

MATH Connections correlation to the Minnesota Standards

<p>Correlation Key: "X" Coverage = Secondary concept of the activity or problem. Students gain a basic understanding or introduction of the concept.</p> <hr/> <p>"XX" In-depth coverage = Primary concept that is the focus of the activity or problem. Students gain thorough understanding of the concept.</p>	MATH Connections 1A				MATH Connections 1B				MATH Connections 2A			MATH Connections 2B			MATH Connections 3A				MATH Connections 3B			
	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8

GRADES 9, 10, 11

D. MATHEMATICAL REASONING

Standard: Apply skills of mathematical representation, communication and reasoning throughout the remaining three content strands.

The student will:	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 1	Chapter 2	Chapter 3	Chapter 4	Chapter 5	Chapter 6	Chapter 7	Chapter 8
1. Assess the reasonableness of a solution by comparing the solution to appropriate graphical or numerical estimates or by recognizing the feasibility of solutions in a given context and rejecting extraneous solutions.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
2. Appropriately use examples and counterexamples to make and test conjectures, justify solutions, and explain results.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
3. Translate a problem described verbally or by tables, diagrams or graphs, into suitable mathematical language, solve the problem mathematically and interpret the result in the original context.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
4. Support mathematical results by explaining why the steps in a solution are valid and why a particular solution method is appropriate.	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
5. Determine whether or not relevant information is missing from a problem and if so, decide how to best express the results that can be obtained without that information.	X		XX	X		X	X	X	XX	XX	XX	XX	X					XX	X			

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6. Know and use the relationship that exists among a logical implication of the form "if A, then B," its converse "if B, then A," its inverse "if not A, then not B," and its contrapositive "if not B, then not A."						X						XX	X								XX		

II. NUMBER SENSE, COMPUTATION, AND OPERATIONS

A. Number Sense

Standard: Use real numbers, represented in a variety of ways, to quantify information and to solve real-world and mathematical problems.

B. Computation and Operation

Standard: Appropriately use calculators and other technologies to solve algebraic, geometric, probabilistic and statistical problems.

The student will:

1. Apply the correct order of operations and grouping symbols when using calculators and other technologies.		XX	X	X	X	X		XX	XX	X	X	XX	XX	XX	X	X	X		XX	X	X		
2. Know, use and translate calculator notational conventions to mathematical notation.	XX	XX	X	X	X	XX		XX		XX	XX	XX	XX	XX	X	X	XX					XX	
3. Recognize the impact of units such as degrees and radians on calculations.										XX	X	XX					XX						
4. Recognize that applying an inverse function with a calculator may lead to extraneous or incomplete solutions.	XX									X					XX	XX	XX					X	
5. Understand the limitations of calculators such as missing or additional features on graphs due to viewing parameters or misleading presentations of zero or very large numbers.	XX		XX			X						XX			XX	XX	XX						
6. Understand that use of a calculator requires appropriate mathematical reasoning and does not replace the need for mental computation.	XX		XX	XX	XX	X		XX		X		XX	XX		XX	XX	XX					XX	

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III. PATTERNS, FUNCTIONS, AND ALGEBRA
A. Patterns and Functions

Standard: Represent and analyze real-world and mathematical problems using numeric, graphic and symbolic methods for a variety of functions.

The student will:																						
1. Know the numeric, graphic and symbolic properties of linear, step, absolute value and quadratic functions. Graphic properties may include rates of change, intercepts, maximal and minima.	XX	XX	XX	XX	XX	XX			XX	X	XX		X	XX	XX	XX	XX	X	XX		XX	
2. Model exponential growth and decay, numerically, graphically and symbolically, using exponential functions with integer inputs.		XX	XX		XX	XX										XX						
3. Analyze the effects of coefficient changes on linear and quadratic functions and their graphs.			XX												XX							
4. Apply basic concepts of linear, quadratic and exponential expressions or equations in real-world problems such as loans, investments and the path of a projectile.		XX	XX		XX	XX									XX	XX						
5. Distinguish functions from other relations using graphic and symbolic methods.						XX						X			X	X	XX					

B. Algebra (Algebraic Thinking)

Standard: Solve simple equations and inequalities numerically, graphically, and symbolically. Use recursion to model and solve real-world and mathematical problems.

The student will:																						
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1. Translate among equivalent forms of expressions, such as, simplify algebraic expressions involving nested pairs of parentheses and brackets, simplify rational expressions, factor a common term from an expression and apply associative, commutative and distributive laws.		XX	XX	X	XX	X			XX		X		X	XX	XX					XX	XX		
2. Understand the relationship between absolute value and distance on the number line and graph simple expressions involving absolute value such as, $ x - 3 = 6$ or $ x + 2 < 5$.	X														X								
3. Find equations of a line given two points on the line, a point and the slope of the line or the slope and the y-intercept of the line.			XX	XX	XX	XX				X			X	X	XX					XX			
4. Translate among equivalent forms of linear equations and inequalities.		XX	XX	X	XX	X														XX			
5. Use a variety of models such as equations, inequalities, algebraic formulas, written statements, tables and graphs or spreadsheets to represent functions and patterns in real-world and mathematical problems.		XX	XX	XX	XX	XX	X		XX	X	X	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX	
6. Apply the laws of exponents to perform operations on expressions with integer exponents.		XX														XX							
7. Solve linear equations and inequalities in one variable with numeric, graphic and symbolic methods.		XX	XX	XX	XX	XX			XX	X					XX					XX	XX		
8. Find real solutions to quadratic equations in one variable with numeric, graphic and symbolic methods.		X	X												XX								

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9. Use appropriate terminology and mathematical notation to define and represent recursion.						XX																XX	
10. Create and use recursive formulas to model and solve real-world and mathematical problems.						XX																XX	
11. Solve systems of two linear equations and inequalities with two variables using numeric, graphic and symbolic methods.		X	X		XX									XX					XX				
12. Understand how slopes can be used to determine whether lines are parallel or perpendicular. Given a line and a point not on the line, find the equations for the lines passing through that point and parallel or perpendicular to the given line.			X							XX													
IV. DATA ANALYSIS, STATISTICS, AND PROBABILITY																							
A. Data and Statistics																							
Standard: Represent data and use various measures associated with data to draw conclusions and identify trends. Understand the effects of display distortion and measurement error on the interpretation of data.																							
The student will:																							
1. Construct and analyze circle graphs, bar graphs, histograms, box-and-whisker plots, scatter plots and tables, and demonstrate the strengths and weaknesses of each format by choosing appropriately among them for a given situation.	XX	X	X	XX	XX	X			X		X			X	X	XX	XX	XX					
2. Use measures of central tendency and variability, such as, mean, median, maximum, minimum, range, standard deviation, quartile and percentile, to describe, compare and draw conclusions about sets of data.	XX			XX	X							X											

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3. Determine an approximate best-fit line from a given scatter plot and use the line to draw conclusions.				XX	XX							X										
4. Know the influence of outliers on various measures and representations of data about real-world and mathematical problems.	XX			XX																		
5. Understand the relationship between correlation and causation.				XX		X																
6. Interpret data credibility in the context of measurement error and display distortion.	X																					
7. Compare outcomes of voting methods such as majority, plurality, ranked by preference, run-off and pair-wise comparison.																		XX				
B. Probability																						
Standard: Use appropriate counting procedures, calculate probabilities in various ways and apply theoretical probability concepts to solve real-world and mathematical problems.																						
The student will:																						
1. Select and apply appropriate counting procedures to solve real-world and mathematical problems, including probability problems.					X		XX	XX											XX	XX		
2. Use area, trees, unions and intersections to calculate probabilities and relate the results to mutual exclusiveness, independence and conditional probabilities, in real-world and mathematical problems.					XX		XX	XX											XX			
3. Use probability models, including area and binomial models, in real-world and mathematical problems.								X											XX			

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2. Know and use theorems about circles to justify geometrical facts and solve real-world and mathematical problems. These theorems include the relationships involving tangent lines and radii, the relationship between inscribed and central angles and the relationship between the measure of a central angle and arc length.												XX											
3. Know and use properties of two- and three-dimensional figures to solve real-world and mathematical problems such as: finding area, perimeter, volume and surface area; applying direct or indirect methods of measurement; the Pythagorean theorem and its converse; and properties of 45° -45° -90° and 30° -60° -90° triangles.									XX	XX	XX	XX	XX		X		X						
4. Apply the basic concepts of right triangle trigonometry including sine, cosine and tangent to solve real-world and mathematical problems.											XX						XX						
5. Use coordinate geometry to represent and examine geometric concepts such as the distance between two points, the midpoint of a line segment, the slope of a line and the slopes of parallel and perpendicular lines.			XX	X	X					XX		XX	XX									X	
6. Use numeric, graphic and symbolic representations of transformations such as reflections, translations and change of scale in one, two and three dimensions to solve real-world and mathematical problems.										XX	XX	X											
7. Perform basic constructions with a straightedge and compass.									XX	XX													

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8. Draw accurate representations of planar figures using a variety of tools.									X	X		X										

C. Measurement

Standard: Use the interconnectedness of geometry, algebra and measurement to explore real-world and mathematical problems.

**GRADES 11-12
STATISTICS**

Standard: Use tables of the normal distribution and properties of that distribution to make judgments about populations based on random samples from these populations.

The student will:																						
1. Use the concept of normal distribution and its properties to answer questions about sets of data.																						XX
2. Describe and use sampling distributions and the central limit theorem. Calculate confidence intervals when appropriate.																						XX
3. Understand the importance of appropriate sampling methods. For instance, the time of day of a survey could lead to inaccuracies in the outcome.																						XX

ALGEBRA

Standard: Demonstrate facility with a wide range of algebraic operations and use the relationship between coordinate geometry and algebraic equations to solve real-world and mathematical problems.

The student will:																						
1. Solve systems of two, three or more simultaneous linear equations or inequalities, in particular, deciding whether a given system of equations has one solution, no solution or infinitely many solutions and, in this latter case, describing them parametrically.		X	X			XX																XX

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2. Solve problems with quadratic functions and equations, where some of the coefficients may be expressed in terms of parameters.		X	X		X	X			XX	XX		XX			XX				X			
3. Perform the four arithmetic operations with polynomials, except that division is restricted to division by monomials and linear binomials.		XX							XX						XX							
4. Simplify a wide variety of algebraic expressions, including those in which numerator or denominator needs to be rationalized.		XX	XX	X	XX	X			XX	X	XX	X	XX	XX	XX	X	X		XX	XX	XX	
5. Apply the laws of exponents to perform operations on expressions with fractional exponents.		XX														XX						
6. Know the numeric, graphic and symbolic properties of power, logarithmic and exponential functions.		XX														XX						
7. Solve a wide variety of mathematical and real-world problems involving power, exponential and logarithmic functions and equations, discard extraneous solutions and present results graphically.		XX	XX		XX	XX										XX						
8. Know the numeric, graphic and symbolic properties of rational functions.															XX							
9. Solve a wide variety of mathematical and real-world problems involving rational functions, discard extraneous solutions and present results graphically.															XX							
10. Factor polynomials representing the difference of squares, perfect square trinomials and quadratics with rational factors.									X						X							

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2. Given the coordinates of a point on the terminal side of an angle in standard position in the xy-plane, find the values of the trigonometric functions.										XX												
3. Convert between degrees and radian measures.																	XX					
4. Solve applied problems about triangles using the law of sines including the ambiguous case.										XX												
5. Solve applied problems about triangles using the law of cosines.										XX												
6. Graph the functions of the form $A\sin(Bt + C)$, $A\cos(Bt + C)$, and $A\tan(Bt + C)$ and know the meaning of the terms frequency, amplitude, phase shift and period.																	XX					
7. Simplify trigonometric expressions using identities and verify simple trigonometric identities including $\sin^2 x + \cos^2 x = 1$, sum, difference, double angle and half-angle formulas for sine and cosine.										X												
8. Find all the solutions of a trigonometric equation on various intervals.										XX							X					
9. Know and be able to use the definitions of the inverse trigonometric functions and related methods to solve problems such as find $\cos(x)$ and $\tan(x)$ given the value of $\sin x$ and the quadrant containing the terminal side.									X	X							XX					