Guthrie Public Schools – Course Pacing Guide: Algebra 3

2019 – 2020

Math Practices	Online Resources
Algebraic operations (25%) • Operations with exponents • Factoring and expanding polynomials • Operations with algebraic expressions • Absolute value • Properties of logarithms ***Equations and inequalities (25%)*** • Linear equations and inequalities • Quadratic equations and inequalities • Absolute value equations and inequalities • Systems of equations and inequalities • Exponential and logarithmic equations ***Functions and their properties* (30%)*** • Definition, interpretation, and representation/modeling (graphical, numerical, symbolic, and verbal) • Domain and range • Evaluation of functions • Algebra of functions • Graphs and their properties (including intercepts, symmetry, and transformations) • Inverse functions ***Number systems and operations (20%)*** • Real numbers • Complex numbers • Sequences and series • Factorials and binomial theorem *Each test may contain a variety of functions, including linear, polynomial (degree ≤ 5), rational, absolute value, power, exponential, logarithmic, and piecewise-defined.	Dan Meyer's Ted Talk about teaching math: https://youtu.be/qocAoN4jNwc Links to his 3-act activities, sorted by standard: https://docs.google.com/spreadsheet/ccc?key=0AjIqyKM9d7ZYdEhtR3BJMmdBWnM2YWxWYVM1UWowTEE#gid=0 Oklahoma Academic Vocabulary: http://sde.ok.gov/sde/building-academic-vocabulary#Math ➢ Oklahoma does not currently have standards for Algebra 3 therefore the standards used are the ACT college and career readiness standards. ➢ Algebra 3 lessons will follow College Board© College Algebra subject matter ➢ **PLEASE NOTE:** This course is designed for Juniors/ Seniors who want to deepen their knowledge of Algebra with possible College Credit at the end of the year. It is assumed that students will take the initiative to refresh Algebra 2 skills.
For more:	**Other online resources**
Elaboration on each practice from the Oklahoma State Education website: https://www.act.org/content/act/en/college-and-career-readiness/standards.html https://clep.collegeboard.org/science-and-mathematics/college-algebra	http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/index.htm is a free college algebra tutorial website.

Number concepts/ Algebra 2 Review

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
N.401 Exhibit knowledge of elementary number concepts such as rounding, the ordering of decimals, pattern identification, primes, and greatest common factor N. 402 Write positive powers of 10 by using exponents N. 403 Comprehend the concept of length on the number line and find the distance between two points AF. 401 Solve routine two-step or three-step arithmetic problems involving concepts such as rate and proportion, tax added, percentage off, and estimating by using a given average value in place of actual values AF. 402 Perform straightforward word-to-symbol translations A. 401 Evaluate algebraic expressions by substituting integers for unknown quantities A. 402 Add and subtract simple algebraic expressions A. 403 Solve routine first-degree equations A. 405 Match simple inequalities with their graphs on the number line F. 401 Evaluate linear and quadratic functions, expressed in function notation, at integer values N. 501 Order fractions N. 502 Find and use the least common multiple N. 503 Work with numerical factors A. 509 Work with squares and square roots of numbers A. 511 Work with scientific notation A. 512 Work problems involving positive integer exponents	Review of algebra topics: • Numbers: Real and Complex • Absolute Value • Operations • Order of Operations • Exponent Properties • Scientific Notation • Radicals • Conversions • Linear Equations • Inequalities • Word problems • Systems of Equations • Factorials	Prerequisites	

Geometry and Measurement concepts/ Geometry Review

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
N. 405 Find the distance in the coordinate plane between two points with the same x-coordinate or y-coordinate G. 404 Find the length of the hypotenuse of a right triangle when only very simple computation is involved G. 405 Use geometric formulas when all necessary information is given G. 406 Locate points in the coordinate plane G. 505-507 Compute the perimeter or area of composite geometric figures, triangles, rectangles, or circles after identifying necessary information when one or more additional simple steps are required. G. 511 Find the midpoint of a line segment	• Formulas and Applications	Supplement material	

Algebra 2 Review Part 2:

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
N. 404 Understand absolute value in terms of distance AF. 403 Relate a graph to a situation described in terms of a starting value and an additional amount per unit AF. 501 Solve multistep arithmetic problems that involve planning or converting common derived units of measure. AF. 502 Build functions and write expressions, equations, or inequalities with a single variable for common pre-algebra settings A. 503 Solve first-degree inequalities with their graphs on the number line A. 504 Match compound inequalities with their graphs on the number line F.503 Build functions and use quantitative information to identify graphs for relations that are proportional or linear AF. 601 Solve word problems containing several rates, proportions, or percentages. AF. 602 Build functions and write expressions, equations, and inequalities for common algebra settings A. 602 Solve linear inequalities when the method involves reversing the inequality A. 606 Solve absolute value equations A. 701 Solve simple absolute value inequalities	• Real and Complex coordinate system • Absolute Value Inequalities • Linear Inequalities • Absolute Value Equations • Introduction to Functions • Domain/ Range • Simple Quadratic Factoring (a=1)	Ch. 1	

Linear Systems/ Linear Review

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
AF. 403 Relate a graph to a situation described in terms of starting value and an additional amount per unit A. 406 Exhibit knowledge of slope A. 502 Solve real-world problems by using first-degree equations G. 510 Determine the slope of a line from points or a graph A. 514 Determine the slope of a line from an equation AF. 503 Match linear equations with their graphs in the coordinate plane A. 604 Solve systems of two linear equations N. 706 Apply properties of matrices and system of equations as a number system	• Linear Equation in one variable • Slope of a line • Equations of Lines (be able to go from one form to another) • Graphing Lines • Parallel and perpendicular Lines • Solving a system of linear equations in 2 and 3 variables • Word problems with a system of linear equations • System of linear Inequalities	Ch.1 Ch. 2 Ch. 9	

Matrices

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
N. 505 Add and subtract matrices that have integer entries N. 607 Use relations involving addition, subtraction, and scalar multiplication of vectors and of matrices N. 706 Apply properties of matrices and system of equations as a number system	• Add and Subtract Matrices • Find determinant of 2x2 • Recognize, identify, and apply basic properties of matrices • Recognize and identify inverse, zero, and identity matrices • Find Inverse of 2x2	Ch. 10	

Parent functions and transformations

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
G. 407 Translate points up, down, left, and right in the coordinate plane. F. 505 Understand the concept of a function as having a well-defined output value at each valid input value F. 507 Interpret statements that use function notation in terms of their context F. 511 Use function notation for simple functions of two variables. AF. 604 Given an equation or function, find an equation or function whose graph is a translation by a specified amount up or down. A. 601 Manipulate expressions and equations (e.g., rewrite to or from standard form) F. 601 Relate a graph to a situation described qualitatively in terms of faster change or slower change AF. 703 Analyze and draw conclusions based on information properties of algebra and/ or functions and information from graphs in the coordinate plane. AF. 706 Given an equation or function, find an equation whose graph is a translation by specified amounts in the horizontal and vertical directions. AF.705 Identify characteristics of graphs based on a set of conditions or on a general equation such as $y = ax^2 + c$ F. 708 Write an expression for the composite of two simple functions	• Types of Functions • Characteristics of Functions • Composition of Functions	Ch. 1 Ch. 2	

Radical Functions and Rational Exponents

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)			
A. 510 Work with cube roots of number N. 601 Apply number properties involving prime factorization N. 604 Apply the facts that p is irrational and that the square root of an integer is rational only if that integer is a perfect square N. 605 Apply properties of rational exponents G. 605 Use the distance formula	• Radical Equations and Equations involving Rational Exponents	Ch. 4	

Polynomials, Polynomial and Radical Functions

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
A. 402 Add and subtract simple algebraic expressions A. 404 Multiply two binomials A. 505 Add, subtract, and multiply polynomials A. 510 Work with cubes of numbers F. 501 Evaluate polynomial functions, expressed in function notation, at integer values F. 506 Understand the concept of domain and range in terms of valid input and output, and in terms of function graphs F. 508 Find the domain of polynomial and rational functions F. 509 Find the range of polynomial functions F. 604 Evaluate composite functions at integer values G. 607 Find the coordinates of a point reflected across a vertical, horizontal, or linear identity function A. 703 Apply the remainder theorem for polynomials, that *P(a)* is the remainder when *P(x)* is divided by *(x-a)* F. 708 Write an expression for the composite of two simple functions	• Polynomials • Factoring Polynomials • Solving Polynomial Equations • Operations with functions • Graphs of functions • Inverse Functions • Long Division/ Synthetic Division • Rational Zero Theorem	Ch. 3 Radical Functions: supplemental material needed	

Quadratic Functions and Equations

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
F. 401 Evaluate quadratic functions, expressed in function notation, at integer values N. 504 Exhibit some knowledge of the complex numbers A. 506 Identify solutions to simple quadratic equations A. 507 Solve quadratic equations in the form$(x + a)(x + b) = 0$, where *a* and *b* are numbers or variables. A. 508 Factor simple quadratics A. 605 Solve quadratic equations N. 704 Apply properties of complex numbers and the complex number system A. 702 match simple quadratic inequalities with their graphs on the number line or coordinate plane	• Complex Numbers • Quadratic Equations • Quadratic Forms • Quadratic Inequalities • Graph of Quadratics	3.1	

Exponential and Logarithmic Functions

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
AF. 701 Solve complex arithmetic problems involving percent of increase or decrease or requiring integration of several concepts F. 702 Build functions for relations that are exponential	• Exponential Functions • Logarithmic Functions • Logarithmic Properties • Exponential Equations • Logarithmic Equations • Natural Functions • Modeling with Log and Exponential function	Ch. 5	

Rational Functions

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
A. 513 Determine when an expression is undefined F. 510 Find where a rational function's graph has a vertical asymptote	• Simplifying Rational Expressions • Multiplying and Diving Rational Expressions • Add and Subtracting Rational Expressions • Complex Rational Expressions • Solving Rational Expressions • Undefined values (holes, asymptotes) of Rational Equations • Rational Inequalities	Ch. 4	

Sequences and Series

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
F. 502 Find the next term in a sequence described recursively F. 603 Find a recursive expression for the general term in a sequence described reclusively F. 703 Exhibit knowledge of geometric sequences	• Arithmetic Sequences and Series • Geometric Sequences and Series • Binomial Theorem • Pascal Triangle •	Ch. 11	

Conics

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
A. 601 Manipulate equations (e.g., convert to or from standard form) G. 609 Recognize special characteristics of parabolas and circles AF. 703 Analyze and draw conclusions based on information from graphs in the coordinate plane G. 701 Use relationships among angles, arcs, and distances in a circle	• Circles, Parabolas, Hyperbolas, Ellipses • Solving a system of nonlinear equations in two variables	4.3 4.4	

Probability and Statistics

Standards		Text	Days
Mathematics College & Career Readiness Standards (ACT)	Oklahoma Academic Standards		
S. 401 Calculate the missing data value given the average and all data values by one S. 402 Translate from one representation of data to another (e.g., bar graph to a circle graph; scatterplot to polynomial) S. 403 Determine the probability of a simple event S. 404 Describe events as combinations of other events (e.g., using *and, or*, and *not*) S.405 Exhibit knowledge of simple counting techniques F. 504 Attend to the difference between a function modeling a situation and the reality of the situation S. 501 Calculate the average given the frequency counts of all the data values S. 502 Manipulate data from tables and charts S. 503 Compute straightforward probabilities for common situations S. 504 Use Venn diagrams in counting F. 701 Compare actual values and the values of a modeling function to judge model fit and compare models. S. 701 Distinguish between mean, median, and mode for a list of numbers S. 702 Analyze and draw conclusions based on information from tables and charts, including two-way frequency tables S. 703 Understand the role of randomization in surveys, experiments, and observational studies S. 704 Exhibit knowledge of conditional and joint probability	• Fundamental Counting Principle • Permutations • Combinations • Probability	11.6 11.7	