Unit 1: Number and Quantity

Standard	Topic	Number of Days	Textbook Alignment
N-RN.1, N-RN.2, N-RN.3	The Real Number System 1. Use laws of exponents including rational exponents. 2. Rewrite expressions involving radicals and rational exponents using the properties of exponents. 3. Use properties of rational and irrational numbers.	4	7.4 – 7.7
N-CN.1, N-CN.2, N-CN.7, N-CN.8, N-CN.9	The Complex Numbers 1. Know there is a complex number i such that $i^2 = -1$, and every complex number has the form a + bi, where a and b are real numbers. 2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. 7. Solve quadratics with real coefficients that have complex solutions. 8. Extend polynomial identities to the complex numbers. For example, rewrite $x^2 + 4$ as $(x + 2i)(x – 2i)$. 9. Know the Fundamental Theorem of Algebra and show that it is true for quadratic polynomials	6	5.4 – 5.6 6.7 and 6.8

Unit 2: Algebra

Standard	Topic	Number of Days	Textbook Alignment
A-CED.1, A-CED.2, A-CED.3, A-CED.4	**Understanding Creating Equations** 1. Create equations and inequalities in one variable and use them to solve problems. 2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. 3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods. 4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R.	6	1.3 and 5.8 2.4 and 2.8 3.1 – 3.4 1.3
A-REI.2, A-REI.4, A-REI.7, A-REI.11	**Reasoning with Equations and Inequalities** 2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. 4a. Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)^2 = q$ that has the same solution. Derive the quadratic formula from this. 4b. Solve quadratic equations in one variable. Solve quadratic equations by inspection, taking square roots, completing the square, 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 $a \pm bi$.	9	7.7 and 9.6 5.2, 5.5, and 5.6 5.3, 5.4, and 5.6

	7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. 11. 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 solutions approximately, e.g. using technology to graph the functions, make tables of values, or find successive approximations.		10.7 (isolated problems) add resources
A-APR.1, A-APR.2, A-APR.3, A-APR.4, A-APR.5, A-APR.6, A-APR.7	Arithmetic with Polynomial and Rational Exponents 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. 2. 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). 3. 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. 4. Prove polynomial identities and use them to describe numerical relationships. For example, the polynomial identity $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples. 5. Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, were x and y are any numbers, with coefficients determined for example by Pascal's Triangle. 6. Rewrite simple rational expressions in different forms using inspection, long division, or for the more complicated examples, a computer algebra system.	8	6.1 6.2 and 6.6 6.4 6.5 (add resources) 6.2 9.1 and 9.2

	7. Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.		9.1 and 9.2
A-SSE.1, A-SSE.2, A-SSE.3, A-SSE.4	Seeing Structure 1a. Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. 1b. Interpret complicated expressions by viewing one or more parts as a single entity. For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P. 2. Use the structure of an expression to identify ways to rewrite it. 3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expressions. 3b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. 3c. Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%. 4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. For example, calculate mortgage payments.	4	1.1, 5.3, 6.3, and 9.1 add resources 5.3 5.5 11.3 (add resources)

Unit 3: Functions

Standard	Topics	Number of Days	Textbook Alignment
F-IF.1, F-IF.2, F-IF.4, F-IF.5, F-IF.6, F-IF.7, F-IF.8, F-IF.9	Interpreting Functions 1. Understand that a function from one set to another set assigns to each element of the domain exactly one element of the range. 2. Use function notation and evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context. 4. Interpret key features of graphs for functions that model a relationship between two quantities and sketch a graph showing key features given in a verbal description. 5. Relate the domain of a function to its graph, and where applicable, to the quantitative relationship it describes. 6. Calculate and interpret the average rate of change of a function over an interval and estimate the rate of change from a graph. 7. Graph functions expressed symbolically and show key features of the graph by hand and using technology. 7b.Graph square root, cube root, piece-wise, step and absolute value functions 7c.Graph polynomials, identify zeros and end behavior. 7e.Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. 8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties. 8a.Use factoring and completing the square to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. 8b.Use properties of exponents to interpret expressions for exponential functions.	12	2.1 6.3 and 6.4 add resources 2.3 and supplement 2.6, 7.3, and supplement cube root functions 6.4, 6.5, 8.1, 8.3, and 13.7 add resources 5.3 and 5.5 chapter 8

	9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).		covered throughout book but supplement
F-BF.1, F-BF.3, F-BF.4	Building Functions 1. Write a function that describes a relationship between two quantities 1b.Combine standard function types using arithmetic operations. 3. Identify the effect on the graph using transformations such as f(x) + k, f(x + k), k f(x), and f(kx). Experiment with cases and explain the effects on the graph using technology. Include recognizing even and odd functions. 4. Find the inverse of a function.	4	7.1 add resources add resources 2.7, 5.7, 7.3, and 13.8 7.2 and 8.3
F-LE.3, F-LE.4	Linear and Exponential Models 3. Recognize using graphs and tables that a quantity increasing exponentially will exceed a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. 4. Express exponentials as logarithms and evaluate logarithms using technology. Understand the relationship between properties of logarithms and properties of exponents.	5	chapter 8 8.3 – 8.7
F-TF.1, F-TF.2, F-TF.5, F-TF.8, F-IF. 7E	Trigonometric Functions 1. Understand radian measure of an angle using the unit circle 2. Explain how the unit circle in the coordinate plane extends the use of trigonometric functions to all real numbers. 5. Choose trigonometric functions to model periodic situations with specific amplitude, frequency, and midline. 8. Prove the Pythagorean Identity $\sin^2\theta + \cos^2\theta = 1$ and use it to find $\sin\theta$, $\cos\theta$, or $\tan\theta$ given $\sin\theta$, $\cos\theta$, or $\tan\theta$ and the quadrant of the angle.	6	13.2 13.6 13.7 14.1 and 14.2

Unit 4: Statistics

Standard	Topics	Number of Days	Textbook Alignment
S-MD.6, S-MD.7	**Using Probabilities to Make Decisions** 1. Use probabilities to make fair decisions. For example, random number generator, situations involving quality control, or diagnostic tests that yield both false positive and false negative results. 2. Analyze decisions and strategies using probability concepts. For example, product testing, medical testing, and pulling a hockey goalie at the end of a game.	2	12.3
S-ID.4	**Interpreting Categorical and Quantitative Data** 4. Use mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages (and recognize that there are data sets for which such a procedure is not appropriate). Use calculators, spreadsheets, and tables to estimate areas under the normal curve.	2	12.5
S-IC.1, S-IC.2, S-IC.3, S-IC.4, S-IC.5, S-IC.6	**Making Inferences and Justifying Conclusion** 1. Understand statistics as a process for making inferences about population parameters based on a random sample. 2. Decide if a specified model is consistent with results from a given data generating process. For example, a model says a spinning coin falls heads up with a probability 0.5. Would a result of 5 heads in a row cause you to question the model? (Include comparing theoretical and empirical results to evaluate the effectiveness of a treatment.)	3	12.6 12.4

	3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies. (Explain how randomization relates to each.) 4. Use data from a sample survey to estimate a population mean or proportion and develop a margin of error through the use of simulation models for random sampling. 5. Use data from a randomized experiment to compare two treatments and use simulations to decide if differences between parameters are significant. 8. Evaluate reports based on data.		12.1 12.2 12.6 12.6