Tennessee Mathematics

Integrated Math I

Adopted 2023

Number and Quantity

Quantities

A. Reason quantitatively and use units to understand problems. M1.N.Q.A

1. Use units as a way to understand real-world problems. M1.N.Q.A.1

   a. Choose and interpret the scale and the origin in graphs and data displays. M1.N.Q.A.1.A

   b. Use appropriate quantities in formulas, converting units as necessary. M1.N.Q.A.1.B

   c. Define and justify appropriate quantities within a context for the purpose of modeling. M1.N.Q.A.1.C

   d. Choose an appropriate level of accuracy when reporting quantities. M1.N.Q.A.1.D

Matrices

A. Perform operations on matrices and use matrices in applications. M1.N.M.A

1. Use matrices to represent data in a real-world context. Interpret rows, columns, and dimensions of matrices in terms of the context. M1.N.M.A.1

2. Perform operations on matrices in a real-world context. M1.N.M.A.2

   a. Multiply a matrix by a scalar to produce a new matrix. M1.N.M.A.2.A

   b. Add and/or subtract matrices by hand and using technology. M1.N.M.A.2.B

   c. Multiply matrices of appropriate dimensions, by hand in simple cases and using technology for more complicated cases. M1.N.M.A.2.C

   d. Describe the roles that zero matrices and identity matrices play in matrix addition and multiplication, recognizing that they are similar to the roles of 0 and 1 in the real number system. M1.N.M.A.2.D

3. Create and use augmented matrices to solve systems of linear equations in real-world contexts, by hand and using technology. M1.N.M.A.3

Algebra

Seeing Structure in Expressions

A. Interpret the structure of expressions. M1.A.SSE.A

1. Interpret expressions that represent M1.A.SSE.A.1
   a. quantity in terms of its context. M1.A.SSE.A.1.A
   b. Interpret parts of an expression, such as terms, factors, and coefficients. M1.A.SSE.A.1.B
   c. Interpret complicated expressions by viewing one or more of their parts as a single entity. M1.A.SSE.A.1.C

Creating Equations

A. Create equations that describe numbers or relationships M1.A.CED.A

1. Create equations and inequalities in one variable and use them to solve problems in a real-world context. M1.A.CED.A.1
2. Create equations and inequalities in two variables to represent relationships between quantities and use them to solve problems in a real-world context. Graph equations with two variables on coordinate axes with labels and scales, and use the graphs to make predictions. M1.A.CED.A.2
3. Create individual and systems of equations and/or inequalities to represent constraints in a contextual situation, and interpret solutions as viable or non-viable. M1.A.CED.A.3
4. Rearrange formulas to isolate a quantity of interest using algebraic reasoning. M1.A.CED.A.4

Reasoning with Equations and Inequalities

A. Understand solving equations as a process of reasoning and explain the reasoning. M1.A.REI.A

1. Understand solving equations as a process of reasoning and explain the reasoning. Construct a viable argument to justify a solution method. M1.A.REI.A.1

B. Solve equations and inequalities in one variable. M1.A.REI.B

2. Solve linear and absolute value equations and inequalities in one variable. M1.A.REI.B.2

   a. Solve linear equations and inequalities, including compound inequalities, in one variable. Represent solutions algebraically and graphically. M1.A.REI.B.2.A

   b. Solve absolute value equations and inequalities in one variable. Represent solutions algebraically and graphically. M1.A.REI.B.2.B

C. Solve systems of equations. M1.A.REI.C

3. Write and solve a system of linear equations in a real-world context. M1.A.REI.C.3

D. Represent and solve equations and inequalities graphically. M1.A.REI.D

4. 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). M1.A.REI.D.4

5. 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 approximate solutions by graphing the functions or making a table of values, using technology when appropriate. M1.A.REI.D.5

6. Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding halfplanes. M1.A.REI.D.6

Functions

Interpreting Functions

A. Understand the concept of a function and use function notation. M1.F.IF.A

1. 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). M1.F.IF.A.1
2. Use function notation. M1.F.IF.A.2
    a. Use function notation to evaluate functions for inputs in their domains, including functions of two variables. M1.F.IF.A.2.A
    b. Interpret statements that use function notation in terms of a context. M1.F.IF.A.2.B
3. Understand geometric formulas as functions. M1.F.IF.A.3

B. Interpret functions that arise in applications in terms of the context. M1.F.IF.B

4. 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. M1.F.IF.B.4
5. Relate the domain of a function to its graph and, where applicable, to the context of the function it models. M1.F.IF.B.5

C. Analyze functions using different representations. M1.F.IF.C

6. Compare properties of functions represented algebraically, graphically, numerically in tables, or by verbal descriptions. M1.F.IF.C.6
    a. Compare properties of two different functions. Functions may be of different types and/or represented in different ways. M1.F.IF.C.6.A
    b. Compare properties of the same function on two different intervals or represented in two different ways. M1.F.IF.C.6.B

Building Functions

A. Build a function that models a relationship between two quantities. M1.F.BF.A

1. Build a function that describes a relationship between two quantities. M1.F.BF.A.1
    a. Determine steps for calculation, a recursive process, or an explicit expression from a context. M1.F.BF.A.1.A
2. Define sequences as functions, including recursive definitions, whose domain is a subset of the integers. Write explicit and recursive formulas for arithmetic and geometric sequences in context and connect them to linear and exponential functions. M1.F.BF.A.2

Linear and Exponential Models

A. Construct and compare linear and exponential models and solve problems. M1.F.LE.A

1. Distinguish between situations that can be modeled with linear functions and with exponential functions. M1.F.LE.A.1

   a. Know that linear functions grow by equal differences over equal intervals and that exponential functions grow by equal factors over equal intervals. M1.F.LE.A.1.A

   b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. M1.F.LE.A.1.B

   c. Recognize situations in which a quantity grows or decays by a constant factor per unit interval relative to another. M1.F.LE.A.1.C

2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a table, a description of a relationship, or input-output pairs. M1.F.LE.A.2

B. Interpret expressions for functions in terms of the situation they model. M1.F.LE.B

3. Interpret the parameters in a linear or exponential function in terms of a context. M1.F.LE.B.3

Geometry

Congruence

A. Experiment with transformations in the plane. M1.G.CO.A

1. 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, by hand for basic transformations and using technology for more complex cases. M1.G.CO.A.1

2. Given a rectangle, parallelogram, trapezoid, or regular polygon, determine the transformations that carry the shape onto itself and describe them in terms of the symmetry of the figure. M1.G.CO.A.2

B. Use geometric theorems to justify relationships. M1.G.CO.B

3. Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures. M1.G.CO.B.3

4. Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures. M1.G.CO.B.4

C. Perform geometric constructions. M1.G.CO.C

5. Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). M1.G.CO.C.5

6. Use geometric constructions to solve geometric problems in context, by hand and using technology. M1.G.CO.C.6

Geometric Properties with Equations

A. Use coordinates to solve problems and justify simple geometric theorems algebraically. M1.G.GPE.A

1. Use coordinates to solve problems and justify geometric relationships algebraically. M1.G.GPE.A.1
2. Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures. M1.G.GPE.A.2
3. Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane. M1.G.GPE.A.3

Statistics and Probability

Interpreting Categorical and Quantitative Data

A. Summarize, represent, and interpret data on two categorical and quantitative variables. M1.S.ID.A

1. Represent data from 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. M1.S.ID.A.1

B. Interpret linear models. M1.S.ID.B

2. Interpret the rate of change and the constant term of a linear model in the context of the data. M1.S.ID.B.2
3. Use technology to compute the correlation coefficient of a linear model; interpret the correlation coefficient in the context of the data. M1.S.ID.B.3
4. Explain the differences between correlation and causation. Recognize situations where an additional factor may be affecting correlated data. M1.S.ID.B.4