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: ÷, 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

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

Strand 3—Geometry & Measurement (Online MCA, 8–10 items) (Paper MCA, 8-10 items)

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

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 ½, 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