting Rational Expressions
11-12.AR.3 Interpret expressions that represent a quantity in context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity.	Algebra I M1 Lesson 26: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M1 Lesson 27: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M3 Lesson 4: Why Do Banks Pay YOU to Provide Their Services? Algebra I M3 Lesson 5: The Power of Exponential Growth Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 7: Exponential Decay Algebra I M4 Lesson 1: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 2: Multiplying and Factoring Polynomial Expressions Algebra I M4 Lesson 3: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lesson 4: Advanced Factoring Strategies for Quadratic Expressions Algebra I M4 Lesson 6: Solving Basic One-Variable Quadratic Equations Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra II M1 Lesson 1: Successive Differences in Polynomials Algebra II M1 Lesson 2: The Multiplication of Polynomials Algebra II M1 Lesson 3: The Division of Polynomials Algebra II M1 Lesson 4: Comparing Methods—Long Division, Again? Algebra II M1 Lesson 5: Putting It All Together

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.4 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a. Factor a quadratic expression to reveal the zeros of the function it defines. b. Use the properties of exponents to transform exponential expressions. c. Complete the square in a quadratic expression to produce an equivalent expression.	Algebra I M3 Lesson 23: Newton's Law of Cooling Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Lesson 11: Completing the Square Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 13: Solving Quadratic Equations by Completing the Square Algebra I M4 Lesson 15: Using the Quadratic Formula Algebra I M4 Lesson 16: Graphing Quadratic Equations from the Vertex Form, $y = a(x - h)^2 + k$ Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra II M1 Lesson 14: Graphing Factored Polynomials Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited
11-12.AR.6 Rewrite simple rational expressions in different forms. Write $a(x)/b(x)$ in the form of $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or technology for the more complicated examples.	Algebra II M1 Lesson 3: The Division of Polynomials Algebra II M1 Lesson 4: Comparing Methods—Long Division, Again? Algebra II M1 Lesson 18: Overcoming a Second Obstacle in Factoring—What If There Is a Remainder? Algebra II M1 Lesson 22: Equivalent Rational Expressions Algebra II M1 Lesson 23: Comparing Rational Expressions

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.7 Create equations and inequalities and use them to solve problems. Include equations arising from linear and quadratic equations and simple rational and exponential equations.	Algebra II M1 Lesson 23: Comparing Rational Expressions Algebra II M1 Lesson 27: Word Problems Leading to Rational Equations Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 27: Modeling with Exponential Functions
11-12.AR.8 Create equations in two or more variables to represent relationships between quantities. Graph equations on coordinate axes with proper labels and scales.	Algebra II M1 Lesson 1: Successive Differences in Polynomials Algebra II M1 Lesson 16: Modeling with Polynomials—An Introduction Algebra II M1 Lesson 17: Modeling with Polynomials—An Introduction Algebra II M1 Lesson 20: Modeling Riverbeds with Polynomials Algebra II M1 Lesson 21: Modeling Riverbeds with Polynomials Algebra II M1 Lesson 30: Linear Systems in Three Variables Algebra II M3 Lesson 22: Choosing a Model Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited
11-12.AR.9 Represent constraints by equations or inequalities and by systems of equations and/or inequalities and interpret solutions as viable or non-viable options in a modeling context.	Algebra I M1 Lesson 15: Solution Sets of Two or More Equations (or Inequalities) Joined by "And" or "Or" Algebra I M1 Lesson 20: Solution Sets to Equations with Two Variables Algebra I M1 Lesson 24: Applications of Systems of Equations and Inequalities Algebra I M1 Lesson 27: Recursive Challenge Problem—The Double and Add 5 Game Algebra I M3 Lesson 8: Why Stay with Whole Numbers? Algebra I M3 Lesson 24: Piecewise and Step Functions in Context

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.9 ***continued***	Algebra II M1 Lesson 20: Modeling Riverbeds with Polynomials Algebra II M1 Lesson 23: Comparing Rational Expressions Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited Algebra II M3 Lesson 32: Buying a House
11-12.AR.10 Derive the quadratic formula from the form $0 = ax^2 + bx + c$.	Algebra I M4 Lesson 14: Deriving the Quadratic Formula
11-12.AR.12 Solve simple rational and radical equations in one variable and identify extraneous solutions.	Algebra II M1 Lesson 26: Solving Rational Equations Algebra II M1 Lesson 27: Word Problems Leading to Rational Equations Algebra II M1 Lesson 28: A Focus on Square Roots Algebra II M1 Lesson 29: Solving Radical Equations
11-12.AR.13 Add, subtract, and multiply polynomials beyond quadratics. Understand that polynomials form a system comparable to integers, namely, they are closed under the operations of addition, subtraction, and multiplication.	Algebra II M1 Lesson 1: Successive Differences in Polynomials Algebra II M1 Lesson 2: The Multiplication of Polynomials Algebra II M1 Lesson 5: Putting It All Together
11-12.AR.14 Identify zeros of polynomial equations when suitable factorizations are available. Use the zeros to construct a rough graph of the function defined by the polynomial.	Algebra II M1 Lesson 11: The Special Role of Zero in Factoring Algebra II M1 Lesson 14: Graphing Factored Polynomials

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.15 Apply the Factor and Remainder Theorems to determine efficiently whether a linear expression is a factor of a polynomial equation. Apply the Remainder Theorem in context.	Algebra II M1 Lesson 19: The Remainder Theorem Algebra II M1 Lesson 20: Modeling Riverbeds with Polynomials
11-12.AR.16 Using graphs, technology, tables, or successive approximations, show that the solution(s) to the equation $f(x) = g(x)$ are the x-value(s) that result in the y-values of $f(x)$ and $g(x)$ being the same.	Algebra II M1 Lesson 36: Overcoming a Third Obstacle to Factoring—What If There Are No Real Number Solutions? Algebra II M3 Lesson 24: Solving Exponential Equations
11-12.AR.17 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.	Algebra II M1 Lesson 31: Systems of Equations Algebra II M1 Lesson 32: Graphing Systems of Equations

Algebraic Reasoning: Learners will look for, generate, and make sense of patterns, relationships, and algebraic symbols to represent mathematical models while adopting approaches and solutions in novel situations.

Functions: Learners will develop a foundational knowledge of functions and use them to model relationships between quantities.

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.1 Write a function that describes a relationship between two quantities. a. Combine standard function types using arithmetic operations. b. Compose functions.	Algebra II M1 Lesson 1: Successive Differences in Polynomials Algebra II M3 Lesson 5: Irrational Exponents Algebra II M3 Lesson 6: Euler's Number, e Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 22: Choosing a Model Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 27: Modeling with Exponential Functions Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited Algebra II M3 Lesson 30: Buying a Car Algebra II M3 Lesson 33: The Million Dollar Problem Precalculus and Advanced Topics M3 Lesson 16: Function Composition Precalculus and Advanced Topics M3 Lesson 17: Solving Problems by Function Composition
11-12.AR.F.2 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.	Algebra II M3 Lesson 6: Euler's Number, e Algebra II M3 Lesson 27: Modeling with Exponential Functions

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.3 Write a function defined by an expression in different but equivalent forms to reveal and explain the different properties of the function. a. Use the process of factoring and completing the square in a quadratic function to show zeros, minimum/maximum, and symmetry of the graph, and interpret these in terms of context. b. Use the properties of exponents to interpret expressions for exponential functions.	Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M4 Lesson 12: Completing the Square Algebra I M4 Lesson 15: Using the Quadratic Formula Algebra I M4 Lesson 16: Graphing Quadratic Equations from the Vertex Form, $y = a(x - h)^2 + k$ Algebra I M4 Lesson 17: Graphing Quadratic Functions from the Standard Form, $f(x) = ax^2 + bx + c$ Algebra I M4 Lesson 21: Transformations of the Quadratic Parent Function, $f(x) = x^2$ Algebra I M4 Lesson 23: Modeling with Quadratic Functions Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 27: Modeling with Exponential Functions Algebra II M3 Topic E: Geometric Series and Finance
11-12.AR.F.4 Identify the effect of transformations on the graph of a function by replacing $f(x)$ with $af(x)$, $f(bx)$, $f(x - h)$, and $f(x) + k$, for specific values of a, h, and k (both positive and negative). Find the value of a, b, h, and k given the graph of the function. Recognize even and odd functions from their graphs and equations.	Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 21: The Graph of the Natural Logarithm Function Precalculus and Advanced Topics M3 Lesson 12: End Behavior of Rational Functions Precalculus and Advanced Topics M3 Lesson 15: Transforming Rational Functions Precalculus and Advanced Topics M4 Lesson 11: Revisiting the Graphs of the Trigonometric Functions

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.6 Apply the inverse relationship between exponents and logarithms to solve problems.	Algebra II M3 Lesson 7: Bacteria and Exponential Growth Algebra II M3 Lesson 8: The "WhatPower" Function Algebra II M3 Lesson 14: Solving Logarithmic Equations Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 19: The Inverse Relationship Between Logarithmic and Exponential Functions Algebra II M3 Lesson 24: Solving Exponential Equations
11-12.AR.F.7 Compare key features of two functions each represented in a different way (algebraically, graphically, numerically, in tables, or by verbal descriptions).	Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Algebra II M3 Lesson 27: Modeling with Exponential Functions Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited Algebra II M3 Lesson 30: Buying a Car Algebra II M3 Lesson 31: Credit Cards
11-12.AR.F.8 Use tables, graphs, verbal descriptions, and equations to interpret and sketch the key features of a function modeling the relationship between two quantities.	Algebra I M3 Lesson 13: Interpreting the Graph of a Function Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 23: Newton's Law of Cooling Algebra I M4 Lesson 10: Interpreting Quadratic Functions from Graphs and Tables Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Algebra I M5 Lesson 1: Analyzing a Graph Algebra I M5 Lesson 2: Analyzing a Data Set Algebra I M5 Lesson 4: Modeling a Context from a Graph Algebra I M5 Lesson 6: Modeling a Context from Data Algebra I M5 Lesson 7: Modeling a Context from Data

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.8 ***continued***	Algebra II M1 Lesson 16: Modeling with Polynomials—An Introduction Algebra II M1 Lesson 17: Modeling with Polynomials—An Introduction Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions Algebra II M3 Lesson 21: The Graph of the Natural Logarithm Function
11-12.AR.F.9 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	Algebra I M3 Lesson 8: Why Stay with Whole Numbers? Algebra I M3 Lesson 9: Representing, Naming, and Evaluating Functions Algebra I M3 Lesson 10: Representing, Naming, and Evaluating Functions Algebra I M3 Lesson 11: The Graph of a Function Algebra I M3 Lesson 12: The Graph of the Equation $y = f(x)$ Algebra I M4 Lesson 9: Graphing Quadratic Functions from Factored Form, $f(x) = a(x - m)(x - n)$ Algebra I M5 Lesson 1: Analyzing a Graph Algebra I M5 Lesson 4: Modeling a Context from a Graph Algebra II M1 Lesson 16: Modeling with Polynomials—An Introduction Algebra II M1 Lesson 17: Modeling with Polynomials—An Introduction Algebra II M3 Lesson 17: Graphing the Logarithm Function

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.10 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph square root, cube root, piecewise-defined, step, and absolute value functions. b. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior. c. Graph exponential and logarithmic functions, showing intercepts and end behavior. d. Graph $f(x) = \sin x$ and $f(x) = \cos x$ as representations of periodic phenomena.	Algebra I M3 Lesson 15: Piecewise Functions Algebra I M3 Lesson 24: Piecewise and Step Functions in Context Algebra I M4 Lesson 18: Graphing Cubic, Square Root, and Cube Root Functions Algebra I M4 Lesson 19: Translating Graphs of Functions Algebra I M4 Lesson 20: Stretching and Shrinking Graphs of Functions Algebra I M4 Lesson 22: Comparing Quadratic, Square Root, and Cube Root Functions Represented in Different Ways Algebra II M1 Lesson 15: Structure in Graphs of Polynomial Functions Algebra II M1 Lesson 16: Modeling with Polynomials—An Introduction Algebra II M2 Lesson 8: Graphing the Sine and Cosine Functions Algebra II M2 Lesson 11: Transforming the Graph of the Sine Function Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M3 Lesson 18: Graphs of Exponential Functions and Logarithmic Functions Algebra II M3 Lesson 20: Transformations of the Graphs of Logarithmic and Exponential Functions

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.11 Analyze and graph functions expressed symbolically (by hand in simple cases and using technology for more complicated cases), identifying key features of the graph. a. Graph rational functions, identifying domain, range, asymptote(s), removable and non-removable discontinuities, intercepts, behavior at the asymptote(s), and end behavior. b. Graph trigonometric functions, showing period, midline, phase shift, and amplitude.	Algebra II M2 Lesson 8: Graphing the Sine and Cosine Functions Algebra II M2 Lesson 11: Transforming the Graph of the Sine Function Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M2 Lesson 14: Graphing the Tangent Function Precalculus and Advanced Topics M3 Lesson 12: End Behavior of Rational Functions Precalculus and Advanced Topics M3 Lesson 13: Horizontal and Vertical Asymptotes of Graphs of Rational Functions Precalculus and Advanced Topics M3 Lesson 14: Graphing Rational Functions Precalculus and Advanced Topics M3 Lesson 15: Transforming Rational Functions Precalculus and Advanced Topics M4 Lesson 11: Revisiting the Graphs of the Trigonometric Functions
11-12.AR.F.12 Compare the end behavior of linear, quadratic, and exponential functions using graphs and/or tables to show that a quantity increasing exponentially eventually exceeds a quantity increasing as a linear or quadratic function.	Algebra I M3 Lesson 5: The Power of Exponential Growth Algebra I M3 Lesson 6: Exponential Growth—U.S. Population and World Population Algebra I M3 Lesson 14: Linear and Exponential Models—Comparing Growth Rates Algebra I M3 Lesson 21: Comparing Linear and Exponential Models Again
11-12.AR.F.13 Determine whether a linear, quadratic, polynomial, exponential, logarithmic, or trigonometric model fits a situation. Determine an appropriate mathematical model in context (with or without technology).	Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets Algebra II M3 Lesson 22: Choosing a Model Algebra II M3 Lesson 23: Bean Counting Algebra II M3 Lesson 27: Modeling with Exponential Functions

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.14 Write arithmetic and geometric sequences both recursively and with an explicit formula and convert between the two forms. Use sequences to model situations.	Algebra II M3 Lesson 25: Geometric Sequences and Exponential Growth and Decay Algebra II M3 Lesson 26: Percent Rate of Change Algebra II M3 Lesson 29: The Mathematics Behind a Structured Savings Plan
11-12.AR.F.15 Use properties of logarithms to express the solution to $ab^{ct} = d$ where a, c, and d are real numbers and b is a positive real number. Evaluate the logarithm using technology when appropriate.	Algebra II M3 Lesson 8: The "WhatPower" Function Algebra II M3 Lesson 10: Building Logarithmic Tables Algebra II M3 Lesson 11: The Most Important Property of Logarithms Algebra II M3 Lesson 12: Properties of Logarithms Algebra II M3 Lesson 13: Changing the Base Algebra II M3 Lesson 14: Solving Logarithmic Equations Algebra II M3 Lesson 15: Why Were Logarithms Developed? Algebra II M3 Lesson 19: The Inverse Relationship Between Logarithmic and Exponential Functions Algebra II M3 Lesson 24: Solving Exponential Equations Algebra II M3 Lesson 27: Modeling with Exponential Functions Algebra II M3 Lesson 28: Newton's Law of Cooling, Revisited
11-12.AR.F.16 Extend right triangle trigonometry and apply knowledge of the unit circle to determine values of sine, cosine, and tangent for multiples of $\frac{\pi}{3}$, $\frac{\pi}{4}$, and $\frac{\pi}{6}$.	Algebra II M2 Lesson 4: From Circle-ometry to Trigonometry Algebra II M2 Lesson 5: Extending the Domain of Sine and Cosine to All Real Numbers Algebra II M2 Lesson 6: Why Call It Tangent? Algebra II M2 Lesson 10: Basic Trigonometric Identities from Graphs

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.AR.F.17 Use the Pythagorean Identity $\sin^2(\theta) + \cos^2(\theta) = 1$ to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.	Algebra II M2 Lesson 15: What Is a Trigonometric Identity? Algebra II M2 Lesson 16: Proving Trigonometric Identities
11-12.AR.F.18 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.	Algebra II M2 Lesson 1: Ferris Wheels—Tracking the Height of a Passenger Car Algebra II M2 Lesson 2: The Height and Co-Height Functions of a Ferris Wheel Algebra II M2 Lesson 3: The Motion of the Moon, Sun, and Stars—Motivating Mathematics Algebra II M2 Lesson 4: From Circle-ometry to Trigonometry Algebra II M2 Lesson 5: Extending the Domain of Sine and Cosine to All Real Numbers Algebra II M2 Lesson 7: Secant and the Co-Functions
11-12.AR.F.19 Use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number.	Algebra II M2 Lesson 4: From Circle-ometry to Trigonometry Algebra II M2 Lesson 5: Extending the Domain of Sine and Cosine to All Real Numbers Algebra II M2 Lesson 6: Why Call It Tangent? Algebra II M2 Lesson 10: Basic Trigonometric Identities from Graphs
11-12. AR.F.21 Create a trigonometric function to model periodic phenomena.	Algebra II M2 Lesson 11: Transforming the Graph of the Sine Function Algebra II M2 Lesson 12: Ferris Wheels—Using Trigonometric Functions to Model Cyclical Behavior Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets Algebra II M2 Lesson 14: Graphing the Tangent Function
11-12. AR.F.24 Know and apply the addition and subtraction formulas for sine, cosine, and tangent to solve problems.	Algebra II M2 Lesson 17: Trigonometric Identity Proofs

Geometry and Measurement: Learners will use visualization, spatial reasoning, geometric modeling, and measurement to investigate the characteristics of figures, perform transformations, and construct logical arguments.

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.GM.1 Write the equation of a conic section given its special features. Convert between the standard form and general form equations of conic sections.	Geometry M5 Lesson 17: Writing the Equation for a Circle Geometry M5 Lesson 18: Recognizing Equations of Circles Algebra II M1 Lesson 33: The Definition of a Parabola Algebra II M1 Lesson 34: Are All Parabolas Congruent? Algebra II M1 Lesson 35: Are All Parabolas Similar? Precalculus and Advanced Topics M3 Lesson 6: Curves in the Complex Plane Precalculus and Advanced Topics M3 Lesson 7: Curves from Geometry Precalculus and Advanced Topics M3 Lesson 8: Curves from Geometry
11-12.GM.2 Identify key features of a conic section given its equation. Apply properties of conic sections in context.	Geometry M5 Lesson 17: Writing the Equation for a Circle Geometry M5 Lesson 18: Recognizing Equations of Circles Algebra II M1 Lesson 33: The Definition of a Parabola Algebra II M1 Lesson 34: Are All Parabolas Congruent? Algebra II M1 Lesson 35: Are All Parabolas Similar? Precalculus and Advanced Topics M3 Lesson 6: Curves in the Complex Plane Precalculus and Advanced Topics M3 Lesson 7: Curves from Geometry Precalculus and Advanced Topics M3 Lesson 8: Curves from Geometry *Supplemental material is necessary to address applying properties of conic sections in context.*

Data, Probability, and Statistics: Learners will ask and answer questions by collecting, organizing, and displaying relevant data, drawing inferences and conclusions, making predictions, and understanding and applying basic concepts of probability.

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.DPS.1 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).	Algebra I M2 Lesson 2: Describing the Center of a Distribution Algebra I M2 Lesson 3: Estimating Centers and Interpreting the Mean as a Balance Point Algebra I M2 Topic B: Describing Variability and Comparing Distributions Algebra II M4 Lesson 8: Distributions—Center, Shape, and Spread
11-12.DPS.2 Use the mean and standard deviation of a data set to fit it to a normal distribution and estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate.	Algebra II M4 Topic B: Modeling Data Distributions
11-12.DPS.3 Evaluate reports based on data. a. Identify and explain misleading use of data, recognize when claims based on data confuse correlation and causation. b. Recognize and describe how graphs and data can be distorted to support different points of view.	Algebra II M4 Lesson 22: Evaluating Reports Based on Data from a Sample Algebra II M4 Lesson 25: Ruling Out Chance Algebra II M4 Lesson 26: Ruling Out Chance Algebra II M4 Lesson 27: Ruling Out Chance Algebra II M4 Lesson 28: Drawing a Conclusion from an Experiment Algebra II M4 Lesson 29: Drawing a Conclusion from an Experiment Algebra II M4 Lesson 30: Evaluating Reports Based on Data from an Experiment

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.DPS.4 Represent data on a scatter plot for two quantitative variables and describe how the variables are related. a. Fit a function to the data (with or without technology) and interpret the special features (e.g., meaning of a and b in the exponential function $y = ab^x$) of the function in context. b. Use functions fitted to data to solve problems in the context of the data.	Algebra I M2 Topic D: Numerical Data on Two Variables Algebra I M5 Lesson 7: Modeling a Context from Data Algebra II M1 Lesson 20: Modeling Riverbeds with Polynomials Algebra II M1 Lesson 21: Modeling Riverbeds with Polynomials Algebra II M2 Lesson 13: Tides, Sound Waves, and Stock Markets
11-12.DPS.5 Informally assess the fit of a function by plotting and analyzing residuals.	Algebra I M2 Lesson 14: Modeling Relationships with a Line Algebra I M2 Lesson 15: Interpreting Residuals from a Line Algebra I M2 Lesson 16: More on Modeling Relationships with a Line Algebra I M2 Lesson 17: Analyzing Residuals Algebra I M2 Lesson 18: Analyzing Residuals

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.DPS.6 Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.	Algebra II M4 Lesson 14: Sampling Variability in the Sample Proportion Algebra II M4 Lesson 15: Sampling Variability in the Sample Proportion Algebra II M4 Lesson 16: Margin of Error When Estimating a Population Proportion Algebra II M4 Lesson 17: Margin of Error When Estimating a Population Proportion Algebra II M4 Lesson 18: Sampling Variability in the Sample Mean Algebra II M4 Lesson 19: Sampling Variability in the Sample Mean Algebra II M4 Lesson 20: Margin of Error When Estimating a Population Mean Algebra II M4 Lesson 21: Margin of Error When Estimating a Population Mean
11-12.DPS.7 Understand the process of making inferences about population parameters based on a random sample from that population.	Algebra II M4 Lesson 13: Using Sample Data to Estimate a Population Characteristic Algebra II M4 Lesson 14: Sampling Variability in the Sample Proportion Algebra II M4 Lesson 15: Sampling Variability in the Sample Proportion Algebra II M4 Lesson 16: Margin of Error When Estimating a Population Proportion Algebra II M4 Lesson 17: Margin of Error When Estimating a Population Proportion Algebra II M4 Lesson 18: Sampling Variability in the Sample Mean Algebra II M4 Lesson 19: Sampling Variability in the Sample Mean Algebra II M4 Lesson 20: Margin of Error When Estimating a Population Mean Algebra II M4 Lesson 21: Margin of Error When Estimating a Population Mean
11-12.DPS.8 Decide if a specified model is consistent with results from a given data-generating process (e.g., using simulation).	Algebra II M4 Lesson 1: Chance Experiments, Sample Spaces, and Events

North Dakota Mathematics K–12 Standards	Aligned Components of *Eureka Math*
11-12.DPS.9 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.	Algebra II M4 Lesson 12: Types of Statistical Studies Algebra II M4 Lesson 23: Experiments and the Role of Random Assignment Algebra II M4 Lesson 24: Differences Due to Random Assignment Alone Algebra II M4 Lesson 25: Ruling Out Chance Algebra II M4 Lesson 26: Ruling Out Chance Algebra II M4 Lesson 27: Ruling Out Chance Algebra II M4 Lesson 28: Drawing a Conclusion from an Experiment Algebra II M4 Lesson 29: Drawing a Conclusion from an Experiment