Mathematics IV Standards Overview for Parents

Standard	Description of the Georgia Performance Standard
	Algebra
MM4A1a (domain)	Investigate and explain domain of rational functions
MM4A1a (range)	Investigate and explain range of rational functions
MM4A1a (zeros)	Investigate and explain zeros of rational functions
MM4A1a (points of discontinuity)	Investigate and explain points of discontinuity of rational functions
MM4A1a (increase/decrease)	Investigate and explain intervals of increase or decrease of rational functions
MM4A1a (rates of change)	Investigate and explain rates of change of rational functions
MM4A1a (extrema)	Investigate and explain extrema of rational functions
MM4A1a (symmetry)	Investigate and explain symmetry of rational functions
MM4A1a (asymptotes)	Investigate and explain asymptotes of rational functions
MM4A1a (end behavior)	Investigate and explain end behavior of rational functions
MM4A1b	Find inverses of rational functions, discussing domain and range, symmetry and function composition
MM4A1c (equations)	Solve rational equations analytically, graphically and by using appropriate technology
MM4A1c (inequalities)	Solve rational inequalities analytically, graphically and by using appropriate technology
MM4A2a	Define and understand angles measured in degrees and radians, including but not limited to 0°, 30°, 45°, 60°, 90°, their multiples and equivalences
MM4A2b	Understand and apply the six trigonometric functions as functions of general angles in standard position
MM4A2c	Find values of trigonometric functions using points on the terminal sides of angles in standard position
MM4A2d	Understand and apply the six trigonometric functions as functions of arc length on the unit circle
MM4A2e	Find values of trigonometric functions using the unit circle
MM4A3a	Understand and apply the six basic trigonometric functions as functions of real numbers (graphing)
MM4A3b (amplitude)	Investigate and explain amplitude of the six basic trigonometric functions and their transformations
MM4A3b (period)	Investigate and explain period of the six basic trigonometric functions and their transformations
MM4A3b (phase shift)	Investigate and explain phase shift of the six basic trigonometric functions and their transformations
MM4A3b (vertical shift)	Investigate and explain vertical shift of the six basic trigonometric functions and their transformations
MM4A3b (domain)	Investigate and explain domain of the six basic trigonometric functions and their transformations
MM4A3b (range)	Investigate and explain range of the six basic trigonometric functions and their transformations
MM4A3b (zeros)	Investigate and explain zeros and intercepts of the six basic trigonometric functions and their transformations
MM4A3b (extrema)	Investigate and explain extrema of the six basic trigonometric functions and their transformations
MM4A3b (points of discontinuity)	Investigate and explain points of discontinuity of the six basic trigonometric functions and their transformations
MM4A3b (increase/decrease)	Investigate and explain intervals of increase or decrease of the six basic trigonometric functions and their transformations
MM4A3b (rates of change)	Investigate and explain rates of change of the six basic trigonometric functions and their transformations
MM4A3c	Graph transformations of trigonometric functions including changing period, amplitude, phase shift and vertical shift
MM4A3d	Apply graphs of trigonometric functions in realistic contexts involving periodic phenomena
MM4A4a	Compare and contrast properties of functions within and across the following types: linear, quadratic, polynomial, power, rational, exponential, logarithmic, trigonometric and piecewise
MM4A4b	Investigate transformations of functions
MM4A4c	Investigate characteristics of functions built through sum, difference, product, quotient and composition
MM4A5 (establish)	Students will establish the following identities: $tan\theta = \frac{sin\theta}{cos\theta}$, $cot\theta = \frac{cos\theta}{sin\theta}$, $sec\theta = \frac{1}{cos\theta}$, $csc\theta = \frac{1}{sin\theta}$, $sin^2\theta + cos^2\theta = 1$, $cot^2\theta + 1 = csc^2\theta$, $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$, $\cos(\alpha \pm \beta) = cos\alpha cos\beta \mp sin\alpha sin\beta$, $\sin(2\theta) = 2sin\theta cos\theta$, $\cos(2\theta) = cos^2\theta - sin^2\theta$
MM4A5 (simplify)	Students will simplify the following identities: $tan\theta = \frac{sin\theta}{cos\theta}$, $cot\theta = \frac{cos\theta}{sin\theta}$, $sec\theta = \frac{1}{cos\theta}$, $csc\theta = \frac{1}{sin\theta}$, $sin^2\theta + cos^2\theta = 1$, $cot^2\theta + 1 = csc^2\theta$, $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$, $\cos(\alpha \pm \beta) = cos\alpha cos\beta \mp sin\alpha sin\beta$, $\sin(2\theta) = 2sin\theta cos\theta$, $\cos(2\theta) = cos^2\theta - sin^2\theta$
MM4A5 (verify)	Students will verify the following identities: $tan\theta = \frac{sin\theta}{cos\theta}$, $cot\theta = \frac{cos\theta}{sin\theta}$, $sec\theta = \frac{1}{cos\theta}$, $csc\theta = \frac{1}{sin\theta}$, $sin^2\theta + cos^2\theta = 1$, $cot^2\theta + 1 = csc^2\theta$, $\sin(\alpha \pm \beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$, $\cos(\alpha \pm \beta) = cos\alpha cos\beta \mp sin\alpha sin\beta$, $\sin(2\theta) = 2sin\theta cos\theta$, $\cos(2\theta) = cos^2\theta - sin^2\theta$
MM4A6a	Solve trigonometric equations over a variety of domains, using technology as appropriate
MM4A6b	Use the coordinates of a point on a terminal side of an angle to express *x* as $rcos\theta$ and *y* as $rsin\theta$
MM4A6c	Apply the law of sines
MM4A6c	Apply the law of cosines
MM4A7	Verify and apply ½ *ab* sin *C* to find the area of a triangle
MM4A8a	Find values of inverse sine, inverse cosine and inverse tangent functions using technology as appropriate
MM4A8b	Determine characteristics of the inverse trigonometric functions and their graphs
MM4A9a (recursive)	Use and find recursive formulae for the terms of sequences
MM4A9a (explicit)	Use and find explicit formulae for the terms of sequences

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MM4A9b (arithmetic)	Recognize and use simple arithmetic sequences
MM4A9b (geometric)	Recognize and use simple geometric sequences
MM4A9c	Find and apply the sums of finite and, where appropriate, infinite arithmetic and geometric sequences
MM4A9d	Use summation notation to explore series
MM4A10a	Represent vectors algebraically and geometrically
MM4A10b	Covert between vectors expressed using rectangular coordinates and vectors expressed using magnitude and direction
MM4A10c (add)	Add vectors
MM4A10c (subtract)	Subtract vectors
MM4A10c (scalar multiples)	Compute scalar multiples of vectors
MM4A10d	Use vectors to solve realistic problems
	Data Analysis
MM4D1	Using simulation, develop the idea of the central limit theorem
MM4D2	Using student generated data from random samples of at least 30 members, determine the margin of error and confidence interval for a specified level of confidence
MM4D3	Use confidence intervals and margin of error to make inferences from data about a population