

# Mathematics MCA-III Test Specifications Grade-Level Tables

## Grade 3

### Strand 1—Number & Operation

(Online MCA, 18-20 items)

(Paper MCA, 20-24 items)

**Standard 3.1.1:** Compare and represent whole numbers up to 100,000 with an emphasis on place value and equality.

(Online MCA, 4–6 items)

(Paper MCA, 5–7 items)

#### Benchmarks

##### 3.1.1.1

Read, write and represent whole numbers up to 100,000. Representations may include numerals, expressions with operations, words, pictures, number lines, and manipulatives such as bundles of sticks and base 10 blocks.

##### *Item Specifications*

- Vocabulary allowed in items: digits, value, plot, locate, point
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##### 3.1.1.2

Use place value to describe whole numbers between 1000 and 100,000 in terms of ten thousands, thousands, hundreds, tens and ones.

##### *Item Specifications*

- Allowable expanded forms:  $300 + 60 + 5$ , 3 hundreds + 6 tens + 5 ones
  - Items may ask to identify a place a digit is in or the value of the digit in a place
  - Vocabulary allowed in items: digits, value, equal
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##### 3.1.1.3

Find 10,000 more or 10,000 less than a given five-digit number. Find 1000 more or 1000 less than a given four- or five-digit number. Find 100 more or 100 less than a given four- or five-digit number.

##### *Item Specifications*

- Vocabulary allowed in items: fewer, more, less, greater
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##### 3.1.1.4

Round numbers to the nearest 10,000, 1000, 100 and 10. Round up and round down to estimate sums and differences.

##### *Item Specifications*

- Vocabulary allowed in items: estimate, round, nearest, closest
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##### 3.1.1.5

Compare and order whole numbers up to 100,000.

##### *Item Specifications*

- $<$  and  $>$  symbols are not allowed
- Vocabulary allowed in items: least, greatest, compare, order, value

**Standard 3.1.2:** Add and subtract multi-digit whole numbers; represent multiplication and division in various ways; solve real-world and mathematical problems using arithmetic.

(Online MCA, 8–10 items)

(Paper MCA, 8–10 items)

### **Benchmarks**

#### **3.1.2.1**

Add and subtract multi-digit numbers using efficient and generalizable procedures based on knowledge of place value, including standard algorithms.

##### *Item Specifications*

- Addition items may contain 3 whole number addends, at most
  - Numbers used may contain 4 digits each, at most
  - Items must not have context
  - Vocabulary allowed in items: add, subtract, sum, difference, result
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#### **3.1.2.2**

Use addition and subtraction to solve real-world and mathematical problems involving whole numbers. Use various strategies, including the relationship between addition and subtraction, the use of technology and the context of the problem, to assess the reasonableness of results.

##### *Item Specifications*

- Addition items may contain 3 whole number addends, at most
  - Numbers used may contain 4 digits each, at most
  - Addition and subtraction can be used in the same item
  - Vocabulary allowed in items: add, subtract, sum, difference, result
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#### **3.1.2.3**

Represent multiplication facts using a variety of approaches, such as repeated addition, equal-sized groups, arrays, area models, equal jumps on a number line and skip counting. Represent division facts by using a variety of approaches, such as repeated subtraction, equal sharing and forming equal groups. Recognize the relationship between multiplication and division.

##### *Item Specifications*

- Factors are limited to 1–12
  - Variables are not used
  - Vocabulary allowed in items: multiply, divide
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#### **3.1.2.4**

Solve real-world and mathematical problems involving multiplication and division, including both "how many in each group" and "how many groups" division problems.

##### *Item Specifications*

- Factors are limited to 1–20; 1 factor must have only 1 digit
- Dividend is no greater than 100
- Vocabulary allowed in items: multiply, divide, product

### 3.1.2.5

Use strategies and algorithms based on knowledge of place value, equality and properties of addition and multiplication to multiply a two- or three-digit number by a one-digit number. Strategies may include mental strategies, partial products, the standard algorithm and the commutative, associative and distributive properties.

#### *Item Specifications*

- Items must not have context
- The one-digit factor must be 2–6
- Vocabulary allowed in items: multiply, product

**Standard 3.1.3:** Understand meanings and uses of fractions in real-world and mathematical situations.

(Online MCA, 5–7 items)

(Paper MCA, 5–7 items)

### **Benchmarks**

#### 3.1.3.1

Read and write fractions with words and symbols. Recognize that fractions can be used to represent parts of a whole, parts of a set, points on a number line or distances on a number line.

#### *Item Specifications*

- Denominators are limited to 2, 3, 4, 6 and 8
  - Sets may contain no more than 12 objects
  - Vocabulary allowed in items: fraction, plot, locate, point
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#### 3.1.3.2

Understand that the size of a fractional part is relative to the size of the whole.

#### *Item Specifications*

- Denominators are limited to 2, 3, 4, 6 and 8
  - Sets may contain no more than 12 objects
  - Vocabulary allowed in items: fraction
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#### 3.1.3.3

Order and compare unit fractions and fractions with like denominators by using models and an understanding of the concept of numerator and denominator.

#### *Item Specifications*

- Denominators are limited to 2, 3, 4, 6 and 8
- Sets may contain no more than 12 objects
- Vocabulary allowed in items: fraction, equal, least, greatest

**Standard 3.2.1:** Use single-operation input-output rules to represent patterns and relationships and to solve real-world and mathematical problems.

(Online MCA, 2–3 items)

(Paper MCA, 3–4 items)

### **Benchmarks**

#### **3.2.1.1**

Create, describe and apply single-operation input-output rules involving addition, subtraction and multiplication to solve problems in various contexts.

#### *Item Specifications*

- At least 3 iterations of the pattern must be given
- Items may require identification of 3 or fewer terms beyond what is given
- Vocabulary allowed in items: rule, input, output, value

**Standard 3.2.2:** Use number sentences involving multiplication and division basic facts and unknowns to represent and solve real-world and mathematical problems; create real-world situations corresponding to number sentences.

(Online MCA, 4–5 items)

(Paper MCA, 5–6 items)

### **Benchmarks**

#### **3.2.2.1**

Understand how to interpret number sentences involving multiplication and division basic facts and unknowns. Create real-world situations to represent number sentences.

#### *Item Specifications*

- Variables, boxes or blanks may be used to represent unknown numbers
- Vocabulary allowed in items: number sentence, equation, value, represent

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#### **3.2.2.2**

Use multiplication and division basic facts to represent a given problem situation using a number sentence. Use number sense and multiplication and division basic facts to find values for the unknowns that make the number sentences true.

#### *Item Specifications*

- Variables, boxes or blanks may be used to represent unknown numbers
- Vocabulary allowed in items: number sentence, equation, value, represent

**Standard 3.3.1:** Use geometric attributes to describe and create shapes in various contexts.

(Online MCA, 3–4 items)

(Paper MCA, 3–4 items)

**Benchmarks**

**3.3.1.1**

Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.

*Item Specifications*

- When identifying shapes by the attribute of parallel or perpendicular lines, shapes are limited to triangle, parallelogram, rectangle, rhombus, square and trapezoid
  - Allowable notation: right angle symbol (square in corner)
  - Items will not require students to identify right triangles by name
  - Vocabulary allowed in items: parallel, perpendicular, right, figure
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**3.3.1.2**

Sketch polygons with a given number of sides or vertices (corners), such as pentagons, hexagons and octagons.

*Item Specifications*

- Allowable shapes: triangle, parallelogram, rectangle, rhombus, square, trapezoid, pentagon, hexagon, octagon
- Vocabulary allowed in items: sides, angles, vertices, figure

**Standard 3.3.2:** Understand perimeter as a measurable attribute of real-world and mathematical objects. Use various tools to measure distances.

(Online MCA, 3–4 items)

(Paper MCA, 3–4 items)

**Benchmarks**

**3.3.2.1**

Use half units when measuring distances.

*Item Specifications*

- Not assessed on the MCA-III
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**3.3.2.2**

Find the perimeter of a polygon by adding the lengths of the sides.

*Item Specifications*

- Polygons may have 6 sides, at most
- Items may require finding the length of an unknown side given the lengths of the other sides and the perimeter
- Units are limited to inches, feet, yards, centimeters and meters
- Vocabulary allowed in items: perimeter, length, width, side, figure

### 3.3.2.3

Measure distances around objects.

#### *Item Specifications*

- Items may require identification of appropriate tools or procedures for measuring distance
- Vocabulary allowed in items: tool, ruler, yardstick, meter stick, tape measure

**Standard 3.3.3:** Use time, money and temperature to solve real-world and mathematical problems.

(Online MCA, 4–6 items)

(Paper MCA, 4–5 items)

### 3.3.3.1

Tell time to the minute using digital and analog clocks. Determine elapsed time to the minute.

#### *Item Specifications*

- Elapsed time must be within a two-hour span
  - Vocabulary allowed in items: a.m., p.m.
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### 3.3.3.2

Know relationships among units of time.

#### *Item Specifications*

- Allowable conversions: minutes to hours, hours to minutes, hours to days, days to hours, days to weeks, weeks to days, months to years, years to months
  - Items may require finding a conversion with mixed units in the answer (e.g., 12 days = 1 week and 5 days)
  - Vocabulary allowed in items: unit
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### 3.3.3.3

Make change up to 1 dollar in several different ways, including with as few coins as possible.

#### *Item Specifications*

- Allowable coins: penny, nickel, dime, quarter
  - Allowable notation: \$5, \$0.75, 75¢
  - When calculating change, the amount tendered is \$10, at most
  - Vocabulary allowed in items: greatest, least, fewest, most, value
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### 3.3.3.4

Use an analog thermometer to determine temperature to the nearest degree in Fahrenheit and Celsius.

#### *Item Specifications*

- Allowable notation: 15°F, 37°C
- Temperatures must be given in whole numbers
- Vocabulary allowed in items: thermometer, temperature, degrees, increase, decrease

## **Strand 4—Data Analysis**

**(Online MCA, 6–7 items)**

**(Paper MCA, 6-8 items)**

**Standard 3.4.1:** Collect, organize, display, and interpret data. Use labels and a variety of scales and units in displays.

(Online MCA, 6–7 items)

(Paper MCA, 6–8 items)

### **Benchmarks**

#### **3.4.1.1**

Collect, display and interpret data using frequency tables, bar graphs, picture graphs and number line plots having a variety of scales. Use appropriate titles, labels and units.

#### *Item Specifications*

- Scale increments will not exceed 5
- Pictograph keys will not exceed 5
- Total number on graph or chart will not exceed 500
- Vocabulary allowed in items: pictograph, tally chart, bar graph, line plot, table, data, title, label, key, represent, scale