

CASAS Math Standards

- M1 Number Sense**
- M2 Algebra**
- M3 Geometry**
- M4 Measurement**
- M5 Statistics, Data Analysis and Probability**

		NRS LEVELS FOR ABE/ASE					
		1	2	3	4	5	6
		CASAS LEVELS					
		A	B	B	C	D	E
M1	Number sense						
M1.1	Read, write, order and compare rational numbers						
M1.1.1	Associate numbers with quantities	•					
M1.1.2	Count with whole numbers	•					
M1.1.3	Count by 2s, 5s, and 10s up to 100	•					
M1.1.4	Recognize odd and even numbers	•	•				
M1.1.5	Understand the decimal place value system: read, write, order and compare whole and decimal numbers (e.g., $0.13 > 0.013$ because $13/100 > 13/1000$)		•	•	•		
M1.1.6	Round off numbers to the nearest 10, 100, 1000 and/or to the nearest whole number, tenth, hundredth or thousandth according to the demands of the context			•	•		
M1.1.7	Using place value, compose and decompose numbers with up to 5 digits and/or with three decimal places (e.g., $54.8 = 5 \times 10 + 4 \times 1 + 8 \times 0.1$)		•	•	•		
M1.1.8	Interpret and use a fraction in context (e.g., as a portion of a whole area or set)	•	•				
M1.1.9	Find equivalent fractions and simplify fractions to lowest terms			•	•		
M1.1.10	Use common fractions to estimate the relationship between two quantities (e.g., $31/179$ is close to $1/6$)	•	•	•	•		
M1.1.11	Convert between mixed numbers and improper fractions			•	•		
M1.1.12	Use common fractions and their decimal equivalents interchangeably			•	•		
M1.1.13	Read, write, order and compare positive and negative real numbers (integers, decimals, and fractions)				•		
M1.1.14	Interpret and use scientific notation				•	•	•
M1.2	Demonstrate understanding of the operations of addition and subtraction, their relation to each other, and their application in solving problems with rational numbers						
M1.2.1	Mentally add and subtract positive whole numbers less than 20	•	•				
M1.2.2	Add and subtract positive multi-digit numbers, including decimal numbers	•	•				
M1.2.3	Recognize when a problem situation requires addition or subtraction with multi-digit positive integers and decimal numbers, carry out the computation, and interpret the answer in context	•	•	•	•	•	•
M1.2.4	Use the inverse relationship between addition and subtraction to write problem statements and to check computation (e.g., add back to check subtraction)	•	•	•			
M1.2.5	Use the commutative property of addition to restate problems (e.g., $34.2 + 6 = 6 + 34.2$) and recognize the proper order to write subtraction problems and enter them into a calculator		•	•	•	•	•
M1.2.6	Add and subtract fractions and mixed numbers, including those with unlike denominators		•	•	•		
M1.2.7	Recognize when a problem situation requires adding and/or subtracting with fractions and mixed numbers, carry out the computation, and interpret the answer in context		•	•	•	•	•
M1.2.8	Use estimation strategies to determine reasonable answers to addition and subtraction problems involving integers, decimal numbers and fractions		•	•	•	•	•
M1.2.9	Express the result of adding and subtracting to the level of precision indicated by the problem (e.g., as in measurements)			•	•	•	•

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M1.3	Demonstrate understanding of the operations of multiplication and division, their relation to each other, and their application in solving problems with rational numbers						
M1.3.1	Mentally double all integers to 20 and halve even integers to 20	•	•				
M1.3.2	Know multiplication facts for integers through 12 and recognize their perfect squares		•	•			
M1.3.3	Mentally multiply and divide numbers by 10, 100, 1000		•	•			
M1.3.4	Identify integers that are multiples of 2, 3, 4, 5, or 10		•				
M1.3.5	Find factors of whole numbers to 100 (e.g., 36 is divisible by 1, 2, 3, 4, 6, 9, 12 and 18; 37 is prime)		•	•	•		
M1.3.6	Recognize when a problem situation requires multiplying and/or dividing with multi-digit positive integers and decimal numbers, carry out the computation, and interpret the answer in context	•	•	•	•	•	•
M1.3.7	Use the inverse relationship of multiplication and division to write problem statements and to check a calculation (e.g., multiply back to check division)		•	•	•		
M1.3.8	Express the result of multiplying and dividing to the level of precision indicated by the problem		•	•	•	•	•
M1.3.9	Use the context to determine whether the answer to a division problem should be rounded off or if the remainder should be expressed as a fraction (e.g., currency contexts usually do not use fractions)		•	•	•		
M1.3.10	Use fractional notation to indicate division (e.g., $6 \div 11 = 6/11$; $12 \div 4 = 12 \times \frac{1}{4}$)		•	•			
M1.3.11	Find fractional parts of whole numbers and/or decimal numbers (e.g., $\frac{1}{4}$ of the \$8.3 million budget)						
M1.3.12	Recognize when a problem situation requires multiplying and/or dividing with fractions and mixed numbers, carry out the computation, and interpret the answer in context						
M1.3.13	Use estimation strategies to determine reasonable answers to multiplication and division problems involving integers, decimal numbers and fractions (e.g., rounding to nearest multiple, benchmark fractions)			•	•		
M1.3.14	Use the commutative property of multiplication to restate problems (e.g., $20 \times 0.25 = \frac{1}{4} \times 20$) and recognize the proper order to write a division problem and to enter it into a calculator			•	•	•	•
M1.3.15	Use the distributive property of multiplication over addition (e.g., $4(136) = 4(100 + 30 + 6)$)			•	•		
M1.3.16	Use exponential notation to indicate repeated multiplication, as in squaring and cubing		•	•	•	•	•
M1.3.17	Read, write and interpret the radical sign ($\sqrt{\quad}$) for square roots and ($\sqrt[3]{\quad}$) for cube roots			•	•		
M1.4	Understand the meaning of ratio, proportion and percent and use them to solve problems						
M1.4.1	Recognize comparisons between quantities in situations that can be expressed as a ratio (e.g., he makes 3 out of 5 free throws) and those that can't (e.g., their final score of 11 was 4 more than the opponent's score)			•	•	•	
M1.4.2	Write and solve proportions for situations where two ratios are equal (e.g., currency conversion)				•	•	•
M1.4.3	Find the percent equivalents to fractions and decimals		•	•	•		
M1.4.4	Know the percent equivalent to common benchmark fractions (e.g., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{10}$, $\frac{1}{5}$) and use them interchangeably for solving problems			•	•		
M1.4.5	Mentally find 10% and 1% of an integer or decimal number			•	•		
M1.4.6	Estimate percentages of numbers by using benchmark percents (10%, 25%, 50%) or combinations of them (e.g., 31% of 89 \approx 3(10% of 90) = 27)			•	•		

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M1.4.7	Calculate a missing value from a percent relationship – the percentage, the percent, or the base – using paper and pencil or a calculator						
M1.4.8	Understand and solve problems using percents greater than 100% and less than 1%		•	•	•	•	•
M1.4.9	Calculate percent of change (increase or decrease) in a variety of situations, including those involving money				•		
M1.5	Use strategies and tools to solve problems						
M1.5.1	Determine when and how to split up a problem into simpler parts			•	•	•	•
M1.5.2	Apply strategies and results from simpler problems to more complex problems			•	•	•	•
M1.5.3	Use a calculator when appropriate			•	•	•	•
M2	Algebra						
M2.1	Find structure and patterns in arithmetic number sequences and contextual situations						
M2.1.1	Recognize the identity, commutative, associative and distributive properties for addition and multiplication as they apply in arithmetic procedures	•	•	•			
M2.1.2	Use tables and algebraic expressions to generalize recurring numeric patterns (e.g., find the rule) and in contextual situations (e.g., seating at different-sized banquet tables)			•	•	•	•
M2.1.3	Find the nth term in the sequence in a functional relationship and predict how changes in one quantity will affect another			•	•		
M2.1.4	Apply the correct order of operations			•	•		
M2.2	Use variables, simplify expressions, and solve equations						
M2.2.1	Use notational conventions such as parentheses and the various ways of representing multiplication				•	•	
M2.2.2	Interpret symbols $<$, $>$, \neq and use them to express number relationships			•	•	•	
M2.2.3	Recognize and interpret the different meanings and uses of variables (e.g., $2x + 1 = 7$; $y = 2x + 1$; $A = 1 \times w$; $a + -a = 0$)				•	•	
M2.2.4	Evaluate expressions that include unknowns by substituting specific values for variables				•	•	
M2.2.5	Use the distributive property and combine like terms to simplify an expression ($5x + 3y - 2x = 3x + 3y$) and to factor ($3x + 3y = 3(x + y)$)				•	•	
M2.2.6	Apply the commutative and associative properties of addition and multiplication to rewrite expressions				•	•	
M2.2.7	Add, subtract, multiply and divide polynomial expressions				•	•	•
M2.2.8	Solve simple one-step equations with unknowns (e.g., $n - 7 = 9$; $3x = 24$)	•	•	•	•	•	
M2.2.9	Use inverse operations and properties of equality to justify steps used in simplifying and solving more complex linear equations				•	•	•
M2.2.10	Solve problems involving life-skill-related and technical formulas (e.g., $\text{units} \times \text{price} = \text{cost}$; $d = r \times t$; $V = I \times R$)			•	•	•	•
M2.2.11	Use substitution to check the solution of an equation			•	•	•	
M2.2.12	Solve inequalities				•	•	•
M2.2.13	Solve systems of linear equations				•	•	•
M2.2.14	Apply the Pythagorean theorem				•	•	•
M2.2.15	Solve quadratic equations				•	•	•
M2.3	Model mathematical relationships (particularly functional relationships) found in context, using words, tables and graphs, as well as algebraic expressions and equations						
M2.3.1	Interpret and write expressions and equations for simple contextual math situations			•	•	•	

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M2.3.2	Place positive and negative numbers on a number line, and relate them to direction and change				•		
M2.3.3	Add, subtract, multiply and divide positive and negative numbers				•		
M2.3.4	Use absolute value in contextual situations emphasizing a number's magnitude				•	•	
M2.3.5	Interpret and write expressions and equations representing contextual situations, including those that involve fractions, decimals, percents and negative numbers				•	•	•
M2.3.6	Generate a table of values from an equation in two variables						
M2.3.7	Demonstrate understanding of the Cartesian coordinate system by locating and plotting points (x,y) and creating a coordinate plane by drawing the axes and establishing a scale				•	•	•
M2.3.8	Determine the slope of a line and relate it to the rate of change in one quantity with respect to the other				•	•	•
M2.3.9	Use a graph to answer questions about functional relationships between independent and dependent variables				•	•	•
M2.3.10	Write the equation of a line given two points, or a slope and a single point			•	•	•	•
M2.3.11	Plot more than one equation on the same plane and find their intersections				•	•	•
M2.3.12	Graph a linear function				•	•	•
M2.3.13	Graph non-linear functions (quadratic, rational, exponential) and compare rates of change				•	•	•
M2.3.14	Make graphs of direct and indirect proportions from contextual situations with attention to the domain and range of each					•	•
M2.3.15	Interpret algebraic concepts and terminology used at the secondary level to solve computationally and conceptually challenging multi-step problems					•	•
M3	Geometry						
M3.1	Recognize, identify and describe the attributes of geometric shapes and use them in solving problems						
M3.1.1	Identify lines of symmetry in two-dimensional figures			•	•	•	
M3.1.2	Draw two-dimensional shapes with specific dimensions				•		
M3.1.3	Identify and describe specific types of triangles based on their properties (e.g., right, acute, scalene, isosceles, equilateral)				•		
M3.1.4	Recognize and use the property that the interior angles of a triangle have a sum of 180 degrees				•	•	
M3.1.5	Identify and describe specific types of quadrilaterals based on their properties (e.g., rectangle, square, parallelogram, rhombus)				•	•	•
M3.1.6	Recognize and use the property that the angles of a quadrilateral have a sum of 360 degrees						
M3.1.7	Identify polygons of various types				•	•	•
M3.1.8	Identify elements of a circle: center, radius, diameter, arc, chord, sector				•	•	•
M3.1.9	Identify various types of common three-dimensional shapes				•	•	•
M3.1.10	Interpret concepts of similarity, and identify figures that are similar or congruent			•	•	•	•
M3.1.11	Use concepts and attributes of geometric shapes to find unknown dimensions in figures and applications				•	•	•
M3.2	Recognize, identify, describe and reason about lines and angles in two dimensions						
M3.2.1	Identify parallel, perpendicular and intersecting lines			•	•	•	
M3.2.2	Describe characteristics of angles formed by two intersecting lines, including complementary and supplementary angles			•	•	•	•
M3.2.3	Describe characteristics of angles formed by a transversal intersecting parallel lines				•	•	•

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M3.2.4	Demonstrate understanding of the 360-degree system of measuring angles and rotation			•	•	•	
M3.2.5	Use benchmark angles of 45, 90 and 180 degrees to estimate the size of angles			•			
M3.2.6	Identify rotations of 90, 180, 270 and 360 degrees as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, full			•	•	•	
M3.2.7	Identify angles as right, acute and obtuse			•	•	•	
M3.2.8	Measure or draw an angle using a protractor			•	•	•	
M3.2.9	Use reasoning to determine the size of unknown angles in complex drawings			•	•	•	
M3.3	Use spatial relationships to interpret two and three-dimensional drawings and figures						
M3.3.1	Use the four main (N, S, E, W) and secondary (e.g., NW) compass directions for spatial orientation		•	•	•		
M3.3.2	Use a map with a coordinate grid (e.g., locate C5)			•	•		
M3.3.3	Enlarge or reduce similar figures, keeping them proportional				•	•	
M3.3.4	Combine, divide, rotate, reconfigure or transform shapes to alter figures and change their position on a coordinate grid		•	•	•	•	•
M3.3.5	Locate or position items in a two-dimensional coordinate system (e.g., in a diagram of a building)				•	•	•
M3.3.6	Recognize or create a three-dimensional object from a two-dimensional representation (e.g., follow a pattern)		•	•	•	•	•
M3.3.7	Recognize and draw two-dimensional views of three-dimensional objects from different perspectives				•	•	•
M4	Measurement						
M4.1	Use tools and apply estimation in measuring						
M4.1.1	Identify and use the appropriate units, instruments and techniques for measurement tasks	•	•	•	•		
M4.1.2	Read and use linear scales (e.g., a ruler, tape measure, metric rule, thermometer)	•	•	•	•		
M4.1.3	Read the temperature from a thermometer in degrees Fahrenheit or Celsius		•	•	•		
M4.1.4	Read and use analog scales (e.g., on clocks, meters, gauges)	•	•	•			
M4.1.5	Read and use digital scales (e.g., on digital clocks, odometers)	•					
M4.1.6	Read and use various indicators of time (e.g., place dates on a time line, interpret numeric representations, compare 12 and 24-hour clocks)	•	•				
M4.1.7	Use non-standard measurement methods (e.g., using an object as a measure)	•	•				
M4.1.8	Compare the measure of one object to another (e.g., this is about 3 times as long as that; about 6 of these will fit in there)		•	•	•		
M4.1.9	Use specialized measurement tools in contextual situations				•	•	•
M4.1.10	Make rough-estimate approximations of measurements		•	•	•		
M4.1.11	Recognize level of accuracy required in a given measurement situation in terms of precision, rounding, etc.		•	•	•	•	
M4.2	Work fluently within measurement systems and use general equivalencies between them						
M4.2.1	Calculate with and convert between customary US units of linear measurement: inches, feet, yards, miles		•	•	•		
M4.2.2	Calculate with and convert between metric units of linear measurement: meters, centimeters, millimeters, kilometers		•	•	•	•	
M4.2.3	Estimate equivalents between customary US and metric units of linear measure				•	•	
M4.2.4	Compare linear measurements, including in decimal notation (e.g., tolerances)				•	•	
M4.2.5	Calculate with and convert between customary US units of weight: ounces, pounds, tons		•	•	•		

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M4.2.6	Calculate with and convert between metric units of weight: grams, kilograms, milligrams				•	•	
M4.2.7	Estimate equivalents between customary US and metric units of weight				•	•	
M4.2.8	Calculate with and convert between customary US units of capacity: fluid ounces, cups, pints, quarts, gallons		•	•	•		
M4.2.9	Calculate with and convert between metric units of capacity: liters, milliliters				•	•	
M4.2.10	Estimate equivalents between customary US and metric units of capacity				•	•	
M4.2.11	Calculate with and compare temperatures, including those below zero		•	•	•	•	
M4.2.12	Estimate equivalents between Fahrenheit and Celsius temperatures				•	•	
M4.2.13	Calculate with and convert between units of time: seconds, minutes, hours, days, months, years		•	•	•		
M4.2.14	Use decimal placement and metric prefixes to convert like units (e.g., mm, cm, m; mg, g, kg)				•	•	
M4.3	Calculate the measures of two and three-dimensional figures						
M4.3.1	Demonstrate understanding of the concept of two and three-dimensional measurements, and square and cubic units			•	•	•	
M4.3.2	Calculate perimeter of rectangles and other common figures			•	•		
M4.3.3	Calculate circumference of a circle, using a given formula				•	•	
M4.3.4	Calculate area of rectangles and other common figures, using a given formula			•	•	•	
M4.3.5	Estimate area of curved shapes				•	•	
M4.3.6	Calculate volume and surface area of rectangular and other common shapes, using a given formula				•	•	
M4.3.7	Calculate area or volume of irregular or composite shapes by dividing the figure into parts				•	•	
M4.3.8	Interpret the exponential relationship of linear measure, area and volume (e.g., ft., sq. ft., cu. ft.)					•	•
M4.3.9	Apply measurement in three-dimensional scale modeling					•	•
M4.4	Use proportional reasoning to measure indirectly (scale drawings)						
M4.4.1	Interpret scale drawings (e.g., blueprints, maps)				•	•	•
M4.4.2	Interpret and use proportions in solving problems involving dimensions or scale				•	•	•
M4.4.3	Plan linear spacing in a design (e.g., the arrangement of shelves to fit in a cabinet)				•	•	•
M4.4.4	Plan a layout (e.g., how many pieces of a specific shape can fit in a space)				•	•	•
M4.5	Use relationships between measures to analyze change (rates)						
M4.5.1	Interpret, calculate and apply rates involving time, such as velocity (e.g., mi/hr, ft/sec, m/sec), frequency (e.g., calls/hr), consumption (e.g., cal/day, kW/hr), flow (e.g., gal/min), change (e.g., degrees/min, inches/year)				•	•	•
M4.5.2	Interpret, calculate and apply rates (e.g., cents/min, \$/sq. ft., mi/gal)				•	•	•
M4.5.3	Use averaging in calculating rates (e.g., average speed)				•	•	•
M4.5.4	Demonstrate understanding and solve problems involving the interrelation of distance, time and speed			•	•	•	
M4.5.5	Estimate time, distance and speed in travel situations				•	•	
M4.5.6	Estimate equivalents between mph and km/h				•	•	
M5	Statistics, Data Analysis and Probability						
M5.1	Collect, organize and display data						
M5.1.1	Identify, count and extract relevant data in lists, tables and charts	•	•	•	•	•	•

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M5.1.2	Collect, label, sort and order numerical information for a particular purpose (e.g., to count and list stock, keep a log, construct a schedule)	•	•	•	•	•	•
M5.1.3	Use a tally to record numerical information	•	•	•	•	•	
M5.1.4	Use or construct a table to record and present numerical information		•	•	•	•	•
M5.1.5	Use or construct a table that provides for calculation of data (e.g., units × price; totals, subtotals)			•	•	•	•
M5.1.6	Construct a graph or other visual representation of data		•	•	•	•	•
M5.1.7	Present data in different interpretations (e.g., as percentages, difference, change)			•	•	•	•
M5.1.8	Demonstrate how selection and presentation of data can be oriented for audience and purpose and can influence perceptions and conclusions (e.g., changing the scale on the graph can change the perceived message)				•	•	•
M5.2	Interpret and analyze data from representations of a data set						
M5.2.1	Extract and compare information from scatterplots and pictographs, as well as bar, circle and line graphs	•	•	•	•	•	•
M5.2.2	Compare information from multiple plottings on the same graph				•	•	•
M5.2.3	Find summary statistics of a data set, including the mean, median, mode and range, and determine how changes in the extreme values affect each of them			•	•	•	
M5.2.4	Demonstrate how the spread of data is a factor in determining whether mean or median should be used as a measure of central tendency			•	•	•	•
M5.2.5	Interpret the language of distribution in statistics (e.g., percentiles, quartiles, standard deviation) and use it to describe and communicate data						•
M5.2.6	Make simple generalizations about a data set, including recognizing clusters and more/less contrasts and identifying trends				•	•	•
M5.2.7	Compare different samples or groupings (e.g., age, gender) in a data set, or compare individual pieces of data to an overall set or average				•	•	•
M5.2.8	Express data relationships in terms of ratios, fractions or percent (e.g., 3 to 1 ratio; 3 out of 4; 75%)			•	•	•	•
M5.2.9	Make observations, evaluate arguments, and draw conclusions based on statistical reasoning, recognizing the distinction between causation and correlation		•	•	•	•	•
M5.2.10	Identify constraints on extending data to make predictions				•	•	•
M5.2.11	Use computer programs to assist in compiling and analyzing data				•	•	•
M5.2.12	Recognize when data sets can be viably compared and when they cannot				•	•	•
M5.2.13	Interpret the concepts and implications of sampling and randomization in surveys				•	•	•
M5.3	Use the laws of probability to predict the likelihood of outcomes						
M5.3.1	Find all the possible outcomes (sample space) by systematically figuring the possible combinations and/or permutations of a number of elements in practical situations			•	•	•	•
M5.3.2	Determine the probability of certain simple events (e.g., in the results of tossing a coin or rolling a die) and express the likelihood of an occurrence as a ratio fraction or a percent		•	•	•		
M5.3.3	Identify possible outcomes involving compound events and determine the probability of their occurrence by considering whether the events are independent (e.g., rolling one die multiple times) or conditional (choosing 2 aces from a deck of cards)			•	•	•	•
M5.3.4	Apply the rules of probability to real-world events (e.g., risk of injury when not wearing seat belts), recognizing the importance of assumptions of randomness and independence of attributes when reading media reports					•	•