

## Grade 5

### Strand 1—Number & Operation

(Online MCA, 15–21 items)  
(Paper MCA, 18–22 items)

**Standard 5.1.1:** Divide multi-digit numbers; solve real-world and mathematical problems using arithmetic.

(Online MCA, 5–7 items)

(Paper MCA, 6–8 items)

#### Benchmarks

##### 5.1.1.1

Divide multi-digit numbers using efficient and generalizable procedures based on knowledge of place value, including standard algorithms. Recognize that quotients can be represented in a variety of ways, including a whole number with a remainder, a fraction or mixed number or a decimal.

##### *Item Specifications*

- Dividends may not be more than 4 digits
  - Divisors may not be more than 2 digits
  - Fractional remainders are not required to be given in lowest terms
  - Allowable division notation:  $\div$ , fraction bar
  - Vocabulary allowed in items: remainder, and vocabulary given at previous grades
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##### 5.1.1.2

Consider the context in which a problem is situated to select the most useful form of the quotient for the solution and use the context to interpret the quotient appropriately.

##### *Item Specifications*

- Dividends may not be more than 4 digits
  - Divisors may not be more than 2 digits
  - Fractional remainders are not required to be given in lowest terms
  - Items may require interpretation of when decimals should be rounded (e.g., with money)
  - Vocabulary allowed in items: remainder, and vocabulary given at previous grades
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##### 5.1.1.3

Estimate solutions to arithmetic problems in order to assess the reasonableness of results.

##### *Item Specifications*

- Assessed within 5.1.1.4

#### 5.1.1.4

Solve real-world and mathematical problems requiring addition, subtraction, multiplication and division of multi-digit whole numbers. Use various strategies, including the inverse relationships between operations, the use of technology and the context of the problem to assess the reasonableness of results.

##### *Item Specifications*

- Solutions are less than 1,000,000
- Multiplication is limited to no more than three-digit numbers by no more than three-digit numbers
- Division is limited to no more than four-digit numbers by no more than two-digit numbers
- Fractional remainders are not required to be given in lowest terms
- Vocabulary allowed in items: vocabulary given at previous grades

**Standard 5.1.2:** Read, write, represent and compare fractions and decimals; recognize and write equivalent fractions; convert between fractions and decimals; use fractions and decimals in real-world and mathematical situations.

(Online MCA, 5–7 items)

(Paper MCA, 6–8 items)

#### **Benchmarks**

##### 5.1.2.1

Read and write decimals using place value to describe decimals in terms of groups from millionths to millions.

##### *Item Specifications*

- Vocabulary allowed in items: place value, and vocabulary given at previous grades
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##### 5.1.2.2

Find 0.1 more than a number and 0.1 less than a number. Find 0.01 more than a number and 0.01 less than a number. Find 0.001 more than a number and 0.001 less than a number.

##### *Item Specifications*

- Vocabulary allowed in items: place value, and vocabulary given at previous grades
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##### 5.1.2.3

Order fractions and decimals, including mixed numbers and improper fractions, and locate on a number line.

##### *Item Specifications*

- Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 15, 16 and 20
- Mixed numbers are less than 10
- Vocabulary allowed in items: place value, and vocabulary given at previous grades

#### 5.1.2.4

Recognize and generate equivalent decimals, fractions, mixed numbers and improper fractions in various contexts.

##### *Item Specifications*

- Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 15, 16, 20, 25, 50 and 100
- Mixed numbers are less than 10
- Vocabulary allowed in items: place value, and vocabulary given at previous grades

#### 5.1.2.5

Round numbers to the nearest 0.1, 0.01 and 0.001.

##### *Item Specifications*

- Numbers can be given up to millionths
- Vocabulary allowed in items: place value, and vocabulary given at previous grades

**Standard 5.1.3:** Add and subtract fractions, mixed numbers and decimals to solve real-world and mathematical problems.

(Online MCA, 5–7 items)

(Paper MCA, 6–8 items)

### **Benchmarks**

#### 5.1.3.1

Add and subtract decimals and fractions using efficient and generalizable procedures, including standard algorithms.

##### *Item Specifications*

- Addends, minuend and subtrahend denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12
  - Mixed numbers are less than 10
  - Items do not require conversion between fractions and decimals
  - Items must not have context
  - Vocabulary allowed in items: vocabulary given at previous grades
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#### 5.1.3.2

Model addition and subtraction of fractions and decimals using a variety of representations.

##### *Item Specifications*

- Addends, minuend and subtrahend denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12
- Mixed numbers are less than 10
- Items do not require conversion between fractions and decimals
- Vocabulary allowed in items: vocabulary given at previous grades

### 5.1.3.3

Estimate sums and differences of decimals and fractions to assess the reasonableness of results.

#### *Item Specifications*

- Assessed within 5.1.3.4
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### 5.1.3.4

Solve real-world and mathematical problems requiring addition and subtraction of decimals, fractions and mixed numbers, including those involving measurement, geometry and data.

#### *Item Specifications*

- Addends, minuend and subtrahend denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12
- Mixed numbers are less than 10
- Fractions and decimals may be used within the same item
- Vocabulary allowed in items: vocabulary given at previous grades

## **Strand 2—Algebra**

**(Online MCA, 9–13 items)**

**(Paper MCA, 10-14 items)**

**Standard 5.2.1:** Recognize and represent patterns of change; use patterns, tables, graphs and rules to solve real-world and mathematical problems.

(Online MCA, 3–4 items)

(Paper MCA, 4–6 items)

### **Benchmarks**

#### **5.2.1.1**

Create and use rules, tables, spreadsheets and graphs to describe patterns of change and solve problems.

#### *Item Specifications*

- In a growing pattern, 3 applications of the rule must be shown, though not necessarily consecutively
  - In a table or graph, 3 input-output pairs must be given; pairs are not required to be consecutive
  - Vocabulary allowed in items: vocabulary given at previous grades
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#### **5.2.1.2**

Use a rule or table to represent ordered pairs of positive integers and graph these ordered pairs on a coordinate system.

#### *Item Specifications*

- Scale increments on grids are limited to 1, 2 and 5
- Rules may be expressed using variables
- Vocabulary allowed in items: ordered pair, graph, and vocabulary given at previous grades

**Standard 5.2.2:** Use properties of arithmetic to generate equivalent numerical expressions and evaluate expressions involving whole numbers.

(Online MCA, 2–3 items)

(Paper MCA, 2–3 items)

**Benchmarks**

**5.2.2.1**

Apply the commutative, associative and distributive properties and order of operations to generate equivalent numerical expressions and to solve problems involving whole numbers.

*Item Specifications*

- Expressions may not contain nested parentheses
- Items must not have context
- Vocabulary allowed in items: expression, and vocabulary given at previous grades

**Standard 5.2.3:** Understand and interpret equations and inequalities involving variables and whole numbers, and use them to represent and solve real-world and mathematical problems.

(Online MCA, 4–6 items)

(Paper MCA, 4–6 items)

**Benchmarks**

**5.2.3.1**

Determine whether an equation or inequality involving a variable is true or false for a given value of the variable.

*Item Specifications*

- Allowable symbols:  $<$  and  $>$
- Items must not have context
- Vocabulary allowed in items: inequality, and vocabulary given at previous grades

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**5.2.3.2**

Represent real-world situations using equations and inequalities involving variables. Create real-world situations corresponding to equations and inequalities.

*Item Specifications*

- $<$  and  $>$  symbols are allowed
- Vocabulary allowed in items: inequality, and vocabulary given at previous grades

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**5.2.3.3**

Evaluate expressions and solve equations involving variables when values for the variables are given.

*Item Specifications*

- Items must not have context
- Vocabulary allowed in items: expression, and vocabulary given at previous grades

**Standard 5.3.1:** Describe, classify, and draw representations of three-dimensional figures.

(Online MCA, 3–4 items)

(Paper MCA, 3–4 items)

### **Benchmarks**

#### **5.3.1.1**

Describe and classify three-dimensional figures including cubes, prisms and pyramids by the number of edges, faces or vertices as well as the types of faces.

#### *Item Specifications*

- Prisms and pyramids are limited to triangular, rectangular, pentagonal, hexagonal and octagonal
  - Vocabulary allowed in items: cube, prism, pyramid, cone, cylinder, edge, face, base, three-dimensional, triangular, rectangular, and vocabulary given at previous grades
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#### **5.3.1.2**

Recognize and draw a net for a three-dimensional figure.

#### *Item Specifications*

- Vocabulary allowed in items: net, cylinder, cube, prism, pyramid, edge, face, base, three-dimensional, triangular, rectangular, and vocabulary given at previous grades

**Standard 5.3.2:** Determine the area of triangles and quadrilaterals; determine the surface area and volume of rectangular prisms in various contexts.

(Online MCA, 5–6 items)

(Paper MCA, 5–6 items)

### **Benchmarks**

#### **5.3.2.1**

Develop and use formulas to determine the area of triangles, parallelograms and figures that can be decomposed into triangles.

#### *Item Specifications*

- Vocabulary allowed in items: formula, and vocabulary given at previous grades
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#### **5.3.2.2**

Use various tools and strategies to measure the volume and surface area of objects that are shaped like rectangular prisms.

#### *Item Specifications*

- When finding surface area, a graphic of the prism or net must be given
- When finding surface area, dimensions of figures are whole numbers
- Surface areas and volumes are no more than 360
- Vocabulary allowed in items: surface area, volume, net, and vocabulary given at previous grades

### 5.3.2.3

Understand that the volume of a three-dimensional figure can be found by counting the total number of same-sized cubic units that fill a shape without gaps or overlaps. Use cubic units to label volume measurements.

#### *Item Specifications*

- Assessed within 5.3.2.2
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### 5.3.2.4

Develop and use the formulas  $V = \ell wh$  and  $V = Bh$  to determine the volume of rectangular prisms. Justify why base area  $B$  and height  $h$  are multiplied to find the volume of a rectangular prism by breaking the prism into layers of unit cubes.

#### *Item Specifications*

- The definition of  $B$  as the area of the base must be given
- Vocabulary allowed in items: volume, base, height, and vocabulary given at previous grades

## Strand 4—Data Analysis

(Online MCA, 6–7 items)  
(Paper MCA, 6-8 items)

**Standard 5.4.1:** Display and interpret data; determine mean, median and range.

(Online MCA, 6–7 items)

(Paper MCA, 6–8 items)

### **Benchmarks**

#### 5.4.1.1

Know and use the definitions of the mean, median and range of a set of data. Know how to use a spreadsheet to find the mean, median and range of a data set. Understand that the mean is a "leveling out" of data.

#### *Item Specifications*

- When finding mean, data sets contain, at most 10 numbers
  - When finding median, data sets contain, at most 15 numbers
  - Numbers are less than 300
  - Vocabulary allowed in items: mean, median, range, minimum, maximum, and vocabulary given at previous grades
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#### 5.4.1.2

Create and analyze double-bar graphs and line graphs by applying understanding of whole numbers, fractions and decimals. Know how to create spreadsheet tables and graphs to display data.

#### *Item Specifications*

- Double-bar graphs have no more than 9 categories
- Line graphs have no more than 10 data points
- Scales are in increments of  $\frac{1}{2}$ , 1, 2, 4, 5, 10, tenths if in decimal form or must be consistent with real world applications
- Vocabulary allowed in items: double-bar graph, line graph, and vocabulary given at previous grades