Algebra 2 Pacing Guide (2023 Standards/Big Ideas Book)

TN State Standards	Pacing
	Chapter 1 **Linear and Absolute Value Functions**
A2.N.Q.A.1 Use units as a way to understand real-world problems.* (1.1) (1.5) a. Choose and interpret the scale and the origin in graphs and data displays.* (1.5) b. Use appropriate quantities in formulas, converting units as necessary.* (1.1) c. Define and justify appropriate quantities within a context for the purpose of modeling.* (1.1) (1.5) d. Choose an appropriate level of accuracy when reporting quantities.* (1.2) **A2.A.CED.A.2** Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*(1.3) (1.4) (1.5) (1.6) **A2.A.CED.A.3** Rearrange formulas to isolate a quantity of interest using algebraic reasoning. * (1.5) **A2.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. ★ (1.5) (1.6) (1.7)	Chapter 1 Opener (1 day) 1.1 Modeling Quantities (1 day) 1.2 Accuracy with Measurements (1 day) 1.3 Parent Functions and Transformations (2 days) 1.4 Transformations of Linear and Absolute Value Functions (2 days) 1.5 Modeling with Linear Functions (2 days) 1.6 Absolute Value Functions (2 days) 1.7 Piecewise Functions (2 days) Chapter Review (1 day) Chapter Test (1 day) Chapter 1- 15 days

A2.F.IF.A.2 Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph. * (1.5)

A2.F.IF.B.4 Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (1.3) (1.4) (1.6) (1.7)

A2.F.IF.B.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* (1.5)

A2.F.IF.B.6 Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* (1.5) (1.6) (1.7)
a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.* (1.5) (1.6)
b. Compare properties of the same function on two different intervals or represented in two different ways.* (1.6) (1.7)

A2.F.BF.B.3 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.(1.3) (1.4)

A2.A.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients.* (1.5)

A2.S.ID.B.4 Represent data from 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.* (1.5)

	Chapter 2 **Quadratic Functions**
A2.N.Q.A.1 Use units as a way to understand real-world problems.* (2.3) a. Choose and interpret the scale and the origin in graphs and data displays.* (2.3) c. Define and justify appropriate quantities within a context for the purpose of modeling.* (2.3) **A2.A.SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* (2.2) (2.3) a. Interpret parts of an expression, such as terms, factors, and coefficients.* (2.2)(2.3)(2.4) b. Interpret complicated expressions by viewing one or more of their parts as a single entity.* (2.2) (2.3) (2.4) **A2.A.APR.A.2** 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. (2.2) (2.4) **A2.A.CED.A.1** Create equations and inequalities in one variable and use them to solve problems in a real-world context.* (2.4) **A2.A.CED.A.2** Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.* (2.1) (2.3) (2.4) **A2.A.REI.A.1** Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. (2.4)	Chapter 2 Opener (1 day) 2.1 Transformations of Quadratic Functions (2 days) 2.2 Characteristics of Quadratic Functions (3 days) 2.3 Modeling with Quadratic Functions (2 days) 2.4 Solving Quadratic Equations and Inequalities (3 days) 2.5 Solving Systems of Equations (2 days) Chapter 2 Review (1 day) Chapter 2 Test (1 day) Chapter 2- (15 days) Year to date 30 days

A2.A.REI.B.3 Write and solve a system of linear equations in a real-world context.* (2.5)

A2.A.REI.B.4 Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically, graphically, and using technology. (2.5)

A2.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. ★ (2.2) (2.3) (2.4)

A2.F.IF.A.2 Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph. * (2.3)

A2.F.IF.A.3 Understand geometric formulas as functions. * (2.1)

A2.F.IF.B.4 Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (2.1) (2.2) (2.4) (2.5)

A2.F.IF.B.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* (2.4)
a. Rewrite quadratic functions to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a real-world context. (2.2) (2.4)

A2.F.IF.B.6 Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* (2.2)

a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.* (2.2) b. Compare properties of the same function on two different intervals or represented in two different ways.* (2.3) **A2.F.BF.B.3** 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. (2.1) **A2.S.ID.B.4** Represent data from 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.* (2.3)	
	Chapter 10 Matrices
A2.N.M.A.1 Use matrices to represent data in a real-world context. Interpret rows, columns, and dimensions of matrices in terms of the context.* (10.1) (10.2) **A2.N.M.A.2** Perform operations on matrices in a real-world context.* (10.1) (10.2) a. Multiply a matrix by a scalar to produce a new matrix.* (10.1) (10.2) b. Add and/or subtract matrices by hand and using technology.* (10.1) (10.2) c. Multiply matrices of appropriate dimensions, by hand in simple cases and using technology for more complicated cases.* (10.2) d. Describe the roles that zero matrices and identity matrices	Chapter 10 Opener (1 day) 10.1 Basic Matrix Operations (2 days) 10.2 Multiplying Matrices (2 days) 10.3 Matrices and Systems of Linear Equations (2 days) Chapter 10 Review (1 day) Chapter 10 Test (1 day) Chapter 10 (9 days) Year to date 39 days

play in matrix addition and multiplication, recognizing that they are similar to the roles of 0 and 1 in the real number system.* (10.1) (10.2) **A2.N.M.A.3** Create and use augmented matrices to solve systems of linear equations in real-world contexts, by hand and using technology.* (10.3) **A2.A.REI.B.3** Write and solve a system of linear equations in a real-world context.* (10.3)	
	Chapter 3 **Cubic Functions**
A2.N.Q.A.1 Use units as a way to understand real-world problems.* (3.8) a. Choose and interpret the scale and the origin in graphs and data displays.* (3.8) c. Define and justify appropriate quantities within a context for the purpose of modeling.* (3.4) (3.8) d. Choose an appropriate level of accuracy when reporting quantities.* (3.8) **A2.A.SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* (3.8) a. Interpret parts of an expression, such as terms, factors, and coefficients.* (3.2) (3.4) (3.8) b. Interpret complicated expressions by viewing one or more of their parts as a single entity.* (3.5) (3.8) **A2.A.APR.A.1** Know and apply the Factor Theorem: For a polynomial p(x) and a number a, p(a) = 0 if and only if (x – a) is a factor of p(x). (3.2) (3.3) (3.4) (3.5) (3.7)	Chapter 3 Opener (1 day) 3.1 Graphing Cubic Functions (2 days) 3.2 Adding, Subtracting, and Multiplying Polynomials (2 days) 3.3 Dividing Polynomials (2 days) 3.4 Factoring Polynomials (2 days) 3.5 Solving Cubic Equations and Inequalities (2 days) 3.6 Transformations and Cubic Functions (2 days) 3.7 Analyzing Graphs of Cubic Functions (2 days) 3.8 Modeling with Cubic Functions (2 days) Chapter 3 Review (1 day) Chapter 3 Test (1 day) Chapter 3 (19 days) Year to Date 58 days

A2.A.APR.A.2 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. (3.1) (3.4) (3.5) (3.7)

A2.A.CED.A.1 Create equations and inequalities in one variable and use them to solve problems in a real-world context.* (3.5)

A2.A.CED.A.2 Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.* (3.5) (3.6) (3.8)

A2.A.CED.A.3 Rearrange formulas to isolate a quantity of interest using algebraic reasoning. * (3.7)

A2.A.REI.A.1 Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. (3.5)

A2.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. ★ (3.1) (3.5) (3.7) (3.8)

A2.F.IF.A.2 Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from

a graph. * (3.1) **A2.F.IF.A.3** Understand geometric formulas as functions. * (3.6) **A2.F.IF.B.4** Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (3.1) (3.5) (3.6) (3.7) (3.8) **A2.F.IF.B.5** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* (3.4) (3.5) **A2.F.IF.B.6** Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* b. Compare properties of the same function on two different intervals or represented in two different ways.* (3.1) **A2.F.BF.B.3** 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. (3.6) **A2.S.ID.B.4** Represent data from 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.* (3.8)	
	Chapter 4 **Rational Exponents and Radical Functions**
A2.N.RN.A.1 Extend the properties of integer exponents to rational exponents. (4.1) (4.2)	Chapter 4 Opener (1 day) 4.1 nth Roots and Rational Exponents (1 day)

a. Develop the meaning of rational exponents by applying the properties of integer exponents. (4.1) b. Explain why $x^{1/n}$ can be written as the n th root of x. (4.1) c. Rewrite expressions involving radicals and rational exponents using the properties of exponents. (4.1) (4.2) **A2.A.SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* a. Interpret parts of an expression, such as terms, factors, and coefficients.* (4.6) **A2.A.CED.A.1** Create equations and inequalities in one variable and use them to solve problems in a real-world context.* (4.1) (4.4) **A2.A.CED.A.2** Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.* (4.3) (4.5) (4.6) (4.7) **A2.A.CED.A.3** Rearrange formulas to isolate a quantity of interest using algebraic reasoning. * (4.2) (4.3) (4.4) (4.7) **A2.A.REI.A.1** Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. (4.1) (4.4) **A2.A.REI.A.2** Solve radical equations in one variable, and identify extraneous solutions when they exist. (4.4) **A2.F.IF.A.1** For a function that models a relationship between two quantities, interpret key features of graphs and tables in	4.2 Properties of Rational Exponents and Radicals (2 days) 4.3 Graphing Radical Functions (2 days) 4.4 Solving Radical Equations and Inequalities (2 days) 4.5 Performing Functions Operations (2 days) 4.6 Compositions of Functions (2 days) 4.7 Inverse of Functions (3 days) Unit 4 Review (1 day) Unit 4 Test (1 day) Chapter 4 (17 days) Year to date 75 days

terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. ★ (4.3) (4.5)

A2.F.IF.B.4 Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (4.3) (4.4) (4.5) (4.7)

A2.F.IF.B.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* (4.3)

A2.F.IF.B.6 Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* (4.3)
a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.* (4.3)

A2.F.BF.A.1 Build a function that describes a relationship between two quantities.* (4.5) (4.6)
a. Combine standard function types using arithmetic operations.* (4.5) (4.6)
b. Combine standard function types using composition.* (4.6)

A2.F.BF.B.3 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. (4.3)

A2.F.BF.B.4 Find the inverse of a function. (4.7)
a. Determine whether a function is one-to-one. (4.7)
b. Find the inverse of a function on an appropriate domain. (4.7)
c. Given an invertible function on an appropriate domain, identify the domain of the inverse function. (4.7)

	Chapter 5 **Exponential and Logarithmic Functions**
A2.N.Q.A.1 Use units as a way to understand real-world problems.* (5.1) (5.7) a. Choose and interpret the scale and the origin in graphs and data displays.* (5.1) b. Use appropriate quantities in formulas, converting units as necessary.* (5.1) (5.7) c. Define and justify appropriate quantities within a context for the purpose of modeling.* (5.7) d. Choose an appropriate level of accuracy when reporting quantities.* (5.7) **A2.A.SSE.A.1** Interpret expressions that represent a quantity in terms of its context.* (5.7) a. Interpret parts of an expression, such as terms, factors, and coefficients.* (5.1) (5.2) (5.7) b. Interpret complicated expressions by viewing one or more of their parts as a single entity.* (5.1) (5.2) (5.7) **A2.A.CED.A.1** Create equations and inequalities in one variable and use them to solve problems in a real-world context.* (5.6) **A2.A.CED.A.2** Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.* (5.1) (5.2) (5.3) (5.4) (5.7) **A2.A.REI.A.1** Understand solving equations as a process of	Chapter Opener (1 day) 5.1 Exponential Growth and Decay Functions (1 day) 5.2 The Natural Base e (2 days) 5.3 Logarithms and Logarithmic Functions (2 days) 5.4 Transformations of Exponential and Logarithmic Functions (2 days) 5.5 Properties of Logarithms (2 days) 5.6 Solving Exponential and Logarithmic Equations (2 days) 5.7 Modeling with Exponential and Logarithmic Functions (2 days) Unit 5 Review (1 day) Unit 5 Test (1 day) Unit 5 (17 days) Year to date 92 days

reasoning and explain the reasoning. Construct a viable argument to justify a solution method. (5.6)

A2.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. ★ (5.1) (5.2) (5.3)

A2.F.IF.A.2 Calculate and interpret the average rate of change of a function (presented algebraically or as a table) over a specified interval. Estimate and interpret the rate of change from a graph. * (5.1) (5.2) (5.3)

A2.F.IF.B.4 Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (5.1) (5.2) (5.3) (5.4) (5.6) (5.7)

A2.F.IF.B.5 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.* (5.1) (5.2)
b. Know and use the properties of exponents to interpret expressions for exponential functions in terms of a real-world context. (5.1) (5.7)

A2.F.IF.B.6 Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions.* (5.1) (5.2) (5.3)
a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways.* (5.1) (5.2) (5.3)

A2.F.BF.A.1 Build a function that describes a relationship

between two quantities.* (5.6) **A2.F.BF.B.3** 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. (5.4) **A2.F.BF.B.4** Find the inverse of a function. (5.4) **A2.F.LE.A.1** Know the relationship between exponential functions and logarithmic functions.* (5.3) (5.5) a. Solve exponential equations using a variety of strategies, including logarithms.* (5.6) b. Understand that a logarithm is the solution to abct = d, where a, b, c, and d are numbers.* (5.5) (5.6) c. Evaluate logarithms using technology.* (5.3) (5.5) (5.6) **A2.F.LE.A.2** Know that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or cubically. * (5.1) **A2.S.ID.B.4** Represent data from 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.* (5.7)	
	Chapter 6 **Probability**
A2.S.ID.A.2 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. * (6.5) **A2.S.CP.A.1** Recognize and explain the concepts of conditional	Chapter 6 Opener (1 day) 6.1 Sample Spaces and Probability (2 days) 6.2 Two-Way Tables and Probability (2 days) 6.3 Conditional Probability (2 days) 6.4 Independent and Dependent Events (2 days)

probability and independence in everyday language and everyday situations. Categorize events as independent or dependent.* (6.4) **A2.S.CP.B.2** Apply statistical counting techniques.* (6.6) a. Use the Fundamental Counting Principle to compute probabilities of compound events and solve problems.* (6.6) b. Use permutations and combinations to compute probabilities of compound events and solve problems.* (6.6) (6.7) **A2.S.CP.B.3** Use the Law of Large Numbers to assess the validity of a statistical claim. * (6.1) **A2.S.CP.C.4** 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 given context.* (6.1) (6.2) (6.3) (6.4)	6.5 Probability of Disjoint and Overlapping Events (2 days) 6.6 Permutations and Combinations (3 days) 6.7 Binomial Distributions (2 days) Unit 6 Review (1 day) Unit 6 Test (1 day) Chapter 6 (18 days) Year to date 110 days
	Chapter 7 **Data Analysis**
A2.N.Q.A.1 Use units as a way to understand real-world problems.* (7.2) (7.3) a. Choose and interpret the scale and the origin in graphs and data displays.* (7.2) (7.3) **A2.S.ID.A.1** Use statistics appropriate to the shape of the data distribution to compare center (mean, median, and/or mode) and spread (range, standard deviation) of two or more different data sets.* (7.1) (7.2) (7.3)	Chapter 7 Opener (1 day) 7.1 Measures of Center and Variation (2 days) 7.2 Box-and-Whisker Plots (2 days) 7.3 Shapes of Distributions (2 days) Chapter 7 Review (1 day) Chapter 7 Test (1 day) Chapter 7 (9 days) Year to date 119 days
	Chapter 8 **More Data Analysis**

A2.S.ID.A.2 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. * (8.1) **A2.S.ID.A.3** Compute, interpret, and compare z-scores for normally distributed data in a real-world context.* (8.1) **A2.S.IC.A.1** Recognize the purposes of and differences among sample surveys, experiments, and observational studies.* (8.3) (8.4) **A2.S.IC.A.2** Identify potential sources of bias in statistical studies.* (8.3) **A2.S.IC.A.3** Distinguish between a statistic and a parameter. Evaluate reports based on data and recognize when poor conclusions are drawn from well-collected data.* (8.2) (8.4)	Chapter 8 Opener (1 day) 8.1 Using Normal Distributions (3 days) 8.2 Populations, Samples, and Hypotheses (2 days) 8.3 Collecting Data (2 days) 8.4 Experimental Design (1 day) Chapter 8 Review (1 day) Chapter 8 Test (1 day) Chapter 8 (13 days) Year to date 132 days
	Chapter 9 Sequences
A2.A.CED.A.2 Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations and inequalities with two variables on coordinate axes with labels and scales, and use the graphs to make predictions.*	Chapter 9 Opener (1 day) 9.1 Defining and Using Sequences and Series (2 days) 9.2 Arithmetic Sequences (2 days) 9.3 Geometric Sequences (2 days) 9.4 Using Recursive Rules with Sequences (3 days)

(9.2) (9.3) **A2.A.REI.A.1** Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. (9.2) (9.3) **A2.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. ★ (9.4) **A2.F.IF.B.4** Graph functions expressed algebraically and show key features of the graph by hand and using technology. * (9.2) (9.3) **A2.F.BF.A.2** Define sequences as functions, including recursive definitions, whose domain is a subset of the integers. Write explicit and recursive formulas for arithmetic and geometric sequences in context and connect them to linear and exponential functions.* (9.1) (9.2) (9.3) (9.4)	Chapter 9 Review (1 day) Chapter 9 Test (1 day) Chapter 9 (12 days) Year to date 144 days