CASE Benchmark Assessments
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Tennessee
MATH I (Semester)
2018-2019 Pacing Guide

Unit	Standards	Major Topics/Concepts
Quantities	M1.N.Q.A.1 M1.N.Q.A.2 M1.N.Q.A.3	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. Identify, interpret, and justify appropriate quantities for the purpose of descriptive modeling. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Expressions and Equations	M1.A.SSE.A.1 M1.A.CED.A.1 M1.A.CED.A.4 M1.A.REI.A.1	Interpret expressions that represent a quantity in terms of its context. ✓ Interpret parts of an expression, such as terms, factors, and coefficients. ✓ Interpret complicated expressions by viewing one or more of their parts as a single entity. Create equations and inequalities in one variable and use them to solve problems. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Linear Functions	M1.F.IF.A.1 M1.F.IF.A.2 M1.F.IF.B.3 M1.F.IF.B.4 M1.F.IF.B.5 M1.F.IF.C.6a M1.F.IF.C.7 M1.F.LE.A.1b	Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function, and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. 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. Graph functions expressed symbolically, and show key features of the graph, by hand and using technology. ✓ Graph linear and quadratic functions, and show its intercepts, maxima, and minima.

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		Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Distinguish between situations that can be modeled with linear functions and with exponential functions. ✓ Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
Modeling Linear Functions	M1.F.BF.A.1a M1.F.BF.A.2 M1.F.LE.A.1 M1.F.LE.A.2 M1.F.LE.B.4	Write a function that describes a relationship between two quantities. ✓ Determine an explicit expression, a recursive process, or steps for calculation from a context. Write arithmetic and geometric sequences with an explicit formula and use them to model situations. Distinguish between situations that can be modeled with linear functions and with exponential functions. ✓ Recognize that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. ✓ Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. ✓ Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. Interpret the parameters in a linear or exponential function in terms of a context.
Exponential Functions	M1.A.CED.A.1 M1.A.CED.A.2 M1.A.REI.C.3 M1.A.REI.C.4 M1.A.SSE.B.2a M1.F.IF.A.1 M1.F.IF.A.2 M1.F.IF.B.3 M1.F.IF.B.4 M1.F.IF.B.5 M1.F.IF.C.7 M1.F.BF.A.2 M1.F.LE.A.1b M1.F.LE.A.1c M1.F.LE.A.3 M1.F.LE.B.4	Create equations and inequalities in one variable and use them to solve problems. Create equations in two or more variables to represent relationships between quantities; graph equations with two variables on coordinate axes with labels and scales. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ✓ Use the properties of exponents to rewrite exponential expressions. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function, and x is an element of its

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		domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. 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. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). Write arithmetic and geometric sequences with an explicit formula and use them to model situations. Distinguish between situations that can be modeled with linear functions and with exponential functions. ✓ Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. ✓ Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly. Interpret the parameters in a linear or exponential function in terms of a context.
1st Cumulative Benchmark (covering all content to this point)		
Systems of Equations	M1.A.CED.A.3 M1.A.CED.A.4 M1.A.REI.B.2 M1.A.REI.C.4 M1.A.REI.C.5	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. Write and solve a system of linear equations in context. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the approximate solutions using technology. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the

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		solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
One-Variable Statistics	M1.S.ID.A.1 M1.S.ID.A.2 M1.S.ID.A.3	Represent single or multiple data sets with dot plots, histograms, stem plots (stem and leaf), and box plots. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
Two-Variable Statistics	M1.S.ID.B.4 M1.S.ID.C.5 M1.S.ID.C.6 M1.S.ID.C.7	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. ✓ Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. ✓ Fit a linear function for a scatter plot that suggests a linear association. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. Compute (using technology) and interpret the correlation coefficient of a linear fit. Distinguish between correlation and causation.
Geometry	M1.G.CO.A.1 M1.G.CO.A.2 M1.G.CO.A.3 M1.G.CO.A.4 M1.G.CO.A.5 M1.G.CO.B.6 M1.G.CO.B.7 M1.G.CO.B.8 M1.G.CO.C.9 M1.G.CO.C.10 M1.G.CO.C.11	Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, plane, distance along a line, and distance around a circular arc. Represent transformations in the plane in multiple ways, including technology. Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not (e.g., translation versus horizontal stretch). Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry the shape onto itself. Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments. Given a geometric figure and a rigid motion, draw the image of the figure in multiple ways, including technology. Specify a sequence of rigid motions that will carry a given figure onto another. Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.

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		Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent. Explain how the criteria for triangle congruence (ASA, SAS, AAS, and SSS) follow from the definition of congruence in terms of rigid motions. Prove theorems about lines and angles. Prove theorems about triangles. Prove theorems about parallelograms.
Final Comprehensive Benchmark (covering all content)		