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.

1. EXPRESSIONS AND EQUATIONS 1

- **FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS**
  - **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*

- **AXIOMS OF EQUALITY**
  - **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **M2.A.REI.A.1** *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.*

2. EXPRESSIONS AND EQUATIONS 2

- **ONE-STEP EQUATIONS AND INEQUALITIES**
  - **M2.A.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **M2.A.REI.A.1** *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.*
  - **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

- **MULTI-STEP EQUATIONS AND INEQUALITIES**
  - **M2.A.REI.A.1** *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.*
  - **M2.A.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*

- **LITERAL EQUATIONS**
  - **M2.A.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*

- **M2.A.CED.A.3** *Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.*

3. FUNCTIONS

- **FUNCTIONS AND RELATIONS**
  - **M2.F.IF.A.1** *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.*
  - **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*

- **DOMAIN AND RANGE**
  - **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - **M2.F.IF.A.1** *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.*
  - **M2.F.IF.B.6** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
  - **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*

4. GEOMETRIC TRANSFORMATIONS

- **TRANSFORMATIONS ON THE COORDINATE PLANE**
  - **M2.G.SRT.A.2** *Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*
  - **M2.G.SRT.A.1** *Verify informally the properties of dilations given by a center and a scale factor.*

- **DILATIONS, TRANSLATIONS, ROTATIONS, AND REFLECTIONS**
  - **M2.G.SRT.A.2** *Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*
  - **M2.G.SRT.A.1** *Verify informally the properties of dilations given by a center and a scale factor.*

5. TRIANGLES AND CONGRUENCE

- **TRIANGLES AND CONGRUENCE TRANSFORMATIONS**
  - **M2.G.SRT.B.5** *Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.*

- **TRIANGLE BISECTORS**
  - **M2.G.SRT.B.4** *Prove theorems about similar triangles.*
  - **M2.G.SRT.B.5** *Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.*

6. SIMILARITY

- **TRIANGLES AND SIMILARITY TRANSFORMATIONS**
  - **M2.G.SRT.A.2** *Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*
  - **M2.G.SRT.B.4** *Prove theorems about similar triangles.*

- **M2.G.SRT.B.5** *Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.*
- **M2.G.SRT.A.3** *Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.*

- **SIMILARITY OF OTHER POLYGONS**
  - **M2.G.SRT.A.2** *Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.*

7. RIGHT TRIANGLES AND TRIGONOMETRIC RATIOS

- **THE PYTHAGOREAN THEOREM**
  - **M2.G.SRT.C.8.a** *Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*
  - **M2.G.SRT.B.4** *Prove theorems about similar triangles.*
  - **M2.G.SRT.B.5** *Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.*

- **TRIGONOMETRIC RATIOS**
  - **M2.G.SRT.C.6** *Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.*
  - **M2.G.SRT.C.8.a** *Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*
  - **M2.G.SRT.C.7** *Explain and use the relationship between the sine and cosine of complementary angles.*
  - **M2.G.SRT.B.5** *Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.*

8. TRIGONOMETRY

- **RADIANS AND THE UNIT CIRCLE**
  - **M2.G.SRT.C.8.a** *Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*

- **LAWS OF SINE AND COSINE**
  - **M2.G.SRT.C.8.a** *Know and use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*
  - **M2.G.SRT.C.8.b** *Know and use the Law of Sines and the Law of Cosines to solve triangles in applied problems. Recognize when it is appropriate to use each.*

9. CIRCLE PROPERTIES

- **CIRCUMFERENCE AND ARC LENGTH**
  - **M2.G.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.*

- **AREA OF CIRCLES AND SECTORS**
  - **M2.G.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.*

10. SOLVING TWO-VARIABLE LINEAR SYSTEMS

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - **M2.A.REI.C.3** *Write and solve a system of linear equations in context.*

- **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*
  - **M2.A.REI.C.3** *Write and solve a system of linear equations in context.*

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*
  - **M2.A.REI.C.3** *Write and solve a system of linear equations in context.*

11. EXPONENTIAL FUNCTIONS, EQUATIONS, AND INEQUALITIES

- **LAWS OF EXPONENTS**
  - **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **M2.A.REI.A.1** *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.*
  - **M2.N.RN.A.1** *Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.*
  - **M2.N.RN.A.2** *Rewrite expressions involving radicals and rational exponents using the properties of exponents.*

- **EXPONENTIAL FUNCTIONS**
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.F.IF.B.5.b** *Know and use the properties of exponents to interpret expressions for exponential functions.*
  - **M2.F.IF.A.3** *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.*
  - **M2.F.IF.A.1** *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.*
  - **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
  - **M2.F.IF.B.4.c** *Graph exponential and logarithmic functions, showing intercepts and end behavior.*
  - **M2.A.CED.A.1** *Create equations and inequalities in one variable and use them to solve problems.*
  - **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

- **EXPONENTIAL GROWTH AND DECAY**
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.F.IF.B.5.b** *Know and use the properties of exponents to interpret expressions for exponential functions.*
  - **M2.F.IF.A.3** *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.*
  - **M2.N.Q.A.1** *Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.*
  - **M2.F.IF.B.4.c** *Graph exponential and logarithmic functions, showing intercepts and end behavior.*

12. POLYNOMIALS

- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - **M2.A.APR.A.1** *Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.*

- **MULTIPLICATION OF POLYNOMIALS**
  - **M2.A.APR.A.1** *Understand that polynomials form a system analogous to the integers, namely, they are closed under the*

operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

- **ARITHMETIC OPERATIONS ON FUNCTIONS**
  - **M2.F.BF.A.1.b** *Combine standard function types using arithmetic operations.*

13. FACTORING

- **FACTORING QUADRATIC TRINOMIALS**
  - **M2.A.SSE.B.3.a** *Factor a quadratic expression to reveal the zeros of the function it defines.*
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*

- **FACTORING SPECIAL CASES**
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*

14. COMPLEX NUMBERS

- **COMPLEX NUMBERS**
  - **M2.N.CN.A.1** *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.*
  - **M2.N.CN.A.2** *Know and use the relation $i^2 = –1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.*

- **POLYNOMIAL IDENTITIES AND COMPLEX NUMBERS**
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
  - **M2.N.CN.A.1** *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.*
  - **M2.N.CN.B.3** *Solve quadratic equations with real coefficients that have complex solutions.*
  - **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as a ± bi for real numbers a and b.*

15. REPRESENTATIONS OF QUADRATIC FUNCTIONS

- **QUADRATIC FUNCTIONS**
  - **M2.F.IF.A.1** *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.*
  - **M2.F.IF.B.4.a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
  - **M2.N.Q.A.1** *Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.*
  - **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*
  - **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
  - **M2.A.SSE.B.3.b** *Complete the square in a quadratic expression in the form $Ax^2 + Bx + C$ where A = 1 to reveal the maximum or minimum value of the function it defines.*
  - **M2.F.IF.B.5.a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
  - **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**

- **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
- **M2.F.IF.B.6** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
- **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.4.a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
- **M2.F.IF.B.5.a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*

REPRESENTATIONS OF QUADRATIC FUNCTIONS

- **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
- **M2.A.SSE.B.3.a** *Factor a quadratic expression to reveal the zeros of the function it defines.*
- **M2.A.REI.B.2.a** *Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
- **M2.F.IF.B.5.a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.6** *Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).*
- **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*
- **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*
- **M2.N.Q.A.1** *Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling.*

16. SOLVING QUADRATIC EQUATIONS

SOLVING QUADRATIC EQUATIONS BY FACTORING

- **M2.A.SSE.B.3.a** *Factor a quadratic expression to reveal the zeros of the function it defines.*
- **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.*
- **M2.F.IF.B.5.a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
- **M2.F.IF.B.4.a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*
- **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

COMPLETING THE SQUARE

- **M2.A.SSE.B.3.b** *Complete the square in a quadratic expression in the form $Ax^2 + Bx + C$ where $A = 1$ to reveal the maximum or minimum value of the function it defines.*
- **M2.A.REI.B.2.a** *Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
- **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.*
- **M2.F.IF.B.5.a** *Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.*
- **M2.A.SSE.A.2** *Use the structure of an expression to identify ways to rewrite it.*
- **M2.F.IF.B.4.a** *Graph linear and quadratic functions and show intercepts, maxima, and minima.*

17. QUADRATIC FORMULA AND COMPLEX NUMBERS

QUADRATIC FORMULA

- **M2.A.SSE.A.1.a** *Interpret complicated expressions by viewing one or more of their parts as a single entity.*
- **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.*
- **M2.F.IF.A.1** *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.*
- **M2.A.REI.B.2.a** *Use the method of completing the square to rewrite any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.*
- **M2.F.BF.A.1.a** *Determine an explicit expression, a recursive process, or steps for calculation from a context.*

COMPLEX NUMBERS AND QUADRATIC FUNCTIONS

- **M2.N.CN.B.3** *Solve quadratic equations with real coefficients that have complex solutions.*
- **M2.A.REI.B.2.b** *Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, knowing and applying the quadratic formula, and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.*
- **M2.N.CN.A.1** *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.*
- **M2.N.CN.A.2** *Know and use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.*

18. NONLINEAR FUNCTIONS

ABSOLUTE VALUE FUNCTIONS

- **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
- **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
- **M2.F.BF.B.2** *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.*

ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS

- **M2.F.BF.B.2** *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.*
- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
- **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*

19. PARENT FUNCTIONS AND TRANSFORMATIONS

PARENT FUNCTIONS

- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
- **M2.F.IF.A.2** *Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.*
- **M2.F.BF.B.2** *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.*
- **M2.F.IF.B.4.c** *Graph exponential and logarithmic functions, showing intercepts and end behavior.*

TRANSFORMATIONS OF PARENT FUNCTIONS

- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
- **M2.F.BF.B.2** *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.*
- **M2.F.IF.B.4.c** *Graph exponential and logarithmic functions, showing intercepts and end behavior.*

MULTIPLE TRANSFORMATIONS OF PARENT FUNCTIONS

- **M2.F.IF.A.1** *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.*
- **M2.F.IF.B.4.b** *Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.*
- **M2.F.BF.B.2** *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.*
- **M2.F.IF.B.4.c** *Graph exponential and logarithmic functions, showing intercepts and end behavior.*

20. ADVANCED SYSTEMS OF EQUATIONS

SOLVING THREE-VARIABLE SYSTEMS OF LINEAR EQUATIONS

- **M2.A.CED.A.2** *Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales.*
- **M2.A.REI.C.3** *Write and solve a system of linear equations in context.*

SYSTEMS OF NONLINEAR EQUATIONS

- **M2.A.REI.C.4** *Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.*

21. VOLUME

VOLUME OF PRISMS AND PYRAMIDS

- **M2.G.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.*
- **M2.G.GMD.A.2** *Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.*

VOLUME OF CYLINDERS AND CONES

- **M2.G.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.*
- **M2.G.GMD.A.2** *Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.*

22. VOLUME AND SURFACE AREA OF COMPOSITE SHAPES

VOLUME OF COMPOSITE SOLIDS

- **M2.G.GMD.A.2** *Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.*

SURFACE AREA OF COMPOSITE SOLIDS

- **M2.G.GMD.A.1** *Give an informal argument for the formulas for the circumference of a circle and the volume and surface area of a cylinder, cone, prism, and pyramid.*

- **M2.G.GMD.A.2** *Know and use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems.*

23. PROBABILITY

- **INTRODUCTION TO PROBABILITY**
  - **M2.S.CP.A.2** *Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.*
  - **M2.S.CP.A.4** *Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.*
  - **M2.S.CP.B.6** *Know and apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.*
  - **M2.S.CP.A.1** *Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").*

- **CONDITIONAL PROBABILITY**
  - **M2.S.CP.A.3** *Know and understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.*
  - **M2.S.CP.A.4** *Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.*
  - **M2.S.CP.B.5** *Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A and interpret the answer in terms of the model.*
  - **M2.S.CP.A.2** *Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.*

24. SCATTERPLOTS AND REGRESSION

- **SCATTERPLOTS**
  - **M2.S.ID.A.1.a** *Fit a function to the data; use functions fitted to data to solve problems in the context of the data.*
  - **M2.F.IF.A.3** *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**
  - **M2.S.ID.A.1.a** *Fit a function to the data; use functions fitted to data to solve problems in the context of the data.*