

Tennessee Tutorials are designed specifically for the Tennessee Academic Standards to prepare students for the Tennessee Comprehensive Assessment Program (TCAP) and the TNReady assessments.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

Unit 1: Literal Equations and Geometric Sequences

• LITERAL EQUATIONS

- M3.A.CED.A.1: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations and inequalities in one variable and use them to solve problems.
- M3.A.CED.A.3: Algebra Creating Equations Create equations that describe numbers or relationships. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

• SUMS OF GEOMETRIC SEQUENCES

- M3.A.SSE.B.3: Algebra Seeing Structure in Expressions Write expressions in equivalent forms to solve problems. Recognize a finite geometric series (when the common ratio is not 1), and know and use the sum formula to solve problems in context.

Unit 2: Exponential Equations and Functions

• EXPONENTIAL FUNCTIONS

- M3.A.SSE.B.2.a: Algebra Seeing Structure in Expressions Write expressions in equivalent forms to solve problems. Choose and produce an equivalent form of an expression to reveal and

explain properties of the quantity represented by the expression. Use the properties of exponents to rewrite expressions for exponential functions.

- M3.F.IF.A.2: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. 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.
- M3.F.LE.A.1: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.A.CED.A.1: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations and inequalities in one variable and use them to solve problems.
- **SOLVING EXPONENTIAL EQUATIONS**
 - M3.A.SSE.B.2.a: Algebra Seeing Structure in Expressions Write expressions in equivalent forms to solve problems. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Use the properties of exponents to rewrite expressions for exponential functions.
 - M3.F.LE.A.2: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.
 - M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
 - M3.F.IF.B.3.d: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph exponential and logarithmic functions, showing intercepts and end behavior.
- **EXPONENTIAL GROWTH AND DECAY**
 - M3.F.LE.A.1: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- M3.N.Q.A.1: Number and Quantity Quantities Reason quantitatively and use units to solve problems. Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.

Unit 3: Logarithmic Functions and Expressions

• LOGARITHMIC FUNCTIONS

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.BF.A.2.a: Functions Building Functions Build new functions from existing functions. Find inverse functions. Find the inverse of a function when the given function is one-to-one.
- M3.F.LE.A.2: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to ab to the ct power = d where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.
- M3.N.Q.A.1: Number and Quantity Quantities Reason quantitatively and use units to solve problems. Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.
- M3.F.IF.B.3.d: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph exponential and logarithmic functions, showing intercepts and end behavior.

• EVALUATING LOGARITHMIC EXPRESSIONS

- M3.F.LE.A.2: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to ab to the ct power = d where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

• SOLVING LOGARITHMIC EQUATIONS

- M3.F.BF.A.2.a: Functions Building Functions Build new functions from existing functions. Find inverse functions. Find the inverse of a function when the given function is one-to-one.
- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.LE.A.2: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to ab to the ct power = d where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

- M3.A.REI.A.1: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- M3.F.LE.A.2: Functions Linear, Quadratic, and Exponential Models Construct and compare linear, quadratic, and exponential models and solve problems. For exponential models, express as a logarithm the solution to ab to the ct power = d where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

Unit 4: Factoring Polynomials and the Factor Theorem

• FACTORING CUBIC POLYNOMIALS

- M3.A.SSE.A.1: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it.
- M3.A.APR.B.3: Algebra Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems. Know and use polynomial identities to describe numerical relationships.
- M3.A.APR.A.2: Algebra Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

• FACTORING HIGHER-ORDER POLYNOMIALS

- M3.A.SSE.A.1: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it.
- M3.A.APR.A.2: Algebra Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
- M3.A.APR.B.3: Algebra Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems. Know and use polynomial identities to describe numerical relationships.

• FACTOR THEOREM AND REMAINDER THEOREM

- M3.A.APR.A.1: Algebra Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. Know and apply the Remainder Theorem: For a polynomial $p(x)$ and a number a , the remainder on division by $x - a$ is $p(a)$, so $p(a) = 0$ if and only if $(x - a)$ is a factor of $p(x)$.
- M3.A.APR.C.4: Algebra Arithmetic with Polynomials and Rational Expressions Rewrite rational expressions. Rewrite rational expressions in different forms.

Unit 5: Polynomial Functions

- **GRAPHS OF POLYNOMIAL FUNCTIONS**

- M3.A.APR.A.2: Algebra Arithmetic with Polynomials and Rational Expressions Understand the relationship between zeros and factors of polynomials. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.BF.A.1: Functions Building Functions Build new functions from existing functions. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- M3.F.IF.B.3.c: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.IF.B.4: Functions Interpreting Functions Analyze functions using different representations. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
- M3.A.CED.A.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.

Unit 6: Polynomial Identities

- **POLYNOMIAL IDENTITIES**

- M3.A.APR.B.3: Algebra Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems. Know and use polynomial identities to describe numerical relationships.
- M3.A.SSE.A.1: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it.

- **POLYNOMIAL IDENTITIES AND COMPLEX NUMBERS**

- M3.A.SSE.A.1: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it.

- M3.A.APR.B.3: Algebra Arithmetic with Polynomials and Rational Expressions Use polynomial identities to solve problems. Know and use polynomial identities to describe numerical relationships.

Unit 7: Square Root Functions and Equations

• ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS

- M3.F.BF.A.1: Functions Building Functions Build new functions from existing functions. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- M3.F.IF.B.3.b: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- M3.F.BF.A.2.a: Functions Building Functions Build new functions from existing functions. Find inverse functions. Find the inverse of a function when the given function is one-to-one.

• SOLVING SQUARE ROOT EQUATIONS

- M3.A.REI.A.2: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.
- M3.A.REI.A.1: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Unit 8: Rational Expressions and Equations

• OPERATIONS WITH RATIONAL EXPRESSIONS

- M3.A.SSE.A.1: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to rewrite it.
- M3.A.APR.C.4: Algebra Arithmetic with Polynomials and Rational Expressions Rewrite rational expressions. Rewrite rational expressions in different forms.

• SOLVING RATIONAL EQUATIONS

- M3.A.REI.A.1: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Explain each step in solving an equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
- M3.N.Q.A.1: Number and Quantity Quantities Reason quantitatively and use units to solve problems. Identify, interpret, and justify appropriate quantities for the purpose of descriptive

modeling.

- M3.A.REI.A.2: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.

Unit 9: Rational Functions

• ANALYZING GRAPHS OF RATIONAL FUNCTIONS

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.A.CED.A.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.

• MODELING SITUATIONS WITH RATIONAL FUNCTIONS

- M3.A.REI.A.2: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Solve rational and radical equations in one variable, and identify extraneous solutions when they exist.
- M3.A.CED.A.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.

Unit 10: Trigonometry

• RADIANS AND THE UNIT CIRCLE

- M3.F.TF.A.1.a: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. Understand and use radian measure of an angle. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.
- M3.F.TF.A.2: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. 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.
- M3.F.TF.A.1.b: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. Understand and use radian measure of an angle. Use the unit circle to find \sin , \cos , and \tan when θ is a commonly recognized angle between 0 and 2π .
- M3.F.TF.B.3.a: Functions Trigonometric Functions Prove and apply trigonometric identities. Use trigonometric identities to find values of trig functions. Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of \sin , \cos , and \tan to evaluate the trigonometric functions.

• TRIGONOMETRIC FUNCTIONS

- M3.F.TF.A.2: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. 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.
- M3.F.TF.B.3.a: Functions Trigonometric Functions Prove and apply trigonometric identities. Use trigonometric identities to find values of trig functions. Given a point on a circle centered at the origin, recognize and use the right triangle ratio definitions of \sin , \cos , and \tan to evaluate the trigonometric functions.
- M3.F.TF.B.3.b: Functions Trigonometric Functions Prove and apply trigonometric identities. Use trigonometric identities to find values of trig functions. Given the quadrant of the angle, use the identity $\sin^2 + \cos^2 = 1$ to find \sin given \cos , or vice versa.

Unit 11: Functions

• INVERSE FUNCTIONS

- M3.F.BF.A.2.a: Functions Building Functions Build new functions from existing functions. Find inverse functions. Find the inverse of a function when the given function is one-to-one.

• SYSTEMS OF NONLINEAR EQUATIONS

- M3.A.REI.B.3: Algebra Reasoning with Equations and Inequalities Represent and solve equations graphically. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology.

Unit 12: Parent Functions and Transformations

• PARENT FUNCTIONS

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.IF.B.3.b: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- M3.F.BF.A.1: Functions Building Functions Build new functions from existing functions. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- M3.F.IF.B.3.c: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.

- M3.F.IF.B.3.a: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- M3.F.IF.B.3.d: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph exponential and logarithmic functions, showing intercepts and end behavior.

• TRANSFORMATIONS OF PARENT FUNCTIONS

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- M3.F.IF.B.3.b: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- M3.F.BF.A.1: Functions Building Functions Build new functions from existing functions. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- M3.F.IF.B.3.a: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- M3.F.IF.B.3.c: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.
- M3.F.IF.B.3.d: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph exponential and logarithmic functions, showing intercepts and end behavior.

• MULTIPLE TRANSFORMATIONS OF PARENT FUNCTIONS

- M3.F.IF.A.1: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.

- M3.F.IF.B.3.b: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
- M3.F.BF.A.1: Functions Building Functions Build new functions from existing functions. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology.
- M3.F.IF.B.3.a: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph linear and quadratic functions and show intercepts, maxima, and minima.
- M3.F.IF.B.3.c: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph polynomial functions, identifying zeros when suitable factorizations are available and showing end behavior.
- M3.F.IF.B.3.d: Functions Interpreting Functions Analyze functions using different representations. Graph functions expressed symbolically and show key features of the graph, by hand and using technology. Graph exponential and logarithmic functions, showing intercepts and end behavior.

Unit 13: Circle Basics

- **CIRCLE BASICS**

- M3.G.C.A.2: Geometry Circles Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii, and chords.
- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.

- **CONGRUENT AND SIMILAR CIRCLES**

- M3.G.C.A.1: Geometry Circles Understand and apply theorems about circles. Recognize that all circles are similar.

- **CENTRAL ANGLES, INSCRIBED ANGLES, AND CHORDS**

- M3.G.C.A.2: Geometry Circles Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii, and chords.
- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.

Unit 14: Circle Properties

- **SECANTS, ANGLES, AND INTERCEPTED ARCS**

- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.
- M3.G.C.A.2: Geometry Circles Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii, and chords.
- **TANGENTS, ANGLES, AND INTERCEPTED ARCS**
- M3.G.C.A.2: Geometry Circles Understand and apply theorems about circles. Identify and describe relationships among inscribed angles, radii, and chords.
- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.
- **AREA OF CIRCLES AND SECTORS**
- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.
- M3.G.MG.A.2: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Apply geometric methods to solve real-world problems.
- M3.G.C.B.4: Geometry Circles Find areas of sectors of circles. Find the area of a sector of a circle in a real-world context.

Unit 15: Geometry

- **CONSTRUCTIONS**
- M3.G.CO.A.1: Geometry Congruence Make geometric constructions. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
- **TRIANGLE BISECTORS**
- M3.G.C.A.3: Geometry Circles Understand and apply theorems about circles. Construct the incenter and circumcenter of a triangle and use their properties to solve problems in context.
- M3.G.CO.A.1: Geometry Congruence Make geometric constructions. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).

Unit 16: The Coordinate Plane 1

- **PARALLEL AND PERPENDICULAR LINES**
- M3.G.GPE.B.3: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems.
- **LENGTH AND THE DISTANCE FORMULA**
- M3.G.GPE.B.4: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

- M3.G.GPE.B.5: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles.
- M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.
- **MIDPOINT FORMULA ON THE COORDINATE PLANE**
 - M3.G.GPE.B.4: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.
 - M3.G.MG.A.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Use geometric shapes, their measures, and their properties to describe objects.
 - M3.G.GPE.B.5: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles.

Unit 17: The Coordinate Plane 2

- **CONJECTURES IN COORDINATE GEOMETRY**
 - M3.G.GPE.B.2: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Use coordinates to prove simple geometric theorems algebraically.
- **AREA ON THE COORDINATE PLANE**
 - M3.G.GPE.B.5: Geometry Expressing Geometric Properties with Equations Use coordinates to prove simple geometric theorems algebraically. Know and use coordinates to compute perimeters of polygons and areas of triangles and rectangles.
- **CIRCLES**
 - M3.G.GPE.A.1: Geometry Expressing Geometric Properties with Equations Translate between the geometric description and the equation for a circle. Know and write the equation of a circle of given center and radius using the Pythagorean Theorem.

Unit 18: Statistics

- **ANALYZING STATISTICAL SAMPLES**
 - M3.S.IC.A.1: Statistics and Probability Making Inferences and Justifying Conclusions Understand and evaluate random processes underlying statistical experiments. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
 - M3.S.IC.A.2: Statistics and Probability Making Inferences and Justifying Conclusions Understand and evaluate random processes underlying statistical experiments. Decide if a specified model is consistent with results from a given data-generating process (e.g., using simulation).

- M3.S.IC.B.4: Statistics and Probability Making Inferences and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context.
- **EXPERIMENTAL AND OBSERVATIONAL DESIGN**
- M3.S.IC.B.3: Statistics and Probability Making Inferences and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
- **NORMAL DISTRIBUTION**
- M3.S.ID.A.1: Statistics and Probability Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on a single count or measurement variable. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages using the Empirical Rule.
- M3.S.IC.B.4: Statistics and Probability Making Inferences and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use data from a sample survey to estimate a population mean or proportion; use a given margin of error to solve a problem in context.

Unit 19: Scatterplots and Regression

- **SCATTERPLOTS**
- M3.S.ID.B.2.a: Statistics and Probability Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.
- M3.S.ID.B.2.b: Statistics and Probability Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a linear function for a scatter plot that suggests a linear association.
- M3.F.IF.A.2: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. 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.
- **SCATTERPLOTS AND MODELING**
- M3.S.ID.B.2.a: Statistics and Probability Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context.

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- M3.S.ID.B.2.b: Statistics and Probability Interpreting Categorical and Quantitative Data Summarize, represent, and interpret data on two categorical and quantitative variables. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Fit a linear function for a scatter plot that suggests a linear association.
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