HOUSTON COUNTY SCHOOLS
MATHEMATICS DEPARTMENT

ALGEBRA 1
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 essential content, listed below.

PACING GUIDE & TEACHER PLANNER

Math teachers from every 6-12 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 "Priority "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.

$^{\mu}$Essential $^{\Sigma}$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 majority 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.

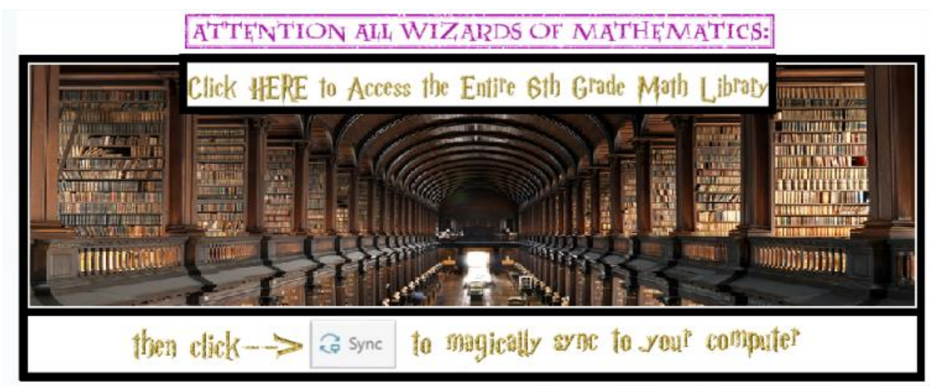
What resources are available for me?

What's on your SharePoint Course page?	• Unit Plans • "I Can" Statements with Examples • Unit Assessments • Daily PODs • 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/

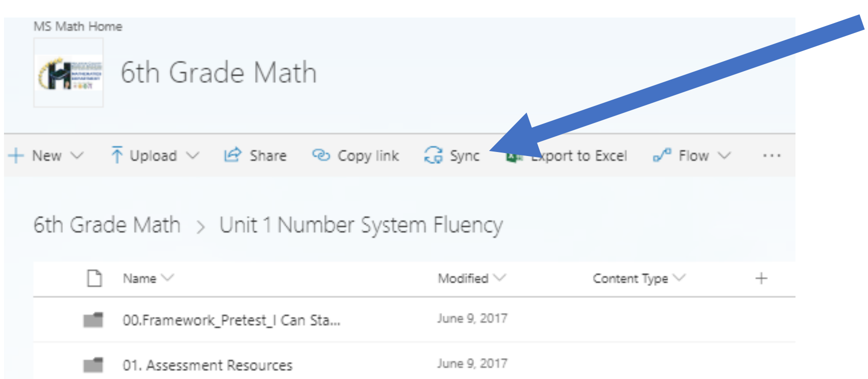
How do I sync the mathematics material to my file library on my desktop?

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

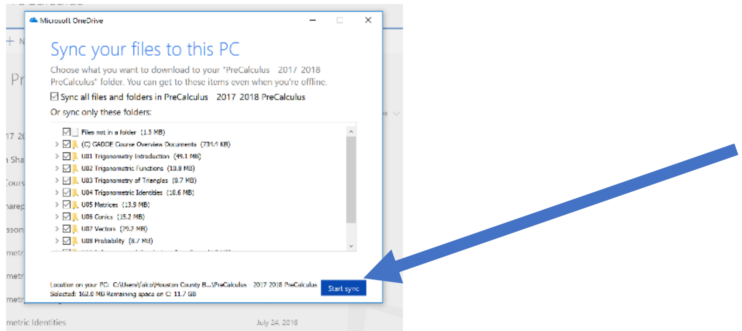
1. Navigate to your course home on SharePoint and click the icon below.



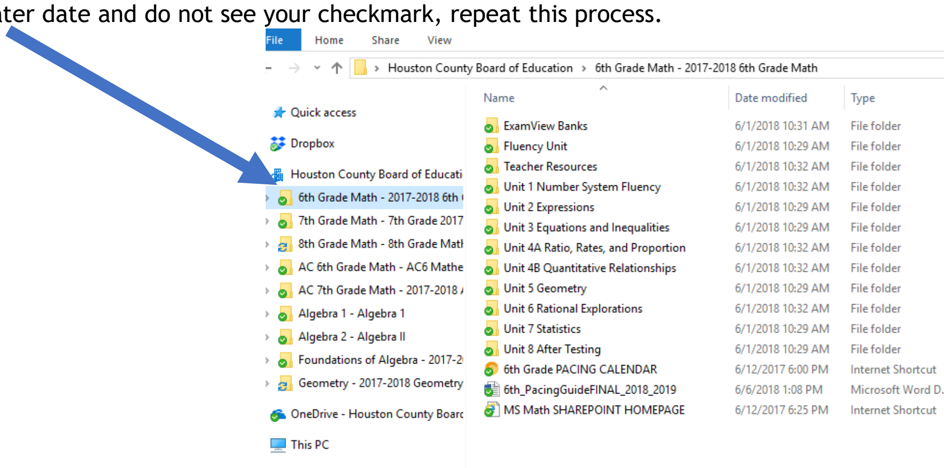
2. You are now in your course's document library. Click the Sync Button.



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

Algebra 1 Unit 1 - Relationships Between Quantities

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

Algebra 1 Georgia Standards of Excellence 2020-2021 Pacing Guide

µEssential ΣSupporting *Additional

Concept 1 (0.5 week) Units of Measure Graphically and Situationally

µN.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.

***N.Q.3** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. For example, money situations are generally reported to the nearest cent (hundredth). Also, an answers' precision is limited to the precision of the data given. Set up and label graphs correctly

- **Define appropriate units for situations**
- **Convert using dimensional analysis**
- **Choose appropriate level of accuracy**

Limit dimensional analysis to 2-step conversions. Throughout the remaining units of Algebra I, all measurements should be appropriately labeled and attention should be given to precision and accuracy.

Concept 2 (0.5 week) Parts of Expressions and Equations

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

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

µA.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.

- **Identify terms', factors', and coefficients' meaning in context**
- **Translate words to symbols and vice versa**

Focus on interpreting the parts of the expressions in context.

Concept 3 (1.5 weeks) Perform Polynomial Operations and Closure

µA.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.

- **Classify polynomials**
- **Add, subtract, and multiply polynomials**
- **Determine if "closure" exists for real numbers and for polynomials**

Limit operations with polynomials to the 2nd degree. Higher degree polynomials will be addressed in Algebra II.

Concept 4 (1.5 weeks) Radicals and Rational and Irrational Number Properties

µN.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. (i.e., simplify and/or use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots).

ΣN.RN.3 Explain why the sum or product of rational numbers is rational; why the sum of a rational number and an irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational.

Simplify radical expressions

- **Determine rational or irrational solution after performing operations on rational and irrational numbers**

Radical expression simplification is in Unit 1 to prepare students to simplify the radical expressions in quadratics in Unit 4. Limit simplification of radicands to numerical expressions. Simplify roots with highest index of 2.

This unit should take approximately 4 weeks.

ALGEBRA 1 – UNIT 1 CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Aug 3	Aug 4	Aug 5	Aug 6	Aug 7
Pre-Planning	**Unit 1, Concept 1**			
Aug 10	Aug 11	Aug 12	Aug 13	Aug 14
MAP Testing	**MAP Testing**	**Unit 1 Concept 2**		
Not necessarily these exact dates. Ask your API for exact dates.	Not necessarily these exact dates. Ask your API for exact dates.			
Aug 17	Aug 18	Aug 19	Aug 20	Aug 21
Unit 1, Concept 3				
Aug 24	Aug 25	Aug 26	Aug 27	Aug 28
Unit 1, Concept 3			**Unit 1, Concept 4**	
Aug 31	Sept 1	Sept 2	Sept 3	Sept 4
Unit 1, Concept 4			**Target date: Review/Assessment**	

Algebra 1 Unit 2 - Reasoning with Linear Equations and Inequalities

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)

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µEssential ΣSupporting *Additional

Concept 1 (4 weeks) Creating and Solving Linear Equations

µ**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)~~.
µ**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.)
µ**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.
µ**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 $A = \pi r^2$ to highlight the radius r.~~*
Σ**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.
Σ**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.5** Show and explain why the elimination method works to solve a system of two-variable equations.
Σ**A.REI.6** Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
Σ**A.REI.10** Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.
Σ**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.
Σ**A.REI.12** Graph the solution set to a linear inequality in two variables.

- **Model situations with equations and inequalities**
- **Rearrange formulas and literal equations**
- **Solve and graph systems of equations and inequalities with various strategies**

Concept 1 builds upon students' prior understanding of equations and inequalities. Valuable teaching time will be lost by starting all the way over in 8th grade content. Refer to the chart in the unit plan to see how Unit 2 takes concepts already covered and extends them to include proof, literal equations, compound and two-variable inequalities, and systems of 2-variable inequalities.

Concept 2 (1.5 weeks) Function Overview with Notation

µ**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).
Σ**F.IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
µ**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.~~
Σ**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.
Σ**F.IF.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
Σ**F.IF.7** Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.
Σ**F.IF.7a** Graph linear ~~and quadratic~~ functions and show intercepts, maxima, and minima (as determined by the function or by context).
Σ**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.*

- **Define and identify functions and their domain and range**
- **Use function notation**
- **Compare functions, noting key features**

In 8th grade students learned about functions but did not use function notation. Algebra I introduces f(x), domain, range, and key features using interval notation.

Concept 3 (2 weeks) Linear Functions as Sequences

µ**F.BF.1** Write a function that describes a relationship between two quantities.
µ**F.BF.1a** Determine an explicit expression and the recursive process (steps for calculation) from context. *For example, if Jimmy starts out with $15 and earns $2 a day, the explicit expression "2x+15" can be described recursively (either in writing or verbally) as "to find out how much money Jimmy will have tomorrow, you add $2 to his total today."* $J_n = J_{n-1} + 2, J_0 = 15$
Σ**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
***F.IF.3** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. (Generally, the scope of high school math defines this subset as the set of natural numbers 1,2,3,4...) By graphing or calculating terms, students should be able to show how the recursive sequence $a_1=7$, $a_n=a_{n-1}+2$; the sequence $s_n = 2(n-1) + 7$; and the function f(x) = 2x + 5 (when x is a natural number) all define the same sequence.

- **Identify and define arithmetic sequences explicitly and recursively**
- **Connect arithmetic sequences to linear functions with appropriate domains**

Students should be able to tell if a given sequence is or is not arithmetic, but they do not write geometric sequences until Unit 3.

ALGEBRA 1 – UNIT 2 CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Sept 7	Sept 8	Sept 9	Sept 10	Sept 11
LABOR DAY	Unit 2, Concept 1			
Sept 14	Sept 15	Sept 16	Sept 17	Sept 18
Unit 2, Concept 1				
Sept 21	Sept 22	Sept 23	Sept 24	Sept 25
Unit 2, Concept 1				
Sept 28	Sept 29	Sept 30	Oct 1	Oct 2
Unit 2, Concept 1				
Oct 5	Oct 6	Oct 7	Oct 8	Oct 9
Unit 2, Concept 2				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, Concept 2			Unit 2, Concept 3	
Oct 26	Oct 27	Oct 28	Oct 29	Oct 30
Unit 2, Concept 3				
Nov 2	Nov 3	Nov 4	Nov 5	Nov 6
Unit 2, Concept 3			Target date: Review/Assessment	

Algebra 1 Unit 3 – Modeling and Analyzing Exponential 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)

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µEssential ΣSupporting *Additional

Concept 1 (1 weeks) Geometric Sequences and Exponential Functions

µF.BF.1 Write a function that describes a relationship between two quantities.
µF.BF.1a Determine an explicit expression and the recursive process (steps for calculation) from context. *For example, if Jimmy starts out with $15 and earns $2 a day, the explicit expression "2x+15" can be described recursively (either in writing or verbally) as "to find out how much money Jimmy will have tomorrow, you add $2 to his total today."* $J_n = J_{n-1} + 2, J_0 = 15$
ΣF.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.
µF.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).
ΣF.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
***F.IF.3** Recognize that sequences are functions, sometimes-defined recursively, whose domain is a subset of the integers. (Generally, the scope of high school math defines this subset as the set of natural numbers 1,2,3,4...) By graphing or calculating terms, students should be able to show how the recursive sequence $a_1=7$, $a_n=a_{n-1}+2$; the sequence $s_n = 2(n-1) + 7$; and the function f(x) = 2x + 5 (when x is a natural number) all define the same sequence.
ΣA.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.

Identify and define geometric sequences explicitly and recursively

- **Connect geometric sequences to exponential functions with appropriate domains**
- **Compare arithmetic and geometric sequences**
- **Describe, evaluate, and solve exponential functions**

Geometric sequences extend students' sequence knowledge and reveals exponential relationships. As you move through this unit, reference comparisons with Unit 2. Doing so will save valuable time in Unit 5 which compares and contrasts linear, exponential, and quadratic functions!

Concept 2 (1 weeks) Writing Exponential Functions from Context

µA.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).
µA.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.)

- **Write exponential equations for given situations**

Focus on relating equations and context. Solve very basic exponential equations that do not require logarithms.

Concept 3 (2 weeks) Graphing Exponential Equations and Analyzing Attributes of Graphs

µF.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.
µF.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.~~
ΣF.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.*
ΣF.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
Analyze functions using different representations.
ΣF.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.
ΣF.IF.7e Graph exponential ~~and logarithmic~~ functions, showing intercepts and end behavior, ~~and trigonometric functions, showing period, midline, and amplitude.~~
ΣF.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.*

- **Graph and interpret key features of exponential functions in context of situations**
- **Graphing transformations of exponential functions**

Students are able to discuss the key attributes of graphs of exponential functions, including functions that have been transformed. Key features include domain, range, end behavior, increasing or decreasing intervals, and average rate of change over an interval.

This unit should take approximately 4 weeks.

ALGEBRA 1 – UNIT 3 CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Nov 9	Nov 10	Nov 11	Nov 12	Nov 13
Unit 3, Concept 1	**Unit 3, Concept 1**	Veteran's Day	**Unit 3, Concept 1**	**Unit 3, Concept 1**
Nov 16	Nov 17	Nov 18	Nov 19	Nov 20
Unit 3, Concept 2	**Unit 3, Concept 2**	**Unit 3, Concept 2**	**Unit 3, Concept 2**	**Unit 3, Concept 2**
Nov 23	Nov 24	Nov 25	Nov 26	Nov 27
THANKSGIVING	**THANKSGIVING**	**THANKSGIVING**	**THANKSGIVING**	**THANKSGIVING**
Nov 30	Dec 1	Dec 2	Dec 3	Dec 4
MAP Testing	**MAP Testing**	**Unit 3, Concept 3**	**Unit 3, Concept 3**	**Unit 3, Concept 3**
Not necessarily these exact dates. Ask your API for exact dates.	Just know 2 instructional days will be taken from this month.			
Dec 7	Dec 8	Dec 9	Dec 10	Dec 11
Unit 3, Concept 3	**Unit 3, Concept 3**	**Unit 3, Concept 3**	**Target date: Review/Assessment**	**Target date: Review/Assessment**
Dec 14	Dec 15	Dec 16	Dec 17	Dec 18
Review	**Review**	**Final Exams**	**Final Exams**	**Final Exams**
				Last day of school (½ day)

Algebra 1 Unit 4 – Modeling and Analyzing Quadratic 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)

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$^{\mu}$Essential $^{\Sigma}$Supporting *Additional

OVER-ARCHING STANDARDS, UNIT 4
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.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.1 Write a function that describes a relationship between two quantities.

Concept 1 (2 weeks) Analyzing Quadratic Functions through Graphing

$^{\mu}$**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.

$^{\mu}$**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).

$^{\Sigma}$**F.IF.2** Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

$^{\mu}$**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.~~

$^{\Sigma}$**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.*

$^{\Sigma}$**F.IF.6** Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

$^{\Sigma}$**F.IF.7** Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.

F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima (as determined by the function or by context).

$^{\Sigma}$**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.*

- **Graph quadratic functions from vertex, standard, and intercept forms**
- **Graph transformations of quadratic functions**
- **Identify quadratic relations as functions, using function notation and interpreting key features of their graphs**

Graphing transformations of exponential functions from Unit 3 extends here in Unit 4 to transformations of quadratic functions. Students should also work with various forms of quadratic equations. Note that modeling real-world situations and writing functions in equivalent forms should be included throughout the unit.

Concept 2 (3.5 weeks) Using Factors to Solve Quadratic Equations

$^{\Sigma}$**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 $(x^2 – y^2)(x^2 + y^2)$.

$^{\Sigma}$**A.SSE.3** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

$^{\Sigma}$**A.SSE.3a** Factor any quadratic expression to reveal the zeros of the function defined by the expression.

$^{\Sigma}$**A.SSE.3b** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function defined by the expression.

$^{\mu}$**REI.4b** 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).

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

$^{\mu}$**F.IF.8a** Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. *For example, compare and contrast quadratic functions in standard, vertex, and intercept forms.*

- **Factor quadratic equations**
- **Solve quadratic equations by factoring and using the zero product property**
- **Use special factors to solve quadratic equations**
- **Recognize that some quadratics are unfactorable**

Solutions of quadratics are also called zeros, roots, and x-intercepts. Factoring methods include greatest common factors, difference of squares, trinomials, and grouping.

Concept 3 (2.5 weeks) Using Other Methods to Solve Quadratic Equations

$^{\Sigma}$**A.SSE.3b** Complete the square in a quadratic expression to reveal the maximum or minimum value of the function defined by the expression.

$^{\mu}$**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 $A = \pi r^2$ to highlight the radius r.*

$^{\Sigma}$**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.

$^{\mu}$**A.REI.4** Solve quadratic equations in one variable.

$^{\mu}$**A.REI.4a** 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 solutions. Derive the quadratic formula from $ax^2 + bx + c = 0$.

$^{\mu}$**A.REI.4b** 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).

$^{\mu}$**F.IF.8** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

- **Solve by taking square roots, completing the square, and using the quadratic formula**
- **Derive the quadratic formula**
- **Choose an appropriate method for solving (graphing, factoring, taking the square root, completing the square, or using the quadratic formula)**
- **Solve and use solutions and equation forms to interpret key features of graphs**

Because not all quadratic equations are factorable, other methods of solving are necessary. These methods are listed above. Remember that all solutions should be real.

ALGEBRA 1 – UNIT 4 CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Jan 4	Jan 5	Jan 6	Jan 7	Jan 8
INSERVICE	**Unit 4, Concept 1**			
Jan 11	Jan 12	Jan 13	Jan 14	Jan 15
Unit 4, Concept 1				
Jan 18	Jan 19	Jan 20	Jan 21	Jan 22
Martin Luther King, Jr Holiday	**Unit 4, Concept 2**			
Jan 25	Jan 26	Jan 27	Jan 28	Jan 29
Unit 4, Concept 2				
Feb 1	Feb 2	Feb 3	Feb 4	Feb 5
Unit 4, Concept 2				
Feb 8	Feb 9	Feb 10	Feb 11	Feb 12
Unit 4, Concept 3				
Feb 15	Feb 16	Feb 17	Feb 18	Feb 19
PRESIDENTS' DAY	**INSERVICE**	**Unit 4, Concept 3**		
Feb 22	Feb 23	Feb 24	Feb 25	Feb 26
Unit 4, Concept 3			**Target date: Reivew/Assessment**	

Algebra 1 Unit 5 - Comparing and Contrasting 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)

Algebra 1 Georgia Standards of Excellence 2020-2021 Pacing Guide

µEssential ΣSupporting *Additional

Concept 1 (1 week) Distinguishing Between LEQ Functions

µF.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.
µF.LE.1a Show that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. (This can be shown by algebraic proof, with a table showing differences, or by calculating average rates of change over equal intervals).
µF.LE.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
µF.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
ΣF.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).
ΣF.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.

- **Identify function type from situations, graphs, and tables**
- **Write equations for various representations of these types of functions**
- **Compare rates of change for these function types, recognizing that exponential eventually exceeds the other types**

In Concept 1, students will pull the last three units together. Focus on distinguishing the types of functions from various representations.

Concept 2 (1 week) Graphing LEQ Functions

ΣF.LE.5 Interpret the parameters in a linear ($f(x) = mx + b$) and exponential ($f(x) = a\bullet d^x$) 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.
µF.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.
µF.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).
ΣF.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
µF.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.~~
ΣF.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.*
ΣF.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
ΣF.IF.7 Graph functions expressed algebraically and show key features of the graph both by hand and by using technology.
ΣF.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.*

- **Interpret parameters (literally and in context) of functions' equations**
- **Determine average rate of change of functions over specified intervals**
- **Identify and describe even and odd functions**
- **Compare properties of functions**

Graph the three types of functions with and without transformations, identifying key characteristics of each function. Extend to even and odd functions.include greatest common factors, difference of squares, trinomials, and grouping.

This unit should take approximately 2 weeks.

ALGEBRA 1 – UNIT 5 CALENDAR

Monday	Tuesday	Wednesday	Thursday	Friday
Mar **1**	Mar **2**	Mar **3**	Mar **4**	Mar **5**
Unit 5, Concept 1				**Unit 5, Concept 2**
Mar **8**	Mar **9**	Mar **10**	Mar **11**	Mar **12**
Unit 5, Concept 2			**Target date: Review/Assessment**	

Algebra 1 Unit 6 - Describing Data

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)

Algebra 1 Georgia Standards of Excellence 2020-2021 Pacing Guide

µEssential ΣSupporting *Additional

Concept 1 (1.5 weeks) Summary Statistics and Shapes of Distributions

Σ**S.ID.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).
Σ**S.ID.2** 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.
Σ**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 a single variable**
- **Describe a distribution using correct measures of center and spread**
- **Describe a distribution that is symmetric or skewed**
- **Identify outliers and describe their effects on summary statistics**

New material includes calculating outliers, mean absolute deviation, and shape vocabulary. All other summary statistics should be review. Standard deviation is not included in the standards.

Concept 2 (0.5 week) Two-Way Tables

Σ**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.

- **Create two-way tables, and interpret joint, marginal, and relative frequencies in these tables**
- **Analyze associations and trends in data**

In 8th grade, students briefly overview two-way tables. They should already be familiar with relative frequencies only. Extend to new concept of conditional relative frequencies.

Concept 3 (2 weeks) Regression and Correlation vs. Causation

µ**S.ID.6** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
µ**S.ID.6a** Decide which type of function is most appropriate by observing graphed data, charted data, or by analysis of context to generate a viable (rough) function of best fit. Use this function to solve problems in context. Emphasize linear, quadratic and exponential models.
µ**S.ID.6c** Using given or collected bivariate data, fit a linear function for a scatter plot that suggests a linear association.
Σ**S.ID.7** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
µ**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".
Σ**S.ID.9** Distinguish between correlation and causation.

- **Create scatterplots from data, then recognize trends or associations**
- **Determine if data is best fit by a linear, quadratic, or exponential function**
- **Write the equation of a function that represents the line of best fit for a data set**
- **Use technology to compute regression and the correlation coefficient**
- **Distinguish between correlation and causation**

In 8th grade, students briefly overview scatter plots. New material includes regression, correlation coefficients, and correlation versus causation. Residuals are not included in the standards.

This unit should take approximately 4 weeks.

Monday	Tuesday	Wednesday	Thursday	Friday
Mar **15**	Mar **16**	Mar **17**	Mar **18**	Mar **19**
MAP Testing		**Unit 6, Concept 1**		
Not necessarily these exact dates. Ask your API for exact dates.	Just know 2 instructional days will be taken from this month.			
Mar **22**	Mar **23**	Mar **24**	Mar **25**	Mar **26**
Unit 6, Concept 1		**Unit 6, Concept 2**		
Mar **29**	Mar **30**	Mar **31**	Apr **1**	Apr **2**
SPRING BREAK	**SPRING BREAK**	**SPRING BREAK**	**SPRING BREAK**	**SPRING BREAK**
Apr **5**	Apr **6**	Apr **7**	Apr **8**	Apr **9**
Unit 6, Concept 3				
Apr **12**	Apr **13**	Apr **14**	Apr **15**	Apr **16**
Unit 6, Concept 3			**Target date: Review/Assessment**	

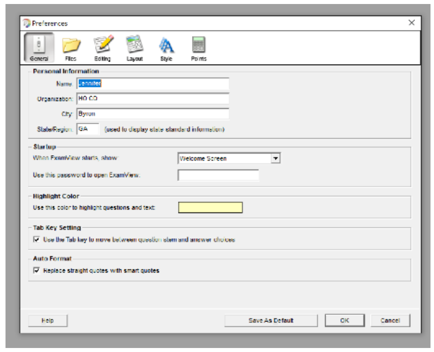
Monday	Tuesday	Wednesday	Thursday	Friday
Apr **19**	Apr **20**	Apr **21**	Apr **22**	Apr **23**
Apr **26**	Apr **27**	Apr **28**	Apr **29**	Apr **30**
May **3**	May **4**	May **5**	May **6**	May **7**
Review for Finals/Prepare for Geometry				
May **10**	May **11**	May **12**	May **13**	May **14**
Review for Finals/Prepare for Geometry				
May **17**	May **18**	May **19**	May **20**	May **21**
Review for Finals				
May **24**	May **25**	May **26**	May **27**	May **28**
Final Exams				

*Note: There is pending legislation to require testing only during the last 25 days of school, so these testing windows could change. These dates are left blank for you to fill in later when you know the actual GMAS dates for Spring 2021.

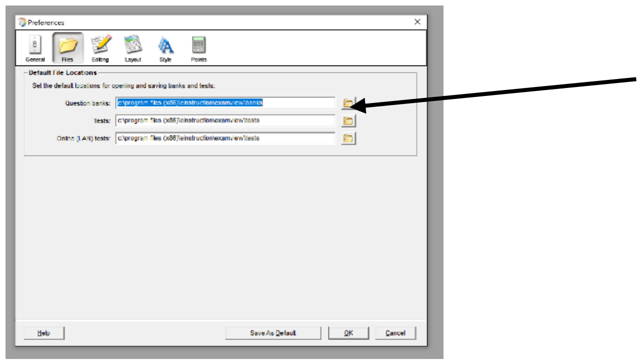
How to Make ExamView Banks Easily Accessible

Open ExamView Test Generator

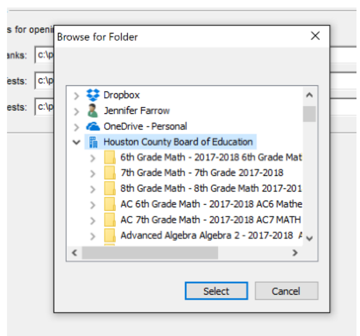
1. After closing the welcome menu, choose the EDIT tab. Select “Preferences”



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.