

## Maryland Curriculum Matrix for Mathematics

Maryland Mathematics Standards/Topics/Indicators/Objectives Grade 8	Common Core Mathematics Domains/Clusters/Standards Grade 8	National Essential Skills Study (NESS) National Rankings Rank		NESS	MSA	Priority
a) Determine the recursive relationship of arithmetic sequences represented in words, in a table or in a graph <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Provide the <math>n^{\text{th}}</math> term no more than 10 terms beyond the last given term using common differences no more than 10 with integers (-100 to 5000)</li> </ul>	<i>There is no Maryland Mathematics Objective-Common Core alignment.</i>	M24	Understand the concepts of recurrence relations and apply them to solve consumer mathematics problems involving such things as percentage rates, personal loans, simple interest, compound interest, installment buying, mortgage rates, etc.	M	H	H
b) Determine whether relationships are linear or nonlinear when represented in words, in a table, symbolically, or in a graph <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Use a graph to determine if a relationship is linear or nonlinear</li> </ul>	<u><b>Functions</b></u> <b>Define, evaluate and compare functions.</b> 3. Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</i>  <b>Use functions to model relationships between quantities.</b> 5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	M21	Evaluate and employ accurate and appropriate procedures for statistical data collection, organization, analysis, and display including making estimates and predictions, critiquing data, and drawing inferences (e.g., using the normal curve and z-scores, line of best fit).	M	H	H
		M44	Know the equation of a line and interpret graphically using the slope-intercept form ( $y = mx + b$ ) and the point-slope form ( $y - b = m(x - a)$ ).			
		M53	Express, graph, and interpret polynomial functions (linear, quadratic, cubic, etc.).			
		M56	Express a linear function ( $f(x) = mx + b$ ) with the appropriate notation and determine the ordered pairs.			

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c) Determine whether relationships are linear or nonlinear when represented symbolically	<p align="center"><b>Functions</b></p> <p><b>Define, evaluate and compare functions.</b></p> <p>3. Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</i></p> <p><b>Use functions to model relationships between quantities.</b></p> <p>5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.</p>	M44	Know the equation of a line and interpret graphically using the slope-intercept form ( $y = mx + b$ ) and the point-slope form ( $y - b = m(x - a)$ ).	L	L	L
		M53	Express, graph, and interpret polynomial functions (linear, quadratic, cubic, etc.).			
		M56	Express a linear function ( $f(x) = mx + b$ ) with the appropriate notation and determine the ordered pairs.			
a) Write an algebraic expression to represent unknown quantities <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Use one unknown and no more than 3 operations and rational numbers (-1000 to 1000)</li> </ul>	<p align="center"><b>Expressions &amp; Equations</b></p> <p><b>Analyze and solve linear equations and pairs of simultaneous linear equations.</b></p> <p>7. Solve linear equations in one variable.</p> <p>a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form <math>x = a</math>, <math>a = a</math>, or <math>a = b</math> results (where <math>a</math> and <math>b</math> are different numbers).</p> <p>b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p>	M11	Apply variables in expressions and equations to solve problems (i.e., write mathematical equations for given situation, create a mathematical model to understand the relationships between variables, or make connections between the structures of mathematically abstract concepts and the real world).	H	H	H

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b) Evaluate an algebraic expression <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Use one or two unknowns and up to three operations and rational numbers (-100 to 100)</li> </ul>	<p align="center"><b>Functions</b></p> <p><b>Define, evaluate, and compare functions.</b></p> 2. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i>	M11	Apply variables in expressions and equations to solve problems (i.e., write mathematical equations for given situation, create a mathematical model to understand the relationships between variables, or make connections between the structures of mathematically abstract concepts and the real world).	H	H	H
c) Evaluate numeric expressions using the order of operations <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Use no more than 5 operations including exponents of no more than 3 and 2 sets of parentheses, brackets, a division bar, or absolute value with rational numbers (-100 to 100)</li> </ul>	<p align="center"><b>Expressions &amp; Equations</b></p> <p><b>Work with radicals and integer exponents.</b></p> 1. Know and apply the properties of integer exponents to generate equivalent numerical expressions. <i>For example, <math>3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27</math>.</i>	M7	Simplify and solve algebraic equations by identifying and using the correct order of operations and techniques necessary to carry out the solution.	H	H	H
d) Simplify algebraic expressions by combining like terms <ul style="list-style-type: none"> <li>• <b>Assessment limit:</b> Use no more than 3 variables with integers (-50 to 50), or proper fractions with denominators as factors of 20 (-20 to 20)</li> </ul>	<p align="center"><b>Expressions and Equations</b></p> <p><b>Analyze and solve linear equations and pairs of simultaneous linear equations.</b></p> 7. Solve linear equations in one variable. <ol style="list-style-type: none"> <li>Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</li> </ol>	M11	Apply variables in expressions and equations to solve problems (i.e., write mathematical equations for given situation, create a mathematical model to understand the relationships between variables, or make connections between the structures of mathematically abstract concepts and the real world).	H	H	H
		M36	Simplify polynomials by performing operations (addition, subtraction, multiplication, and division) to simplify expressions (e.g., $(2a + 2) + (3a - 1) = 5a + 1$ ).			