HOUSTON COUNTY SCHOOLS
MATHEMATICS DEPARTMENT

College Readiness Mathematics
2020-2021

Houston County's system-wide initiatives center around building fully functional, intensely focused professional learning communities in our schools.

This initiative includes a focus on learning which clarifies and monitors essential learning.

Not all content in a given grade or course is emphasized equally in the standards, nor should it be. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas may also be necessary for students to meet the demands of the Georgia Milestones assessments.

*To say that some standards have greater emphasis is **not** to say that anything in the standards can safely be neglected in instruction!* Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade. This new guide not only gives calendar pacing at the unit level, but also pacing at the standard level and one of three levels of content Essential, listed below.

PACING GUIDE & TEACHER PLANNER

Math teachers from every middle school in Houston County were invited to meet to identify "Essential Standards." Teachers considered the content expectations for future units within their grade, for future grades, on state assessments, and in other content areas to determine which standards were "Essential," Supporting," or "Additional." Their designations are color-coded within the list of standards as below and the included calendar shows approximate within-unit time allocations by standard or cluster.

μEssential Σ Supporting *Additional

On SharePoint, we amended course materials (including lesson plans, study guides, assessments, and POD's) to reflect the content of greatest emphasis for this math course because of their prioritization of standards.

This document shows where students and teachers should spend the large Essential of their time in order to meet the expectations of the standards. It includes a standard-by-standard calendar for teachers to use to plan and allocate teaching/learning time appropriately.

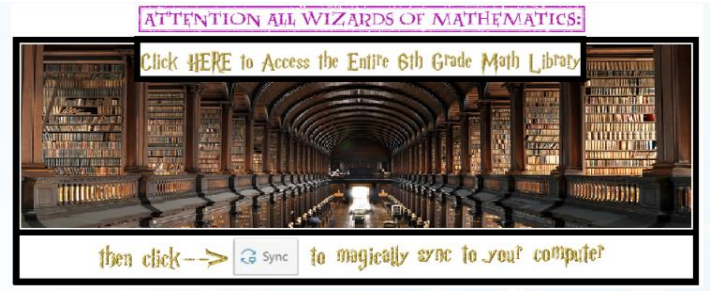
What resources are available for me?

What's on your SharePoint Course page?	• Unit Plans • Lessons and Tasks • Assessment Banks *(instructions for ExamView banks after the calendars)* • Milestones Resources including Mock Assessments • HRW Teacher/Student Instructions • And much more
Student Weeblys	http://hcbemath.weebly.com/ *(T-CRM does not have its own Weebly yet, but the other grade levels' Weebly sites cover the material found in T-CRM.)*

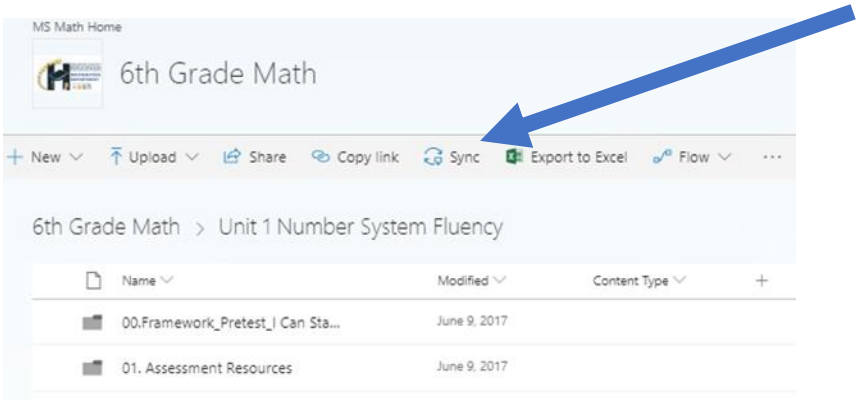
How do I sync the mathematics material to my file library on my desktop?

From Office 365, navigate to > SharePoint > Departments > Teaching & Learning > Math > Grade Band > Course Home.

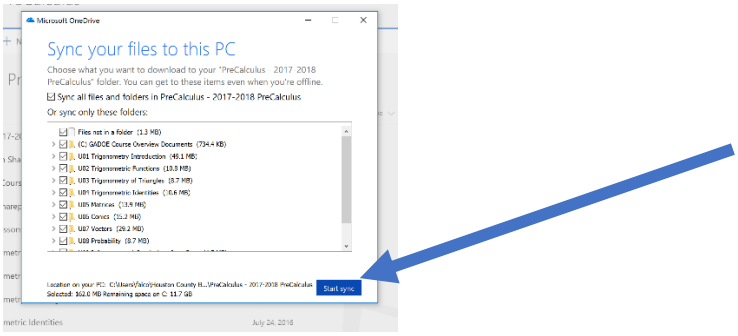
1. Navigate to your course home on SharePoint and click the icon below.



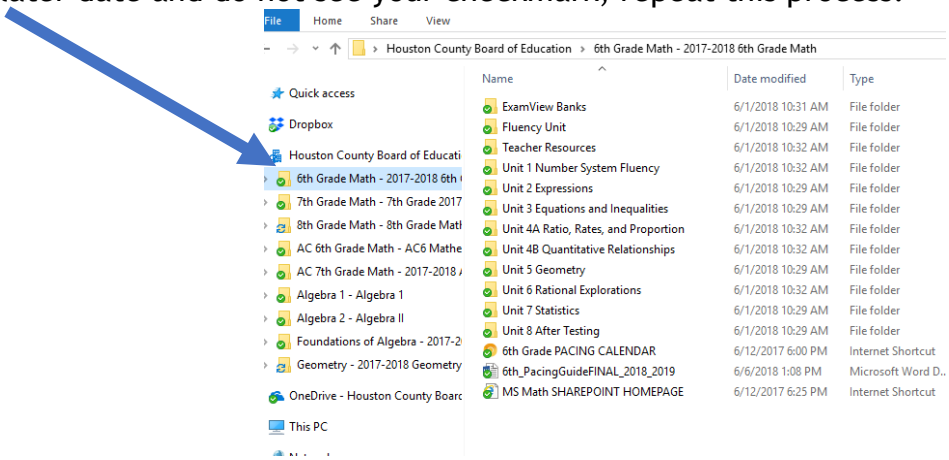
2. You are now in your course's document library. Click the Sync Button.



3. A window will open and all the folders in this library should be checked. Keep them checked and choose Start sync. ***Note, you may encounter two screens before this in which you choose ALLOW and then must SIGN IN with your HCBE email.



4. After a few seconds, you will get notified that the files are syncing to your Houston County BOE One Drive and the files will be located in your file library. These files work like Dropbox and are updated in real time as changes are made by Dr. Rape or Jennifer Farrow. BE SURE YOU SEE GREEN CHECK MARK. This means it is synced and your files are updated. If you open at a later date and do not see your checkmark, repeat this process.



NOTE*** These files are locked for editing and saving to these folders. You may open, edit, and save to your personal files in another file location.

NOTE**** ExamView Tests will NOT open directly from the Houston County Board of Education File Folders. To open, right-click copy and right-click save to a folder on your desktop or My Documents. Then, open the file from this location. A PDF of each test is available for you to preview

College Readiness Mathematics Unit 1 – Linear, Quadratics, Complex Numbers, Polynomials

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

ᵘEssential ᵀSupporting *Additional

Students will revisit solving quadratic, linear, and polynomial equations in this unit. Students will perform operations with complex numbers and solve quadratic equations with complex solutions. Students will compare functions and relations and define functions. **IMPORTANT: USE THE TASKS, TOO!**

TEACHING MAP FOR UNIT 1:

ᵘEssential ᵀSupporting *Additional

Complex Numbers	Solving Linear, Quadratic and Polynomial Functions	Function vs. Relation
○ Use any method to solve quadratics with a complex solution ○ The meaning of i^u ○ Operating with Complex Numbers: Addition, Subtraction, Multiplication ○ Find the conjugate of complex numbers and use the complex conjugate to divide complex numbers	○ Solve quadratics using any method with real number solutions ○ Factor polynomials with complex numbers ○ Know & apply the Binomial Theorem ○ Rewrite simple rational expressions in different forms using inspection, long division or technology ○ Solving linear equations & inequalities in one variable	○ Define and Identify functions ○ Interpret expressions & parts of expressions (terms, factors, coefficients, etc.) in term of context ○ Rewrite expressions in different equivalent forms to reveal & explain properties (ex. Use difference of two squares to rewrite a binomial) ○ Compare properties of two functions represented in a different way ○ Write a function given applications, and combine functions using arithmetic operations in context

STANDARDS:

N.CN.1ᵘ Understand 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.

N.CN.2ᵀ Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

N.CN.3ᵀ Find the conjugate of a complex number; use the conjugate to find the ~~absolute value (modulus) and~~ quotient of complex numbers.

A.REI.4ᵘ Solve quadratic equations in one variable.

A.REI.4bᵘ Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).

N.CN.7ᵘ Solve quadratic equations with real coefficients that have complex solutions by (but not limited to) square roots, completing the square, and the quadratic formula.

N.CN.8 Extend polynomial identities to include factoring with complex numbers. For example, rewrite x2 + 4 as (x + 2i)(x – 2i).

A.APR.5 Know and apply that the Binomial Theorem gives the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined using Pascal's Triangle. *

A.APR.6 Rewrite simple rational expressions in different forms using inspection, long division, or a computer algebra system; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x). ᵀ

F.IF.1 Understand that a function from one set (the input, called the domain) to another set (the output, called the range) assigns to each element of the domain exactly one element of the range, i.e. each input value maps to exactly one output value. If f is a function, x is the input (an element of the domain), and f(x) is the output (an element of the range). Graphically, the graph is y = f(x).

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.

A.SSE.1 Interpret expressions that represent a quantity in terms of its context. ᵀ

A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients, in context.ᵀ

A.SSE.1b Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors. ᵀ

A.SSE.2 Use the structure of an expression to rewrite it in different equivalent forms. For example, see $x^4 – y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 – y^2)(x^2 + y^2)$. ᵘ

A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A.REI.1 Using algebraic properties and the properties of real numbers, justify the steps of a simple, one-solution equation. Students should justify their own steps, or if given two or more steps of an equation, explain the progression from one step to the next using properties.

A.REI.3 Solve linear equations and inequalities in one variable including equations with coefficients represented by letters. For example, given ax + 3 = 7, solve for x..

F.BF.1 Write a function that describes a relationship between two quantities. ᵀ

F.BF.1b Combine standard function types using arithmetic operations in contextual situations (Adding, subtracting, and multiplying functions of different types). ᵀ

Monday	Tuesday	Wednesday	Thursday	Friday
Aug 3	Aug 4	Aug 5	Aug 6	Aug 7
Summer	UNIT 1			
	COMPLEX NUMBERS----------→			
	First Day of School			
Aug 10	Aug 11	Aug 12	Aug 13	Aug 14
UNIT 1				
COMPLEX NUMBERS, cont'd----------→				
Aug 17	Aug 18	Aug 19	Aug 20	Aug 21
UNIT 1				
FUNCTION vs. RELATION ----------I				
Aug 24	Aug 25	Aug 26	Aug 27	Aug 28
UNIT 1				
SOLVING LINEAR QUADRATIC, EXPONENTIAL, AND QUADRATIC FUNCTIONS----------→				
Aug 31	Sept 1	Sept 2	Sept 3	Sept 4
UNIT 1				
SOLVING LINEAR, QUADRATIC AND POLYNOMIAL FUNCTIONS----------I				
Sept 7	Sept 8	Sept 9	Sept 10	Sept 11
LABOR DAY	UNIT 1			
	SOLVING LINEAR, QUADRATIC, AND POLYNOMIAL FUNCTIONS			
Sept 14	Sept 15	Sept 16	Sept 17	Sept 18
UNIT 1				
SOLVING LINEAR, QUADRATIC, AND POLYNOMIAL FUNCTIONS			**Target Date – Unit 1 Review/Assessment**	

College Readiness Mathematics Unit 2 – Graphing and Describing Linear, Quadratic and Polynomial Functions

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

μEssential ΣSupporting *Additional

In this unit students, will:

- Graph and describe linear, quadratic, and polynomial functions.

In this unit students will graph linear, quadratic and polynomial functions. Students will identify the domain, range, end behavior, intervals of increase/decrease, intercepts, slope(linear), and axis of symmetry (quadratic). Students will write equations of parallel and perpendicular lines.

Teaching Map for Unit 2

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards

Graphing and Describing Functions

- Create & graph linear, exponential, quadratic, & polynomial functions, & show key features
- Identify characteristics of linear, exponential, quadratic & polynomial functions
- Calculate & interpret average rate of change
- Relate the domain of a function to its graph

Writing Functions

- Write a function in different but equivalent forms & explain different properties (ex. Write a linear function in slope-intercept and point-slope form, write a quadratic function in standard and vertex form, then identify the characteristics you can see in each form)
- Write equations of parallel and perpendicular lines
- Prove polynomial identities and use them to describe relationships (ex. $x^2 + y^2 = (x^2 - y^2)^2 + (2xy)^2$ can be used to generate Pythagorean triples)

F.IF.4μ Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior. (Limit to rational functions.)

F.IF.5Σ Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. (Limit to radical and rational functions.)

F.IF.6Σ Calculate and interpret the average rate of change of a function (presented symbolically or a as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. μ

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.

A.CED.2 Create linear, quadratic, and exponential equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (The phrase "in two or more variables" refers to formulas like the compound interest formula, in which A = P(1 + r/n)nt has multiple variables.)

F.BF.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. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.APR.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.* *

UNIT 2: Linear, Quadratic & Polynomial Functions *SUGGESTED PACING CALENDAR*

Monday	Tuesday	Wednesday	Thursday	Friday
Sept **21**	Sept **22**	Sept **23**	Sept **24**	Sept **25**
UNIT 2				
Graphing and Characteristics of Linear Quadratic and Polynomial Functions				
Fundamental Theorem of Algebra *Zero Product Theorem*	*Zeros from graphs, given zeros, list factors*	*Synthetic Division*	*Synthetic Division*	*Rational Root Theorem, Sythetic Division*
Sept **28**	Sept **29**	Sept **30**	Oct **1**	Oct **2**
UNIT 2				
Graphing and Characteristics of Linear Quadratic and Polynomial Functions				
Oct **5**	Oct **6**	Oct **7**	Oct **8**	Oct **9**
UNIT2				
Graphing and Characteristics of Linear Quadratic and Polynomial Functions ------I				INSERVICE
Oct **12**	Oct **13**	Oct **14**	Oct **15**	Oct **16**
~~FALL BREAK~~	~~FALL BREAK~~	~~FALL BREAK~~	~~FALL BREAK~~	~~FALL BREAK~~
Oct **19**	Oct **20**	Oct **21**	Oct **22**	Oct **23**
UNIT 2				
PARALLEL AND PERPENDICULAR LINES----------→				**Target Data – Unit 2 Assessment**

College Readiness Mathematics Unit 3 – Systems of Equations

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021Pacing Guide

μEssential Σ Supporting *Additional

In this unit students will:

- Solve systems of linear, quadratic and polynomial equations using various methods
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In this unit, students will solve a system using graphing, substitution, and elimination. Equations should be linear, quadratic, and polynomial.

TEACHING MAP FOR UNIT 3:

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards

Solving Systems

- Graphing Systems of linear, quadratic, and polynomial equations.
- Solve a system of linear, quadratic, and polynomial equations by substitution and explain why the method works
- Solve a system of linear, quadratic, and polynomial equations by elimination and explain why the method works
- Solve systems using tables and successive approximation
- Represent constraints by systems of equations and inequalities

A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret data points as possible (i.e. a solution) or not possible (i.e. a non-solution) under the established constraints.

A.REI.5 Show and explain why the elimination method works to solve a system of two-variable equations.

A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line y = –3x and the circle x2 + y2 = 3.

A.REI.11 Using graphs, tables, or successive approximations, show that the solution to the equation f(x) = g(x) is the x-value where the y-values of f(x) and g(x) are the same.

Monday	Tuesday	Wednesday	Thursday	Friday
Oct **26**	Oct **27**	Oct **28**	Oct **29**	Oct **30**
UNIT 3				
SOLVING SYSTEMS OF EQUATIONS ----------→				
Nov **2**	Nov **3**	Nov **4**	Nov **5**	Nov **6**
UNIT 3				
SOLVING SYSTEMS OF EQUATIONS ----------→				
Nov **9**	Nov **10**	Nov **11**	Nov **12**	Nov **13**
UNIT 3		Veteran's Day		
SOLVING SYSTEMS OF EQUATIONS ----------→			**Target Date – Unit 3 Review/Assessment**	

College Readiness Mathematics Unit 4A – ~~*Rational and*~~ Radical Functions

1st Semester

August 4 - December 18

September 7 (Labor Day Holiday); October 13-16 (Fall Holiday); November 11 (Veteran's Day); November 23-27 (Thanksgiving Holiday)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

μEssential ΣSupporting *Additional

In this unit students will:

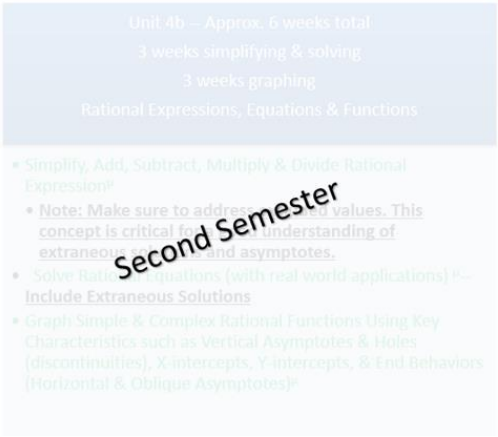
- Define rational exponents
- rewrite expressions involving radicals and rational exponents
- Explore Radical Functions (also discussions of "closure").
- Perform arithmetic operations with radical expressions and simplify arithmetic and radical expressions
- Investigate the properties of simple radical functions and then expand their knowledge of the graphical behavior and characteristics
- Solve equations and inequalities involving radical functions – understanding extraneous solutions are sometimes generated.
- Apply radical functions with an emphasis on interpretation of real world phenomena of the radical expressions
- Compose linear, quadratic, polynomial, and radical functions.

TEACHING MAP FOR UNIT 4A:

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards

Unit 4A – Radical Expressions, Equations, & Functions

- Rational vs. Irrational numbers
- Rewrite Radical Expressions as Expressions Containing Rational Exponents
- Simplify Expressions Written with Radicals or Rational Expressions
- Simplify, Add, Subtract, Multiply & Divide Radical Expressions
- Solve Radical Equations (with real world applications) – include extraneous solutions
- Graph Radical Functions (square root & cube root) – Notice Behavior & Key Characteristics such as Domain, Range, End Behavior, Symmetry & Transformations
- Composition of functions
- Relate the domain of a function to its graph
- Write a function in different but equivalent forms to explain different properties



N.RN.1μ Explain how the meaning of rational exponents follows from extending the properties of integer exponents to rational numbers, allowing for a notation for radicals in terms of rational exponents. *For example, we define* $5^{(1/3)}$ *to be the cube root of 5 because we want* $[5^{(1/3)}]^3 = 5^{[(1/3)\times 3]}$ *to hold, so* $[5^{(1/3)}]^3$ *must equal 5.*

N.RN.2Σ Rewrite expressions involving radicals and rational exponents using the properties of exponents.

A.REI.2μ Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

F.IF.4μ Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior. (Limit to rational functions.)

F.IF.5Σ Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. (Limit to radical and rational functions.)

F.IF.7μ Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. (Limit to rational functions.)

F.IF.7bμ Graph square root, cube root~~, and piecewise-defined functions, including step functions and absolute value functions.~~

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function..

F.BF.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. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Monday	Tuesday	Wednesday	Thursday	Friday
Nov **16**	Nov **17**	Nov **18**	Nov **19**	Nov **20**
UNIT 4A				
SIMPLIFY RADICAL EXPRESSIONS (RATIONAL EXPONENTIAL OR RADICAL FORM) ------I		COMPOSITION OF FUNCTIONS----------I		
Nov **23**	Nov **24**	Nov **25**	Nov **26**	Nov **27**
Thanksgiving Break				
Nov **30**	Dec **1**	Dec **2**	Dec **3**	Dec **4**
UNIT 4A				
GRAPH RADICAL EXPRESSIONS/NOTE CHARACTERISTICS----------→				
Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations				
Dec **7**	Dec **8**	Dec **9**	Dec **10**	Dec **11**
UNIT 4A			**Target Date – Unit 4A Review/Assessment**	
GRAPH RADICALS----I				
Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations				
Dec **14**	Dec **15**	Dec **16**	Dec **17**	Dec **18**
Final Exams Review		**Final Exams**		
				Last day of school (½ day)

College Readiness Mathematics Unit 4B – Rational ~~and Radical~~ Functions

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

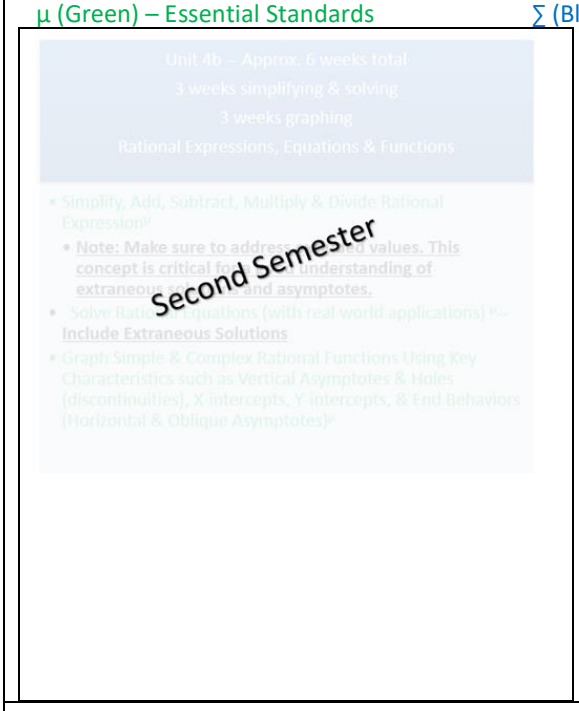
μEssential ΣSupporting *Additional

In this unit students will:

- Rewrite expressions involving rational exponents
- Explore Rational Functions (also discussions of "closure").
- Perform arithmetic operations with rational expressions and simplify arithmetic expressions
- Investigate the properties of simple rational functions and then expand their knowledge of the graphical behavior and characteristics of more complex rational functions
- Solve equations and inequalities involving rational functions – understanding extraneous solutions are sometimes generated.
- Apply rational functions with an emphasis on interpretation of real world phenomena of the rational expressions

TEACHING MAP FOR UNIT 4A:

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards



Unit 4b – Rational Expressions, Equations, & Functions

- Simplify, Add, Subtract, Multiply, & Divide Rational Expressions
  - Note: Make sure to address excluded values. This concept is critical for a good understanding of extraneous solutions and asymptotes.
- Solve Rational Equations (with real world applications)
  - Include Extraneous Solutions
- Graph Simple & Complex Rational Functions Using Key Characteristics such as Vertical Asymptotes & Holes (discontinuities), X-intercepts, Y-intercepts, & End Behaviors (Horizontal & Oblique Asymptotes)
- Use tables, graphs & verbal descriptions to interpret key characteristics of functions
- Compare properties of two functions represented in different ways
- Identify the effects of transformations on the graph
- Relate the domain of a function to its graph

A.REI.2μ Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

F.IF.4μ Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior. (Limit to rational functions.)

F.IF.5Σ Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. (Limit to radical and rational functions.)

F.IF.7μ Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. (Limit to rational functions.)

F.IF.7dμ Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.

F.BF.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. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.APR.7μ Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a non-zero rational expression; add, subtract, multiply, and divide rational expressions.

Jan **4**	Jan **5**	Jan **6**	Jan **7**	Jan **8**
Inservice	UNIT 4B			
	Rational Operations, Excluded Values----------I			
Jan **11**	Jan **12**	Jan **13**	Jan **14**	Jan **15**
	UNIT 4B			
	Solve Rational Equations, Extraneous solutions----------→			
Jan **18**	Jan **19**	Jan **20**	Jan **21**	Jan **22**
MLK Holiday	UNIT 4B			
	Solve Rational Equations, Extraneous solutions----------→			
Jan **25**	Jan **26**	Jan **27**	Jan **28**	Jan **29**
	UNIT 4B			
	Graph Rational Functions, Asymptotes, Characteristics----------→			
	Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations			
Feb **1**	Feb **2**	Feb **3**	Feb **4**	Feb **5**
	UNIT 4B			
	Graph Rational Functions, Asymptotes, Characteristics----------→			
	Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations			
Feb **8**	Feb **9**	Feb **10**	Feb **11**	Feb **12**
	UNIT 4B			
	Graph Rationals ----------I		**Target Date – Unit 4B Review/Assessment**	
	Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations			

College Readiness Mathematics Unit 5 –Exponential and Logarithmic Functions

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021Pacing Guide

In this unit, students will:

- Review exponential functions and their graphs
- Explore Exponential Growth
- Develop the Concept of a logarithm as an exponent, along with the inverse relationship with exponents
- Define Logarithms and Natural Logarithms
- Develop the Change-of-Base Formula
- Develop the Properties of Logarithms
- Solve Problems Relating to Exponential and Logarithmic Functions

TEACHING MAP FOR UNIT 5:

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards

Unit 5A – Properties and Equations of Exponentials of Logarithms

- Use the properties of exponents to transform exponential functions
- Concept of logarithm; convert between logarithmic & exponential forms
- Evaluate logarithms by hand
- Base 'e' (note: this is the first introduction to 'e')
- Properties of logarithms – power property, quotient property, product property, & identity
- Solve exponential & logarithmic equations

Unit 5B – Graphing Exponentials (start by comparing to Linear) & Logarithms

- Distinguish between linear or exponential situations
- Observe that exponential increasing functions will always exceed polynomial functions
- Construct linear & exponential functions given different representations
- Interpret the parameters of linear & exponential functions in terms of context
- Graphing exponential & logarithmic functions & show key features such as intercepts, end behavior, asymptote, periodicity, etc.
- Relate the domain of a function to its graph
- Graph exponential equations in two or more variables with labels and scales (ex. $A=P(1 + r/n)nt$
- Use the idea of inverse functions (Note: this is the first intro to inverse functions.)
- Compare properties of two functions represented in different ways
- Identify the effects of transformations on a graph

F.BF.5μ Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

A.SSE.3Σ Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. *(Limit to exponential and logarithmic functions.)*

A.SSE.3cΣ Use the properties of exponents to transform expressions for exponential functions. *For example, the expression 1.15^t , where t is in years, 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%.*

F.IF.7μ Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. *(Limit to exponential and logarithmic functions.)*

F.IF.7eμ Graph exponential and logarithmic functions, showing intercepts and end behavior.

A.CED.2 Create linear, quadratic, and exponential equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. (The phrase "in two or more variables" refers to formulas like the compound interest formula, in which A = P(1 + r/n)nt has multiple variables.)

F.IF.4 Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.IF.8Σ Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. (Limit to exponential and logarithmic functions.)

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one function and an algebraic expression for another, say which has the larger maximum.

F.BF.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. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table)

F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

F.LE.4 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.

F.LE.5 Interpret the parameters in a linear (f(x) = mx + b) and exponential (f(x) = a•dx) function in terms of context. (In the functions above, "m" and "b" are the parameters of the linear function, and "a" and "d" are the parameters of the exponential function.) In context, students should describe what these parameters mean in terms of change and starting value.

Monday	Tuesday	Wednesday	Thursday	Friday
Feb **15**	Feb **16**	Feb **17**	Feb **18**	Feb **19**
PRESIDENTS DAY	INSERVICE	UNIT 5A Review Exponents, Work on Exponent Fact Fluency----------I		
Feb **22**	Feb **23**	Feb **24**	Feb **25**	Feb **26**
UNIT 5A Exponent/Log Relationship as Inverses, solve equations, real world applications (Newton's Law of Cooling, HalfLife, Interest----------→				
Mar **1**	Mar **2**	Mar **3**	Mar **4**	Mar **5**
UNIT 5A Solving Simple Exponential and Log Eqs applications, base "e," "ln"----------I				
Mar **8**	Mar **9**	Mar **10**	Mar **11**	Mar **12**
UNIT 5A **Target Date – Unit 5A Review/Assessment**		UNIT 5B Graph Exponential and Logarithmic Functions, real world applications----------→ *Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations*		
Mar **15**	Mar **16**	Mar **17**	Mar **18**	Mar **19**
UNIT 5B Graph Exponential and Logarithmic Functions, attributes of exp & log graphs---------→ *Zeros, End Behavior, Y intercept, domain, range, intervals of increase and decrease, turning points, end behavior, average rate of change over an interval, even, odd, neither, transformations*				
Mar **22**	Mar **23**	Mar **24**	Mar **25**	Mar **26**
UNIT 5B Graph Exponential and Logarithmic Functions, attributes of exp & log graphs---------→			**Target Date – Unit 5B Review/Assessment**	

College Readiness Mathematics Unit 6 – Inequalities

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

μEssential ΣSupporting *Additional

In this unit students are graphing and solving compound inequalities. Students will graph linear inequalities in two variables. Students will create linear equalities.

TEACHING MAP FOR UNIT 6:

μ (Green) – Essential Standards ∑ (Blue) – Supporting Standards * (Orange/Red) – Additional Standards

Linear Inequalities in One Variable

- Solve equations & inequalities including equations with variable coefficients
- Write & solve equations & inequalities
- Justify the steps of solving a simple equation using algebraic properties

Linear Inequalities in Two Variables

- Solve & interpret data as possible or not possible solutions
- Graph the solution set to a linear inequality

A.CED.3* Represent constraints by equations or inequalities, and by systems of equation and/or inequalities, and interpret data points as possible (i.e. a solution) or not possible (i.e. a non-solution) under the established constraints.

A.CED.1* Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear, quadratic, simple rational, and exponential functions (integer inputs only).

A.REI.1 Using algebraic properties and the properties of real numbers, justify the steps of a simple, one-solution equation. Students should justify their own steps, or if given two or more steps of an equation, explain the progression from one step to the next using properties.

A.REI.3 Solve linear equations and inequalities in one variable including equations with coefficients represented by letters. For example, given $ax + 3 = 7$, solve for x.

A.REI.12 Graph the solution set to a linear inequality in two variables.

Monday	Tuesday	Wednesday	Thursday	Friday
Mar **29**	Mar **30**	Mar **31**	Apr **1**	Apr **2**
Spring Break				
Apr **5**	Apr **6**	Apr **7**	Apr **8**	Apr **9**
UNIT 6				
LINEAR INEQUALITIES IN ONE VARIABLE				
Apr **12**	Apr **13**	Apr **14**	Apr **15**	Apr **16**
UNIT 6				
LINEAR INEQUALITIES IN TWO VARIABLES----------I			**Target Date – Unit 6 Review & Assessment**	

College Readiness Mathematics Unit 7 – Geometry

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

μEssential ΣSupporting *Additional

In This Unit Students will use properties of polynomials to find perimeter, area, and volume. Students will use sine, cosine, and tangent to solve right triangles.

TEACHING MAP FOR UNIT 7:

Perimeter, Area and Volume

- Add, subtract and multiply polynomials
- Represent sides of polygons with polynomials to calculate perimeter, area, volume and surface area.
- Find perimeter and area on the coordinate plane.
- Apply geometric methods to solve design problems
- Apply concepts of density based on area & volume
- Use coordinates to prove simple geometric theorems
- Give informal arguments for geometric formulas
- Use units of measure as a way to understand problems
- Define appropriate quantities
- Rearrange formulas to highlight a specific variable

Right Triangle Trigonometry

- Application of Sin, Cos, Tan (this is additional based on input from surrounding college algebra teachers)

A.APR.1 Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations. Σ

N.Q.1 Use units of measure (linear, area, capacity, rates, and time) as a way to understand problems: a. Identify, use, and record appropriate units of measure within context, within data displays, and on graphs; b. Convert units and rates using dimensional analysis (English-to-English and Metric-to-Metric without conversion factor provided and between English and Metric with conversion factor); c. Use units within multi-step problems and formulas; interpret units of input and resulting units of output.

N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. Given a situation, context, or problem, students will determine, identify, and use appropriate quantities for representing the situation.

A.CED.4 Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations. Examples: Rearrange Ohm's law V = IR to highlight resistance R; Rearrange area of a circle formula A = π r2 to highlight the radius r.

G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0,2). (Focus on quadrilaterals, right triangles, and circles.)

G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

G.GMD.1 Give informal arguments for geometric formulas. a. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments. b. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieri's principle.

G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G.MG.3 Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Monday	Tuesday	Wednesday	Thursday	Friday
Apr **19**	Apr **20**	Apr **21**	Apr **22**	Apr **23**
UNIT 7				
PERIMETER, AREA VOLUME----------				I
Apr **26**	Apr **27**	Apr **28**	Apr **29**	Apr **30**
UNIT 7				
RIGHT TRIANGLE TRIGONOMETRY				
May **3**	May **4**			
UNIT 7				
Target Date – Unit 7 Review/Assessment				

College Readiness Mathematics Unit 8 – Statistics and Sequences

2nd Semester

January 5 - May 26

January 18 (MLK Holiday); February 15 (President's Day Holiday); February 16 (Student Holiday) March 29-April 2 (Spring Break)

College Readiness Mathematics Georgia Standards of Excellence 2020-2021 Pacing Guide

μEssential Σ Supporting *Additional

In this Units, Students will identify terms and notations in statistics. Students will identity types of data and compare one and two variable data sets. Students write arithmetic and geometric sequences.

TEACHING MAP FOR UNIT 8:

Statistics

- Make inferences about population parameters based on a random sample.
- Decide if a specified model is consistent with results from a data-generating process
- Recognize the purposes and differences among sample surveys, experiments and observational studies
- Use data from a sample survey to estimate a population mean or develop a margin of error
- Use data from a randomized experiment to compare two treatments
- Evaluate reports based on data for flaws in data, biases, collection methods, etc.
- Represent data w/ dot plots, histograms & box plots
- Compare the measures of center and spread
- Use the mean & standard deviation to fit a set to a normal distribution & estimate pop. percentages
- Interpret differences in shape, center & spread
- Create & interpret two-way frequency tables
- Represent two variable data on a scatterplot
- Interpret the slope & intercept of a linear model
- Compute & interpret the correlation coefficient & line of best fit
- Distinguish between correlation and causation

Sequences

- Write arithmetic sequences both explicitly and recursively, translate between the two forms, and connect to linear functions.
- Write geometric sequences both explicitly and recursively, translate between the two forms, and connect to exponential functions.

S.IC.1Σ Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S.IC.2Σ Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?

S.IC.3μ Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S.IC.4μ Use data from a sample survey to estimate a population mean or proportion develop a margin of error through the use of simulation models for random sampling.

S.IC.5Σ Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S.IC.6Σ Evaluate reports based on data. For example, determining quantitative or categorical data; collection methods; biases or flaws in data.

S.ID.2μ Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, mean absolute deviation, standard deviation) of two or more different data sets.

S.ID.4μ Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

F.BF.2 Write arithmetic and geometric sequences recursively and explicitly, use them to model situations, and translate between the two forms. Connect arithmetic sequences to linear functions and geometric sequences to exponential functions.

S.ID.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).

S.ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). Summarize, represent, and interpret data on two categorical and quantitative variables

S.ID.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

S.ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8 Compute (using technology) and interpret the correlation coefficient "r" of a linear fit. (For instance, by looking at a scatterplot, students should be able to tell if the correlation coefficient is positive or negative and give a reasonable estimate of the "r" value.) After calculating the line of best fit using technology, students should be able to describe how strong the goodness of fit of the regression is, using "r".

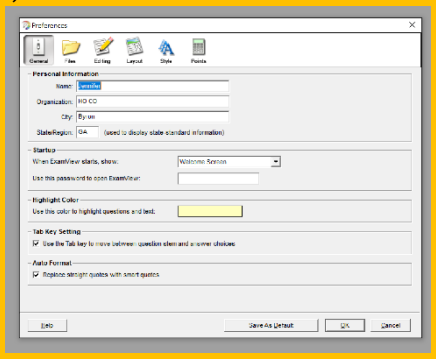
S.ID.9 Distinguish between correlation and causation.

Monday	Tuesday	Wednesday	Thursday	Friday
		May **5**	May **6**	May **7**
		UNIT 8		
		STATISTICS----------→		
May **10**	May **11**	May **12**	May **13**	May **14**
UNIT 8				
Statistics			**Sequences**	
May **17**	May **18**	May **18**	May **20**	May **21**
UNIT 8				
SEQUENCES			**Review for Finals**	
May **24**	May **25**	May **26**	May **27**	May **28**
Final Exams				
		LAST DAY OF SCHOOL (½ Day)		

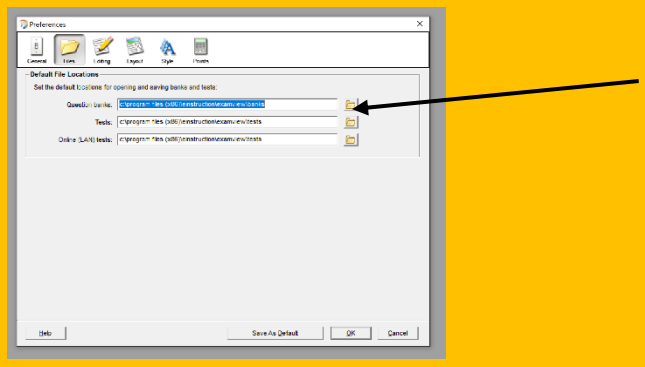
How to Make ExamView Banks Easily Accessible

Open ExamView Test Generator

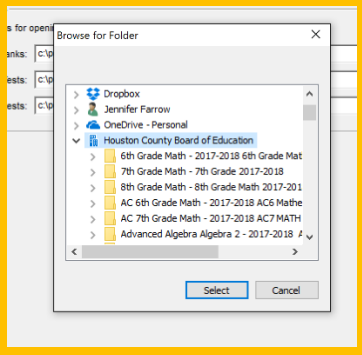
1. After closing the welcome menu, choose the EDIT tab. Select “Preferences”



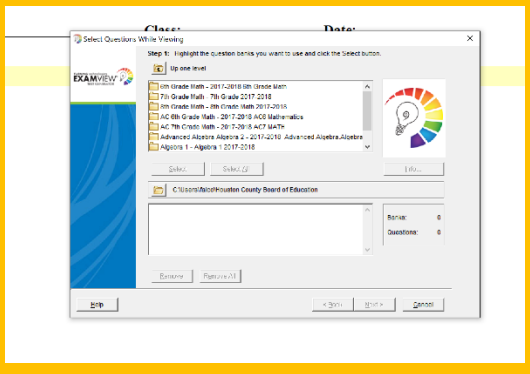
2. In this window, choose “Files” and then the file folder icons next to Question banks.



3. Navigate to the location of the course materials on your computer -Houston County Board of Education Synced Files. Highlight and select. Click OK.



4. Now when you go to create a test and select questions, ExamView will default to this location. ExamView Banks are located in the ExamView folder and in each Unit’s Assessment folder.




HOUSTON COUNTY
BOARD OF EDUCATION
HIGH-ACHIEVING STUDENTS
MATHEMATICS
DEPARTMENT