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Pre-HSE Core Skills in Mathematics
correlated to CASAS Math Standards

The shaded standards are assessed on the Math GOALS Series

Standard	Standard Description	NRP 2881: *Pre-HSE Core Skills in Mathematics*
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	pp.15–18
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	pp. 19–22
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 × 10 + 4 × 1 + 8 × 0.1)	pp. 13–18
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	pp. 31, 34
M1.1.10	Use common fractions to estimate the relationship between two quantities (e.g., 31/179 is close to 1/6)	pp. 32, 34
M1.1.11	Convert between mixed numbers and improper fractions	pp. 36, 39
M1.1.12	Use common fractions and their decimal equivalents interchangeably	pp. 33–34
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	pp. 23–26
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	pp. 23–26
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)	

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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	pp. 35–39
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	pp. 35–39
M1.2.8	Use estimation strategies to determine reasonable answers to addition and subtraction problems involving integers, decimal numbers and fractions	pp. 20–22
M1.2.9	Express the result of adding and subtracting to the level of precision indicated by the problem (e.g., as in measurements)	
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	pp. 27–30
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)	pp. 27–30
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	pp. 24–26, 55–57
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 ÷ 11 = 6/11; 12 ÷ 4 = 12 × ¼)	pp.32, 34, 39
M1.3.11	Find fractional parts of whole numbers and/or decimal numbers (e.g., ¼ of the $8.3 million budget)	pp.36–37, 39
M1.3.12	Recognize when a problem situation requires multiplying and/or dividing with fractions and mixed numbers, carry out the computation, and interpret the answer in context	pp.32, 34, 36–37, 39
M1.3.13	Use estimation strategies to determine reasonable answers to multiplication and division problems involving integers, decimal numbers and fractions (e.g., rounding to nearest multiple, benchmark fractions)	
M1.3.14	Use the commutative property of multiplication to restate problems (e.g., 20 × 0.25 = ¼ × 20) and recognize the proper order to write a division problem and to enter it into a calculator	
M1.3.15	Use the distributive property of multiplication over addition (e.g., 4(136) = 4(100 + 30 + 6))	pp.27–30
M1.3.16	Use exponential notation to indicate repeated multiplication, as in squaring and cubing	pp.61–63
M1.3.17	Read, write and interpret the radical sign ($\sqrt{}$) for square roots and ($\sqrt[3]{}$) for cube roots	

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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)	pp.44, 46–47
M1.4.2	Write and solve proportions for situations where two ratios are equal (e.g., currency conversion)	pp.44–46, 48–50, 119–121
M1.4.3	Find the percent equivalents to fractions and decimals	
M1.4.4	Know the percent equivalent to common benchmark fractions (e.g., ½, ¼, ¾, 1/10, 1/5) and use them interchangeably for solving problems	pp.44–46, 117–121
M1.4.5	Mentally find 10% and 1% of an integer or decimal number	pp.48–50
M1.4.6	Estimate percentages of numbers by using benchmark percents (10%, 25%, 50%) or combinations of them (e.g., 31% of 89 ≈ 3(10% of 90) = 27)	
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	pp.44–46
M1.4.8	Understand and solve problems using percents greater than 100% and less than 1%	pp.44–46, 48–49
M1.4.9	Calculate percent of change (increase or decrease) in a variety of situations, including those involving money	pp.48–49
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	pp.60–66, 76–78
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 *n*th term in the sequence in a functional relationship and predict how changes in one quantity will affect another	pp. 72–75
M2.1.4	Apply the correct order of operations	pp. 60–66, 76–78
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	pp. 61, 63
M2.2.2	Interpret symbols <, >, ≠ and use them to express number relationships	pp. 13–14, 16–18
M2.2.3	Recognize and interpret the different meanings and uses of variables (e.g., $2x + 1 = 7$; $y = 2x + 1$; $A = l \times w$; $a + -a = 0$)	pp. 63–66, 68–70, 72–74, 76–78, 99–101, 103–105
M2.2.4	Evaluate expressions that include unknowns by substituting specific values for variables	pp. 61–63

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M2.2.5	Use the distributive property and combine like terms to simplify an expression ($5x + 3y – 2x = 3x + 3y$) and to factor ($3x + 3y = 3(x + y)$)	pp. 61–63
M2.2.6	Apply the commutative and associative properties of addition and multiplication to rewrite expressions	pp. 60–66, 76–78
M2.2.7	Add, subtract, multiply and divide polynomial expressions	pp. 60–66, 76–78
M2.2.8	Solve simple one-step equations with unknowns (e.g., $n – 7 = 9$; $3x = 24$)	pp. 35–38, 45–46, 48–49, 54–56, 60–71, 76–79, 101, 104–105
M2.2.9	Use inverse operations and properties of equality to justify steps used in simplifying and solving more complex linear equations	pp. 60–66, 76–78
M2.2.10	Solve problems involving life-skill-related and technical formulas (e.g., units × price = cost; $d = r \times t$; $V = I \times R$)	pp. 35–38, 44–50, 54–56, 72–78, 101, 104–105, 119–121
M2.2.11	Use substitution to check the solution of an equation	pp. 64–71
M2.2.12	Solve inequalities	pp. 35–38, 45–46, 48–49, 54–56, 63–74, 76–79, 99–101, 103–105
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	pp. 63–66, 68–70, 72–74, 76–78, 99–101, 103–105
M2.3.2	Place positive and negative numbers on a number line, and relate them to direction and change	pp. 12–14, 32–33, 65–66, 72–73, 89–91
M2.3.3	Add, subtract, multiply and divide positive and negative numbers	pp.23–25, 27–30, 32–33, 35–38, 44–45, 48–49, 54–56, 60–66
M2.3.4	Use absolute value in contextual situations emphasizing a number's magnitude	pp.12–14, 32, 72
M2.3.5	Interpret and write expressions and equations representing contextual situations, including those that involve fractions, decimals, percents and negative numbers	pp.61, 64–66, 68–70, 76–78
M2.3.6	Generate a table of values from an equation in two variables	pp.72–75
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	pp.89–93
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	p. 125

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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	p. 125
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)	pp.86–87
M3.1.6	Recognize and use the property that the angles of a quadrilateral have a sum of 360 degrees	pp.86–87
M3.1.7	Identify polygons of various types	pp.86–87
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	pp.99–101, 103–105
M3.1.10	Interpret concepts of similarity, and identify figures that are similar or congruent	p. 95
M3.1.11	Use concepts and attributes of geometric shapes to find unknown dimensions in figures and applications	pp.99–101, 103–105
M3.2 Recognize, identify, describe and reason about lines and angles in two dimensions		
M3.2.1	Identify parallel, perpendicular and intersecting lines	pp.84–87
M3.2.2	Describe characteristics of angles formed by two intersecting lines, including complementary and supplementary angles	pp.94–97
M3.2.3	Describe characteristics of angles formed by a transversal intersecting parallel lines	pp.94–97
M3.2.4	Demonstrate understanding of the 360-degree system of measuring angles and rotation	p. 94
M3.2.5	Use benchmark angles of 45, 90 and 180 degrees to estimate the size of angles	pp.95–98
M3.2.6	Identify rotations of 90, 180, 270 and 360 degrees as ¼, ½, ¾, full	p. 94
M3.2.7	Identify angles as right, acute and obtuse	pp.84–87

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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	pp.94–97
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)	pp.89–90
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	pp.91–93
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	pp.119–122
M4.2.2	Calculate with and convert between metric units of linear measurement: meters, centimeters, millimeters, kilometers	pp.119–122
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)	pp.33–34
M4.2.5	Calculate with and convert between customary US units of weight: ounces, pounds, tons	pp.119–122
M4.2.6	Calculate with and convert between metric units of weight: grams, kilograms, milligrams	pp.119–122

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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	pp.119–122
M4.2.9	Calculate with and convert between metric units of capacity: liters, milliliters	pp.119–122
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	pp.112–122
M4.2.14	Use decimal placement and metric prefixes to convert like units (e.g., mm, cm, m; mg, g, kg)	pp.112–122
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	pp.103–104
M4.3.2	Calculate perimeter of rectangles and other common figures	pp.100–102
M4.3.3	Calculate circumference of a circle, using a given formula	pp.99–101
M4.3.4	Calculate area of rectangles and other common figures, using a given formula	pp.99–102
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	pp.99–101, 103–105
M4.3.7	Calculate area or volume of irregular or composite shapes by dividing the figure into parts	pp.99–106
M4.3.8	Interpret the exponential relationship of linear measure, area and volume (e.g., ft., sq. ft., cu. ft.)	pp.99–101, 103–105
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)	pp.99–101, 103–105
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)	pp.44–50, 72–75, 125
M4.5.2	Interpret, calculate and apply rates (e.g., cents/min, $/sq. ft., mi/gal)	pp.44–49, 72–75, 119–121
M4.5.3	Use averaging in calculating rates (e.g., average speed)	pp.44–46
M4.5.4	Demonstrate understanding and solve problems involving the interrelation of distance, time and speed	pp.44–46
M4.5.5	Estimate time, distance and speed in travel situations	
M4.5.6	Estimate equivalents between mph and km/h	

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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	
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	pp.113–114, 134–135, 137
M5.1.7	Present data in different interpretations (e.g., as percentages, difference, change)	pp.134–136
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)	pp.134–136
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	p. 125
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	pp.131–136
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	pp.131–137
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	pp.123–125, 130–132, 134–136
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	pp.130–132, 134–136
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	pp.123–125, 134–136
M5.2.13	Interpret the concepts and implications of sampling and randomization in surveys	pp.123–125

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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	