Pre-HSE Core Skills in Mathematics

correlated to the Texas AEL Content Standards

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
II. Mathematics Content Standards and Benchmarks	
Introduction	
A. Integrate the following mathematical processes through all mathematical content. 1. Apply appropriate mathematics to problems arising in everyday life, society, and the workplace.	pp. 23, 24, 25, 26, 35, 36, 37, 39, 48, 49, 50, 51, 115, 116, 117, 118
2. Use a problem-solving model that incorporates analysis of given information along with relevant data to formulate a plan or strategy for determining a solution, justifying the solution, and evaluating the reasonableness of the solution and the problem-solving process used.	pp. 48, 49, 50, 51, 54, 55, 56, 57, 60, 61, 62, 63, 64, 65, 66, 67, 76, 77, 78, 79,
3. Select tools (including real objects, manipulatives, and paper and pencil) and appropriate technology (such as software and graphing calculators) to solve problems.	pp. 72, 73, 74, 75, 111, 112, 113, 114
4. Apply cognitive strategies (such as mental math, estimation, and number sense) to solve problems that include rational numbers and the four basic operations (addition, subtraction, multiplication, and division).	pp. 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 35, 36, 37, 38, 39, 54, 55, 56, 57, 61, 62, 63
5. Communicate both orally and in writing mathematical concepts and reasoning and their associated implications, using multiple representations (including appropriate symbols, diagrams, charts, graphs, and language).	pp. 15, 16, 17, 18, 31, 32, 33, 34, 84, 85, 86, 87, 88, 89, 91, 92, 93, 123, 124, 125, 126
6. Analyze mathematical relationships to connect and communicate mathematical concepts.	pp. 12, 13, 14, 99, 100, 101, 102, 103, 104, 105, 106, 134, 135, 136, 137
7. Develop, display, explain, and justify mathematical concepts and logical arguments using precise mathematical language in written and oral communication.	pp. 13, 32, 44, 45, 46, 47, 48, 49, 50, 51,68, 69, 70, 71, 72, 73, 74, 75, 84, 85, 86, 87, 88, 131, 132, 133
Subarea II.1 – Numerical Representations and Relationships	
A. Recognizing Numbers and Counting. Develop an understanding of place value. 1. Count and represent quantities accurately, efficiently, and fluently.	
2. Develop and apply an understanding of the base-10 place value system, and place value concepts using pictorial models, such as number lines and graphs.	pp. 12-18
3. Compare and order quantities accurately, efficiently, and fluently.	
B. Apply knowledge of two-dimensional and three-dimensional shapes, including exploration of early fraction concepts. 1. Use attributes to compose and decompose two-dimensional shapes and three-dimensional solids.	
2. Separate objects into equal parts to represent a fraction.	
3. Demonstrate an understanding of equivalent fractions by representing a fraction in two ways of a uniform whole using objects or pictorial models such as 2/3 represented as 2/3 and 4/6.	
4. Equate fractions and decimals.	
Subarea II.2 – Computations	
A. Adding and Subtracting Whole Numbers. Understand and apply place value and properties of operations to solve problems involving addition and subtraction of whole numbers. 1. Identify situations in which addition and subtraction are necessary to solve problems.	

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
2. Use efficient, accurate, and generalizable methods based on the application of the principles of place value, the properties of operations, and the relationship between addition and subtraction to solve problems involving addition and subtraction of whole numbers.	
3. Solve multi-step problems involving addition and subtraction with whole numbers that include equations with a letter standing for the unknown quantity.	
B. Multiplying Whole Numbers. Develop accuracy, efficiency, and flexibility in the use of the mathematical operations (addition, subtraction, and multiplication) with whole numbers, and use this knowledge to solve problems. 1. Add, subtract, and multiply whole numbers accurately, efficiently, and fluently, and justify these procedures. Use these operations to solve problems, including using formulas for perimeter and area.	pp. 99, 100, 101, 102
C. Dividing Numbers. Use operations with positive rational numbers to solve problems. 1. Develop procedures for addition, subtraction, multiplication, and division of real numbers, including rational and irrational numbers, to solve real-world problems.	pp. 23, 24, 25, 26, 35, 36, 37, 38, 39
2. Relate multiplication and division as inverse operations.	
3. Evaluate rational expressions by substituting whole numbers and decimals for unknown quantities.	pp. 60, 61, 62, 63
D. Performing a Variety of Operations with Rational Numbers. 1. Accurately, efficiently, and fluently add, subtract, multiply, and divide rational numbers using the order of operations to solve problems in a variety of real-world contexts.	pp. 23, 24, 25, 27, 28, 29, 30, 32, 33, 35, 36, 37, 38, 44, 45, 48, 49, 54, 55, 56, 61, 62, 63, 64, 65, 66
E. Determining and Simplifying Numeric and Algebraic Expressions. Understand and generate expressions and equations to solve problems. 1. Demonstrate comprehension of the relationship between multiplication and division and use of the order of operations in solving problems with rational numbers.	pp. 23, 24, 25, 27, 28, 29, 30, 32, 33, 35, 36, 37, 44, 45, 48, 49, 54, 55, 56, 62, 63
2. Use or generate expressions and equations to solve problems involving the four mathematical operations (addition, subtraction, multiplication, and division).	pp. 35, 36, 37, 38, 45, 46, 47, 48, 49, 54, 55, 56, 64, 65, 66, 67, 76, 77, 78, 99, 100, 101, 102, 103, 104, 105, 123, 124, 125
F. Build foundations and develop an understanding of addition, subtraction, multiplication, and division of fractions and decimals, and perform these operations accurately, efficiently, and fluently. 1. Recognize that equivalent fractions can have different denominators.	
2. Apply understanding of representations of equivalent fractions (with like and unlike denominators) when using multiplication and division operations.	
3. Demonstrate understanding of addition and subtraction to include adding and subtracting fractions and decimals.	
4. Make reasonable estimates of fraction and decimal sums and differences using the four basic mathematical operations to solve real-world problems.	
5. Apply an understanding of multiplication and division to fractions and decimals.	pp. 35, 36, 37, 38, 39
Subarea II.3 – Geometry	
A. Identify, analyze, and use attributes of two-dimensional shapes and three-dimensional solids. 1. Identify, name, and create basic two-dimensional shapes and three- dimensional solids, and identify the attributes of each shape.	pp. 84, 85, 86, 87, 88
2. Use attributes to identify, classify, and sort components of two-dimensional shapes and three-dimensional solids, including measurable attributes.	

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
3. Compose and decompose two-dimensional shapes and three-dimensional solids	
4. Construct and use drawings, models, and coordinate representations of plane and space figures in order to solve problems with and without technology.	
B. Use right triangle relationships, including the Pythagorean Theorem, to describe relationships. 1. Select and use expressions and equations to represent and solve geometric problems involving rational numbers.	pp. 95, 99, 100, 101, 103, 104, 105
2. Use geometric concepts, including the Pythagorean Theorem, to solve problems.	
3. Construct and use drawings, models, and coordinate representations of plane and space figures in order to solve problems with and without technology.	
C. Represent, apply, and analyze proportional relationships by graphing on the coordinate plane. 1. Use knowledge of proportions to draw representations on a coordinate plane (such as the slope of a line) and solve real-life applications.	pp. 44, 45, 46, 48, 49
2. Compare and contrast proportional and non-proportional relationships.	pp. 44, 45, 46
Subarea II.4 – Measurement Including Geometry	
A. Understand units of measure and utilize measurement tools. (i.e. tape measure). 1. Demonstrate ability to convert between different units of measure, such as English to the metric system.	pp. 44, 45, 46, 48, 49, 50, 119, 120, 121
B. Measuring length, area, volume, and weight/mass in different measuring systems. 1. Identify length as an attribute that can be measured. List and use appropriate units to solve real-world problems related to length.	
2. Identify area as an attribute that can be measured. List and use appropriate units to solve real-world problems related to area.	pp. 99, 100, 101, 103, 104, 105
3. Identify volume as an attribute that can be measured. List and use appropriate units to solve real-world problems related to volume.	pp. 99, 100, 101, 103, 104, 105
4. Identify weight and mass as an attribute that can be measured. List and use appropriate units to solve real-world problems related to weight/mass.	
5. When given the area or perimeter, use the appropriate formulas to calculate the missing side dimensions of triangles, rectangles, and other polygons.	pp. 99, 100, 101, 103, 104, 105
6. Understand units of measure and utilize measurement tools, such as a tape measure.	pp. 111
7. Apply estimation in measuring, and use tools (e.g., rulers, tape measures, real objects, manipulatives, paper and pencil) and technology as appropriate.	
C. Represent and solve problems with perimeter, area, and volume. 1. Apply understanding of measurement to select appropriate units when measuring perimeter, area, and volume in real-world contexts.	
2. Use a variety of representations to build connections between the stated formulas and the direct measurement of perimeter, area, and volume.	
3. Solve real-world mathematical problems involving surface area and volume of three-dimensional shapes such as right prisms, pyramids, cylinders, spheres, cones, and composite figures.	pp. 99, 100, 101, 103, 104, 105
D. Describe characteristics of 2-D and 3-D geometric figures, including measurable attributes. 1. Use attributes to sort, classify, and measure two- and three-dimensional figures.	pp. 84, 85, 86, 87, 88
2. Use the decomposition of rectangles into rows of squares to determine that area can be found through multiplication.	

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
E. Measuring Angles and Using Angle Relationships. 1. Measure an angle.	
2. Recognize, identify, describe, and reason about intersecting and parallel lines and the associated angles in two dimensions.	pp. 94, 95, 96, 97
3. Analyze and use spatial relationships and basic concepts of geometry to construct, draw, describe, and compare geometric models and their transformations. Use geometric relations and patterns to solve real-world problems.	pp. 95
F. Use relationships between measures to analyze rates of change. 1. Interpret, calculate, and apply rates including those involving time, such as velocity (e.g., mi/hr, ft/sec, and m/sec), frequency (e.g., calls/hr), consumption (e.g., cal/day and kw/hr), flow (e.g., gal/min), and change (e.g., degrees/min and inches/year).	pp. 44, 45, 46, 48, 49, 50, 119, 120, 121
Subarea II.5 – Algebraic Relationships	
A. Represent and use algebra to solve problems for the unknown. 1. Identify Properties of Real Numbers for addition, subtraction, multiplication, division, and exponents.	pp. 60, 61, 62, 63, 64, 65, 66, 76, 77, 78
2. Use mathematical symbols to represent linear relationships and formulas.	
3. Use words, tables, and graphs as well as algebraic expressions and equations to model the mathematical relationships (particularly functional relationships) found in real-world problems.	pp. 35, 36, 37, 38, 45, 46, 48, 49, 54, 55, 56, 64, 65, 66, 76, 77, 78, 99, 100, 101, 102, 103, 104, 105, 123, 124, 125
4. Simplify expressions.	pp. 60, 61, 62, 63, 64, 65, 66, 76, 77, 78
5. Solve one-step linear equations using addition, subtraction, multiplication, and division properties of equality including proportions.	pp. 64, 65, 66, 68, 69, 72, 73, 74, 76, 77, 78, 79, 99, 100, 101, 102, 103, 104, 105
6. Solve two and three-step linear equations.	pp. 64, 65, 66, 67, 76, 77, 78, 79
7. Solve linear equations involving fractions and decimals by clearing them from the problem.	pp. 76, 77, 78, 79
8. Solve application problems involving linear equations to include percent, interest, sales and sales tax, distance, and geometrical problems.	
9. Solve systems of equations in real-world applications.	
10. Solve application problems involving systems of equations	
11. Solve and graph absolute value equations.	pp. 12, 13, 14, 32, 72, 91, 92
B. Linear Inequalities 1. Solve linear inequalities in one variable using the addition, subtraction, multiplication, and division properties.	pp. 68, 69, 70, 71
2. Graph linear inequalities on a number line.	pp. 72, 73, 74, 75
3. Solve and graph compound inequalities on a number line.	
4. Use set builder notation and interval notation with linear inequalities.	
5. Solve and graph absolute value inequalities.	
C. Graphing 1. Select and use expressions and equations to represent and solve problems involving rational numbers.	pp. 76, 77, 78, 79
2. Use properties of addition, subtraction, multiplication and division with radicals.	pp. 61

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
3. Understand and use a rectangular coordinate system to interpret a graph, plot points, and determine coordinates of points from a graph.	pp. 89, 90, 91, 92, 93
4. Graph linear functions by plotting points, including vertical and horizontal lines.	
5. Understand and use x- and y-intercepts to graph a linear function.	
6. Identify and calculate the slope of a line from both a graph and given coordinates, including vertical and horizontal functions.	pp. 125
7. Determine if two lines are parallel or perpendicular.	
8. Write linear functions with information given for slope and a point on a line.	
9. Graph linear inequalities in two dimensions.	
10. Graph systems of linear functions.	
11. Use linear equations and inequalities to model or solve problems using real-world data.	pp. 64, 65
12. Solve linear functions, with and without technology, and evaluate the reasonableness of their solutions	
D. Use numeric and algebraic methods 1. Identify functions using sets of ordered pairs, tables, mappings, and graphs, including using the vertical line test.	
2/4. Solve Quadratic equations using the Quadratic Formula.	
3. Apply algebraic methods to define, solve, analyze, split into parts, and evaluate equations, relations, and functions, including finding the domain and range	
E. Understand and apply ratios and rates by using equivalent ratios to represent percentages and proportional relationships. 1. Use knowledge of fractions to develop procedures for modeling and solving real- world ratio and rate problems.	pp. 44, 45, 46
2. Extend knowledge of equivalent fractions to create equivalent ratios that describe real-world situations that involve proportionality.	pp. 44, 45, 46, 48, 49
3. Use various representations (e.g., graphs, tables, and equations) to solve real- world problems, involving proportional relationships	pp. 44, 45, 46, 48, 49, 50, 119, 120, 121
4. Use knowledge of both direct and inverse variations to solve real-world problems.	pp. 44, 45, 46
5. Use reasoning to solve real-world problems, including proportions, and percentages (e.g., simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error).	pp. 44, 45, 46, 48, 49, 50, 119, 120, 121
F. Polynomials and properties of exponents. 1. Use properties of exponents to simplify expressions.	pp. 61
2. Use the properties of addition, subtraction, multiplication, and division to simplify polynomials.	
3. Use various representations (e.g., graphs, tables, and equations) to solve real- world problems involving polynomial relationships.	
Subarea II.6 – Non-Linear Equations, Functions, and Inequalities	
A. Use Quadratic Functions and Equations. 1. Factor polynomials by identifying the greatest common factor.	

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
2. Factor polynomials, including the use of grouping, trial and error method, difference of squares and sum, and difference of two cubes.	
3. Solve quadratic equations, with and without technology, by using the zero- product rule, including applications to model situations, solve problems, and make predictions.	
B. Rational Expressions 1. Use properties of addition, subtraction, multiplication, and division to simplify rational expressions.	
2. Solve rational equations.	
3. Use properties of rational equations to solve real-world problems	
4. Select and justify appropriate symbolic representations to solve problems in varied contexts, including use of geometric formulas for triangles and pyramids as well as the equation of a circle.	
5. Write a representative quadratic equation based on a graph or other given attributes.	
C. Radicals 1. Apply properties of radicals to simplify radical exponents and expressions.	pp. 61
2. Use properties of addition, subtraction, multiplication, and division with radicals.	pp. 61
3. Solve radical equations involving one radical.	
4. Solve radical equations involving more than one radical.	
5. Use properties of complex numbers to simplify expressions.	
D. Use quadratic and square-root functions, equations, and inequalities. 1. Solve quadratic equations using completing-the-square and square-root property.	
2. Solve quadratic equations using the quadratic formula.	
3. Apply quadratic and square-root equations and quadratic inequalities to model situations, solve problems, and make predictions.	
4. Understand that quadratic and square-root equations and quadratic inequalities can be used to model situations, solve problems, and make predictions.	
E. Use cubic, cube root, absolute value, and rational functions, equations, and inequalities. 1. Use cubic, cube-root, absolute value, and rational functions, equations and inequalities to model situations, solve problems, and make predictions.	
2. Perform computations and write numerical expressions with cubes and cube roots of non-zero rational numbers	
F. Use exponential functions and equations. 1. Use the properties of exponential functions and their related transformations to represent exponential functions graphically, in a table, and as equation—with and without technology.	
2. Use exponential functions to model or solve problems using real-world data. Evaluate the reasonableness of the solutions with and without technology.	
Subarea II.7 – Data Analysis	
A. Organizing, Representing, and Interpreting Sets of Data. Select and apply appropriate visual representations of data. 1. Organize and construct graphical displays of data (e.g., line plots, bar graphs, histograms, box plots, scatter plots, and coordinate planes) to describe data based on the attributes of a given data set.	

Texas Standard	*Pre-HSE Core Skills in Mathematics* (NRP 2881)
B. Read, analyze, interpret, and draw conclusions from data. 1. Understand the relevance and importance of reliable data sampling techniques to ensure more accurate statistical results.	pp. 123, 124, 125, 131, 132, 134, 135, 136
2. Use and understand the meaning of representative and non-representative samples.	pp. 123, 124, 125, 131, 132, 134, 135, 136
3. Understand and use descriptions of center, spread, and shape to summarize and compare data sets.	pp. 130, 131, 132, 134, 135, 136
4. Make predictions and draw inferences using summary statistics.	pp. 123, 124, 125, 130, 131, 132
5. Analyze data sets using graphs and summary statistics.	pp. 131, 132, 134, 135, 136
6. Analyze relationships between paired data using spreadsheets, graphing calculators, or software.	
C. Determine and use probability to solve problems. 1. Understand probability in real-world situations.	
2. Understand the influence of independence and dependence of events and variables.	
Subarea II.8 – Financial Literacy	
A. Understand the Connections Among Income, Expenses, and Careers. 1. Research and analyze college and career opportunities.	
2. Understand skills needed for a specific career and income potential of different types of jobs and careers.	
3. Understand taxes (e.g., income, sales, property, etc.).	
4. Understand fixed and variable expenses and how to develop your personal budget.	
B. Develop and use an economic way of thinking and problem solving useful in one's life as a knowledgeable employee, consumer, provider, and investor. 1. Apply critical thinking skills to analyze the costs and benefits of personal financial decisions, including assumption of large amounts of debt.	
2. Understand how to provide for basic needs while living and working within a budget.	
3. Compare and understand the various financial-aid methods available for college and other postsecondary education and training.	
4. Develop an economic way of thinking and problem solving useful in one's life as a knowledgeable consumer, employee, and investor.	
5. Understand the role of financial markets/ institutions in saving, borrowing, and capital formation.	
6. Understand the role of individuals in financial markets as well as banking and credit systems.	
7. Calculate and compare simple interest and compound interest as it applies to saving, borrowing, and lines of credit.	pp. 48, 49, 50
8. Navigate and use banking, credit, and financial markets in saving, borrowing, and capital formation.	