**Minnesota 4th Grade MCA-III**

**2007 Math Strands & Standards**

**Online MCA-III—42 items/points—32-40 MC & 2-10 TE**

**Paper MCA-III—50 items/points—50 MC**

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| **STRAND** | **STANDARD** |
| **4.1**  **Number & Operation**  **Online (16-20 items)**  **Paper (18-22 items)** | **4.1.1** Demonstrate mastery of multiplication and division basic facts; multiply multi-digit numbers; solve real-world and mathematical problems using arithmetic. (8-10 items) |
| **4.1.2** Represent and compare fractions and decimals in real-world and mathematical situations; use place value to understand how decimals represent quantities.  (10-12 items) |
| **4.2**  **Algebra**  **Online (7-8 items)**  **Paper (8-10 items)** | **4.2.1** Use input-output rules, tables and charts to represent patterns and relationships and to solve real-world and mathematical problems. (4-5 items) |
| **4.2.2** Use number sentences involving multiplication, division and unknowns to represent and solve real-world and mathematical problems; create real world situations corresponding to number sentences. (4-5 items) |
| **4.3**  **Geometry & Measurement**  **Online (10-14)**  **Paper (12-15 items)** | **4.3.1** Name, describe, classify and sketch polygons.  (4-5 items) |
| **4.3.2** Understand angle and area as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and areas. (5-7 items) |
| **4.3.3** Use translations, reflections and rotations to establish congruency and understand symmetries.  (3-4 items) |
| **4.4**  **Data Analysis**  **Online (6-7 items)**  **Paper (6-8 items)** | **4.4.1** Collect, organize, display and interpret data, including data collected over a period of time and data represented by fractions and decimals. (6-8 items) |

**4th Grade—Number & Operation Strand**

**2007 MN Math Standard to Benchmarks with Vocabulary & Symbols from MCAIII Draft Test Specifications**

**Online (16-20 items)**

**Paper (18-22 items)**

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| **STANDARD** | **VOCABULARY** | **BENCHMARK** |
| 4.1.1  Demonstrate mastery of multiplication & division facts; multiply multi-digit numbers; solve real-world & mathematical problems using arithmetic.  Online (6-8 items)  Paper (8-10 items) | * **quotient** * **vocabulary given at previous grades** | **4.1.1.1**  **Demonstrate fluency with multiplication & division facts.**   * Factors are limited to 1-9 |
| * **vocabulary given at previous grades** | **4.1.1.2**  **Use an understanding of place value to multiply a number by 10, 100, & 1000.**   * Numbers multiplied by 10, 100 and 1000 may contain at most 2 digits * Numbers must be whole numbers |
| * **factor** * **vocabulary given at previous grades** | **4.1.1.3**  **Multiply multi-digit numbers, using efficient & generalizable procedures, based on knowledge of place value, including standard algorithms.**   * Items will contain multiplication of a one- or two-digit number by a two- or three-digit number * Numbers must be whole numbers * Items must not have context |
|  | **4.1.1.4**  **Estimate products & quotients of multi-digit whole numbers by using rounding, benchmarks & place value to assess the reasonableness of results.**  *For example:* 53 x 38 is between 50 x 30 & 60 x 40, or between 1500 & 2400, & 411/73 is between 5 & 6.   * Assessed within 4.1.1.5 |
| * **operation** * **strategy** * **solve** * **vocabulary given at previous grades** | **4.1.1.5**  **Solve multi-step real-world & mathematical problems requiring the use of addition, subtraction & multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of technology, & the context of the problem to assess the reasonableness of results.**   * Solutions must be less than 100,000 |
| * **quotient** * **divisor** * **dividend** * **vocabulary given at previous grades** | **4.1.1.6**  **Use strategies & algorithms based on knowledge of place value, equality & properties of operations to divide multi-digit whole numbers by one- or two-digit numbers. Strategies may include mental strategies, partial quotients, the commutative, associative, & distributive properties & repeated subtraction.**  *For example:* A group of 324 students is going to a museum in 6 buses. If each bus has the same number of students, how many students will be on each bus?   * Dividend may contain at most 3 digits |
| 4.1.2  Represent & compare fractions & decimals in real-world & mathematical situations; use place value to understand how decimals represent quantities.  Online (10-12 items)  Paper (10-12 items) | * **equivalent** * **represent** * **numerator** * **denominator** * **vocabulary given at previous grades** | **4.1.2.1**  **Represent equivalent fractions using fraction models such as parts of a set, fraction circles, fraction strips, number lines & other manipulatives. Use the models to determine equivalent fractions.**   * Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12 |
| * **equivalent** * **numerator** * **denominator** * **improper fraction** * **mixed numbers** * **compare** * **vocabulary given at previous grades** | **4.1.2.2**  **Locate fractions on a number line. Use models to order & compare whole numbers & fractions, including mixed numbers & improper fractions.**  *For example:* Locate  &  on a number line & give a comparison statement about these two fractions, such as “ is less than .”   * Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12 |
| * **numerator** * **denominator** * **vocabulary given at previous grades** | **4.1.2.3**  **Use fraction models to add & subtract fractions with like denominators in real-world & mathematical situations. Develop a rule for addition & subtraction of fractions with like denominators.**   * Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12 |
| * **decimal** * **vocabulary given at previous grades** | **4.1.2.4**  **Read & write decimals with words & symbols; use place value to describe decimals in terms of thousands, hundreds, tens, ones, tenths, hundredths & thousandths.**  *For example:* Writing 382.45 is a shorter way of writing the sum:  3 hundreds + 6 tens + 2 ones + 4 tenths + 5 hundredths,  which can also be written as:  three hundred sixty-two and forty-five hundredths. |
| * **decimal** * **vocabulary given at previous grades** | **4.1.2.5**  **Compare & order decimals & whole numbers using place value, a number line & models such as grids & base 10 blocks.**   * Numbers used are from thousands to thousandths * Allowable symbols: < and > |
| * **decimal** * **equivalent** * **vocabulary given at previous grades** | **4.1.2.6**  **Read & write tenths & hundredths in decimal & fraction notations using words & symbols; know the fraction & decimal equivalents for halves & fourths.**  *For example:*  & , which can also be written as one and three-fourths or one and seventy-five hundredths. |
| * **decimal** * **vocabulary given at previous grades** | **4.1.2.7**  **Round decimals to the nearest tenth.**  *For example:* The number 0.36 rounded to the nearest tenth is 0.4.   * numbers must be less than 500 * decimals may be given up to thousandths |

**4th Grade—Algebra Strand**

**2007 MN Math Standard to Benchmarks with Vocabulary & Symbols from MCAIII Draft Test Specifications**

**Online (7-8 items)**

**Paper (8-10 items)**

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| **STANDARD** | **VOCABULARY** | **BENCHMARK** |
| 4.2.1  Use input-output rules, tables and charts to represent patterns and relationships and to solve real-world and mathematical problems.  Online (3-4 items)  Paper (4-5 items) | * **vocabulary given at previous grades** | **4.2.1.1**  **Create and use input-output rules involving addition, subtraction, multiplication and division to solve problems in various contexts. Record the inputs and outputs in a chart or table.**  *For example*: If the rule is "multiply by 3 and add 4," record the outputs for given inputs in a table.  *Another example*: A student is given these three arrangements of dots:  Identify a pattern that is consistent with these figures, create an input-output rule that describes the pattern, and use the rule to find the number of dots in the 10th figure.   * When creating a rule from pairs, 3 input-output pairs must be given; pairs are not required to be consecutive * Output should not exceed 100 |
| 4.2.2  Use number sentences involving multiplication, division and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences.  Online (3-4 items)  Paper (4-5 items) | * **variable** * **vocabulary given at previous grades** | **4.2.2.1**  **Understand how to interpret number sentences involving multiplication, division and unknowns. Use real-world situations involving multiplication or division to represent number sentences.**  *For example*: The number sentence *a* × *b* = 60 can be represented by the situation in which chairs are being arranged in equal rows and the total number of chairs is 60.   * Numbers must be less than 100 * Variables, boxes or blanks may be used to represent unknown numbers |
| * **variable** * **vocabulary given at previous grades** | **4.2.2.2**  **Use multiplication, division and unknowns to represent a given problem situation using a number sentence. Use number sense, properties of multiplication, and the relationship between multiplication and division to find values for the unknowns that make the number sentences true.**  *For example*: If $84 is to be shared equally among a group of children, the amount of money each child receives can be determined using the number sentence 84 ÷ *n* = *d*.  *Another example*: Find values of the unknowns that make each number sentence true:  12 × *m* = 36  *s* = 256 ÷ *t*.   * Numbers must be less than 100 * Variables, boxes or blanks may be used to represent unknown numbers |

**4th Grade—Geometry & Measurement Strand**

**2007 MN Math Standard to Benchmarks with Vocabulary & Symbols from MCAIII Draft Test Specifications**

**Online (10-14 items)**

**Paper (12-15 items)**

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| **STANDARD** | **VOCABULARY** | **BENCHMARK** |
| 4.3.1  Name, describe, classify and sketch polygons.  Online (3-4 items)  Paper (4-5 items) | * **vertex** * **vocabulary given at previous grades** | **4.3.1.1**  **Describe, classify and sketch triangles, including equilateral, right, obtuse and acute triangles. Recognize triangles in various contexts.**   * Naming of triangles is limited to equilateral, right, obtuse and acute * Allowable notation: 90° |
| * **vertex** * **congruent** * **vocabulary given at previous grades** | **4.3.1.2**  **Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts.**   * Naming of quadrilaterals is limited to quadrilateral, square, rectangle, trapezoid, rhombus, parallelogram and kite * Allowable notation: 90° |
| 4.3.2  Understand angle and area as measurable attributes of real-world and mathematical objects. Use various tools to measure angles and areas.  Online (4-6 items)  Paper (5-7 items) |  | **4.3.2.1**  **Measure angles in geometric figures and real-world objects with a protractor or angle ruler.**   * Not assessed on the MCA-III |
| * **vocabulary given at previous grades** | **4.3.2.2**  **Compare angles according to size. Classify angles as acute, right and obtuse.**  *For example*: Compare different hockey sticks according to the angle between the blade and the shaft.   * Allowable notation: 90°, angle arc |
| * **area** * **vocabulary given at previous grades** | **4.3.2.3**  **Understand that the area of a two-dimensional figure can be found by counting the total number of same size square units that cover a shape without gaps or overlaps. Justify why length and width are multiplied to find the area of a rectangle by breaking the rectangle into one unit by one unit squares and viewing these as grouped into rows and columns.**  *For example*: How many copies of a square sheet of paper are needed to cover the classroom door? Measure the length and width of the door to the nearest inch and compute the area of the door. |
| * **area** * **vocabulary given at previous grades** | **4.3.2.4**  **Find the areas of geometric figures and real-world objects that can be divided into rectangular shapes. Use square units to label area measurements.** |
| 4.3.3  Use translations, reflections and rotations to establish congruency and understand symmetries.  Online (3-4 items)  Paper (3-4 items) | * **translation** * **reflection** * **rotation** * **symmetry** * **congruent** * **transformation** * **image** * **vocabulary given at previous grades** | **4.3.3.1**  **Apply translations (slides) to figures.** |
| * **translation** * **reflection** * **rotation** * **symmetry** * **congruent** * **vertical** * **horizontal** * **transformation** * **image** * **vocabulary given at previous grades** | **4.3.3.2**  **Apply reflections (flips) to figures by reflecting over vertical or horizontal lines and relate reflections to lines of symmetry.** |
| * **translation** * **reflection** * **rotation** * **symmetry** * **congruent** * **clockwise** * **counterclockwise** * **transformation** * **image** * **vocabulary given at previous grades** | **4.3.3.3**  **Apply rotations (turns) of 90˚ clockwise or counterclockwise.** |
| * **translation** * **reflection** * **rotation** * **symmetry** * **congruent** * **transformation** * **image** * **vocabulary given at previous grades** | **4.3.3.4**  **Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.** |

**4th Grade—Data Analysis Strand**

**2007 MN Math Standard to Benchmarks with Vocabulary & Symbols from MCAIII Draft Test Specifications**

**Online (6-7 items)**

**Paper (6-8 items)**

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| **STANDARD** | **VOCABULARY** | **BENCHMARK** |
| 4.4.1  Collect, organize, display and interpret data, including data collected over a period of time and data represented by fractions and decimals.  Online (6-7 items)  Paper (6-8 items) | * **timeline** * **Venn diagram** * **survey** * **vocabulary given at previous grades** | **4.4.1.1**  **Use tables, bar graphs, timelines and Venn diagrams to display data sets. The data may include fractions or decimals. Understand that spreadsheet tables and graphs can be used to display data.**   * Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12 * Decimals are limited to hundredths * When interpreting data, displays may include tables, bar graphs, timelines, Venn diagrams, line plots and pictographs |