Revised College and Career Readiness Standards for Mathematics

I. Numeric Reasoning

    A. Number representations and operations

        1. Compare relative magnitudes of rational and irrational numbers, [real numbers] and understand that numbers can be represented in different ways.

        2. Perform computations with rational and irrational numbers.[Define and give examples of complex numbers.]

    B. Number sense and number concepts[operations]

        1. Use estimation to check for errors and reasonableness of solutions.[Perform computations with real and complex numbers.]

        2. Interpret the relationships between the different representations of numbers.

    C. Systems of measurement[Number sense and number concepts]

        1. Select or use the appropriate type of method, unit, and tool for the attribute being measured.[Use estimation to check for errors and reasonableness of solutions.]

        2. Convert units within and between systems of measurement.

II. Algebraic Reasoning

    A. Identifying e[E]xpressions and equations

        1. Explain [and differentiate] the difference between expressions and equations.[using words such as "solve," "evaluate," and "simplify."]

    B. Manipulating expressions

        1. Recognize and use algebraic [(field)] properties, concepts, [procedures,] and algorithms to combine, transform, and evaluate expressions (e.g., polynomials, radicals, rational expressions).

    C. Solving equations, inequalities, and systems of equations and inequalities

        1. Describe and interpret solution sets of equalities and inequalities.[Recognize and use algebraic (field) properties, concepts, procedures, and algorithms to solve equations, inequalities, and systems of linear equations.]

        2. Explain the difference between the solution set of an equation and the solution set of an inequality.

        3. Recognize and use algebraic properties, concepts, and algorithms to solve equations, inequalities, and systems of linear equations and inequalities.

    D. Representing relationships[Representations]

        1. Interpret multiple representations of equations, inequalities, and relationships.

2. Convert[Translate] among multiple representations of equations, inequalities, and relationships.

III. Geometric and Spatial Reasoning

A. Figures and their properties

1. Recognize characteristics and dimensional changes of two- and three-dimensional figures.[Identify and represent the features of plane and space figures.]

2. Form and validate[Make, test, and use] conjectures about one-, two-, and three-dimensional figures and their properties.

3. Recognize and apply right triangle relationships including basic trigonometry.

B. Transformations and symmetry

1. Identify [and apply] transformations and symmetries of [to] figures.

2. Use transformations to investigate congruence, similarity, and symmetries of figures.[Identify the symmetries of a plane figure.]

[3. Use congruence transformations and dilations to investigate congruence, similarity, and symmetries of plane figures.]

C. Connections between geometry and other mathematical content strands

1. Make connections between geometry and algebraic equations.[algebra.]

2. Make connections between geometry, statistics, and probability.

[3. Make connections between geometry and measurement.]

D. Measurements involving geometry and algebra[Logic and reasoning in geometry]

1. Find the perimeter and area of two-dimensional figures.[Make and validate geometric conjectures.]

2. Determine the surface area and volume of three-dimensional figures. [Understand that Euclidean geometry is an axiomatic system.]

3. Determine indirect measurements of geometric figures using a variety of methods.

[IV. Measurement Reasoning

A. Measurement involving physical and natural attributes

1. Select or use the appropriate type of unit for the attribute being measured.

B. Systems of measurement

1. Convert from one measurement system to another.

2. Convert within a single measurement system.

C. Measurement involving geometry and algebra

1. Find the perimeter and area of two-dimensional figures.

2. Determine the surface area and volume of three dimensional figures.

3. ~~Determine indirect measurements of figures using scale drawings, similar figures, the Pythagorean Theorem, and basic trigonometry.~~

D. ~~Measurement involving statistics and probability~~

1. ~~Compute and use measures of center and spread to describe data.~~

2. ~~Apply probabilistic measures to practical situations to make an informed decision.~~]

IV. [~~V.~~] Probabilistic Reasoning

A. Counting principles

1. Determine the nature and the number of elements in a finite sample space.

B. Computation and interpretation of probabilities

1. Compute and interpret the probability of an event and its complement.

2. Compute and interpret the probability of [~~conditional and~~] compound events.

C. <u>Measurement involving probability</u>

1. <u>Use probability to make informed decisions.</u>

V. [~~VI.~~] Statistical Reasoning

A. <u>Design a study</u>[~~Data collection~~]

1. <u>Formulate a statistical question, plan an investigation, and collect data.</u>[~~Plan a study.~~]

B. Describe data

1. <u>Classify</u> [~~Determine~~] types of data.

2. <u>Construct</u> [~~Select and apply~~] appropriate visual representations of data.

3. Compute and describe <u>the study data with measures of center and basic notions of spread.</u> [~~summary statistics of data.~~]

4. Describe patterns and departure from patterns in <u>the study</u> [~~a set of~~] data.

C. [~~Read,~~] <u>A</u>[a]nalyze, interpret, and draw conclusions from data

1. <u>Analyze data sets using graphs and summary statistics.</u>[~~Make predictions and draw inferences using summary statistics.~~]

2. <u>Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.</u>[~~Analyze data sets using graphs and summary statistics.~~]

3. <u>Make predictions using summary statistics.</u>[~~Analyze relationships between paired data using spreadsheets, graphing calculators, or statistical software.~~]

4. <u>Identify and explain misleading uses of data.</u>[~~Recognize reliability of statistical results.~~]

VI. [~~VII.~~] Functions

A. Recognition and representation of functions

1. Recognize if [~~whether~~] a relation is a function.

2. Recognize and distinguish between different types of functions.

B. Analysis of functions

1. Understand and analyze features of a~~~~ function~~s~~.

2. Algebraically construct and analyze new functions.

C. Model real-world situations with functions

1. Apply known functions to model real-world situations.[~~models.~~]

2. Develop a function to model a situation.

VII. [~~VIII.~~] Problem Solving and Reasoning

A. Mathematical problem solving

1. Analyze given information.

2. Formulate a plan or strategy.

3. Determine a solution.

4. Justify the solution.

5. Evaluate the problem-solving process.

B. Proportional [~~Logical~~] reasoning

1. Use proportional reasoning to solve problems that require fractions, ratios, percentages, decimals, and proportions in a variety of contexts using multiple representations.[~~Develop and evaluate convincing arguments.~~]

[~~2. Use various types of reasoning.~~]

C. Logical reasoning[~~Real world problem solving~~]

1. Develop and evaluate convincing arguments.[~~Formulate a solution to a real world situation based on the solution to a mathematical problem.~~]

2. Understand attributes and relationships with inductive and deductive reasoning.[~~Use a function to model a real world situation.~~]

[~~3. Evaluate the problem-solving process.~~]

D. Real-world problem solving

1. Interpret results of the mathematical problem in terms of the original real-world situation.

2. Evaluate the problem-solving process.

VIII. [~~IX.~~] Communication and Representation

A. Language, terms, and symbols of mathematics

1. Use mathematical symbols, terminology, and notation to represent given and unknown information in a problem.

2. Use mathematical language to represent and communicate the mathematical concepts in a problem.

3. Use <u>mathematical</u> [~~mathematics as a~~] language for reasoning, problem solving, making connections, and generalizing.

B. Interpretation of mathematical work

1. Model and interpret mathematical ideas and concepts using multiple representations.

2. Summarize and interpret mathematical information provided orally, visually, or in written form within the given context.

C. Presentation and representation of mathematical work

1. Communicate mathematical ideas, reasoning, and their implications using symbols, diagrams, <u>models,</u> graphs, and words.

2. Create and use representations to organize, record, and communicate mathematical ideas.

3. Explain, display, or justify mathematical ideas and arguments using precise mathematical language in written or oral communications.

<u>IX.</u> [~~X.~~] Connections

A. Connections among the strands of mathematics

1. Connect and use multiple <u>key concepts</u> [~~strands~~] of mathematics in situations and problems.

2. Connect mathematics to the study of other disciplines.

B. Connections of mathematics to nature, real-world situations, and everyday life

1. Use multiple representations to demonstrate links between mathematical and real-world situations.

2. Understand and use appropriate mathematical models in the natural, physical, and social sciences.

3. Know and understand the use of mathematics in a variety of careers and professions.