

# *Mathematics*

## **Standard**

**MA.1: The student understands and applies concepts of numbers.**

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**Benchmark**

**MA.1.0.1 Grade K:** Understands symbolic and pictorial representations of whole numbers 0-20.

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**Benchmark**

**MA.1.0.2 Grade K:** Write whole numbers to 12.

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**Benchmark**

**MA.1.1.1 Grade 1:** Understand the meaning of place value of ones and tens.

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**Benchmark**

**MA.1.1.2 Grade 1:** Write all whole numbers zero to hundred.

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**Benchmark**

**MA.1.1.3 Grade 1:** Understand fractions of one-half, one-third, and one-fourth.

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**Benchmark**

**MA.1.2.1 Grade 2:** Understand the basic meaning of place value of ones, tens, and hundreds.

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**Benchmark**

**MA.1.2.2 Grade 2:** Read and write numbers 0-1,000

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**Benchmark**

**MA.1.2.3 Grade 2:** Understand simple fractions with denominators of three and four.

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**Benchmark**

**MA.1.3.1 Grade 3:** Observe the basic meaning of place value to ten thousand.

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**Benchmark**

**MA.1.3.2 Grade 3:** Estimate by rounding to the nearest hundred.

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**Benchmark**

**MA.1.3.3 Grade 3:** Apply the concept of odd and even numbers.

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**Benchmark**

**MA.1.3.4 Grade 3:** Model fractions as part of a whole and part of a group.

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**Benchmark**

**MA.1.4.1 Grade 4:** Understand the basic meaning of place value to hundred thousands.

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**Benchmark**

**MA.1.4.2 Grade 4:** Estimate by rounding to the nearest thousand.

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**Benchmark**

**MA.1.4.3 Grade 4:** Estimate by rounding to the nearest dollar.

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**Benchmark**

**MA.1.4.4 Grade 4:** Perform addition and subtraction of fractions with like denominators.

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**Benchmark**

**MA.1.5.1 Grade 5:** Understands the basic meaning of place value to millions.

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**Benchmark**

**MA.1.5.2 Grade 5:** Estimate by rounding to the nearest hundred thousand.

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**Benchmark**

**MA.1.5.3 Grade 5:** Understand, round, and order decimals expressed through the hundredths place.

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**Benchmark**

**MA.1.5.4 Grade 5:** Order and compare fractions with denominators less than or equal to five.

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**Benchmark**

**MA.1.6.1 (Exit) Grade 6:** Order and compare fractions and mixed numbers.  
(Exit)

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**Benchmark**

**MA.1.6.2 Grade 6:** Identify the characteristics of prime and composite numbers.

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**Benchmark**

**MA.1.6.3 Grade 6:** Know when an estimate is more appropriate than an exact answer in problem situations.

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**Benchmark**

**MA.1.7.1 Grade 7:** Exhibit the role of integers in the number system.

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**Benchmark**

**MA.1.7.2 Grade 7:** Relate the concept and characteristics of factors and multiples, and their role in divisibility.

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**Benchmark**

**MA.1.7.3 Grade 7:** Convert between percents, fractions, and decimals.

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**Benchmark**

**MA.1.8.1 Grade 8:** Identify and operate with the properties of operations with rational numbers (eg. distributive property, commutative and associative properties of addition and multiplication, inverse properties, and identity properties).

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**Benchmark**

**MA.1.8.2 (Exit) Grade 8:** Apply the properties of exponents. (Exit)

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**Benchmark**

**MA.1.A1.1 Algebra 1:** Explain the properties of the real number system and its subsystems.

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**Benchmark**

**MA.1.A1.2 Algebra 1:** Analyze the appropriate use between fraction, percent, and decimal notation.

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**Benchmark**

**MA.1.A1.3 Algebra 1:** Solve percent problems using equations.

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**Benchmark**

**MA.1.A1.4 Algebra 1:** Develop the formula for slope.

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**Benchmark**

**MA.1.AA.1 Advanced Algebra:** Analyze and apply the properties and basic theorems of roots and exponents.

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**Benchmark**

**MA.1.AA.2 Advanced Algebra:** Use matrices to solve systems of equations and as the means of producing transformations.

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**Benchmark**

**MA.1.AA.3 Advanced Algebra:** Develop and apply the point-slope form for linear equations.

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**Benchmark**

**MA.1.AM.1 Applied Math:** Explain the basic properties of the real number system and its subsystems.

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**Benchmark**

**MA.1.F.1 Functions, Statistics, Trig:** Prove and apply the basic properties of logarithms.

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**Benchmark**

**MA.1.F.2 Functions, Statistics, Trig:** Apply the basic properties of the complex number systems.

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**Benchmark**

**MA.1.G.1 Geometry:** Investigate the relationship between the slopes of parallel and perpendicular lines.

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**Benchmark**

**MA.1.GM.1 General Math:** Demonstrate the appropriate use and corresponding notation of fraction, proportion, and percent.

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**Benchmark**

**MA.1.PDM.1 Precalculus & Discrete Math:** Examine rational and irrational numbers and their related equations, functions, and applications.

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## Standard

**MA.2: The student uses appropriate procedures while performing computation.**

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**Benchmark**

**MA.1.CM.1 Consumer Math:** Use a variety of methods to compute hourly rate and salary.

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**Benchmark**

**MA.2.0.1 Grade K:** Understands combinations and separation of objects in sets up to five items. (e.g. Simple addition and subtraction with pictures and drawings.)

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**Benchmark**

**MA.2.0.2 Grade K:** Perform addition of whole numbers to 5 using numerals.

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**Benchmark**

**MA.2.1.1 Grade 1:** Perform addition of whole numbers to 18.

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**Benchmark**

**MA.2.1.2 Grade 1:** Perform subtraction of whole numbers to 18.

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**Benchmark**

**MA.2.1.3 Grade 1:** Memorize addition facts to 12.

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**Benchmark**

**MA.2.1.4 Grade 1:** Memorize subtraction facts to 12.

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**Benchmark**

**MA.2.2.1 Grade 2:** Perform addition of whole numbers with trading through 99.

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**Benchmark**

**MA.2.2.2 Grade 2:** Perform subtraction of whole numbers with regrouping through 99.

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**Benchmark**

**MA.2.2.3 Grade 2:** Memorize addition facts to 18.

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**Benchmark**

**MA.2.2.4 Grade 2:** Memorize subtraction facts to 18.

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**Benchmark**

**MA.2.3.1 Grade 3:** Perform addition of whole numbers with trading ones, tens, and hundreds.

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**Benchmark**

**MA.2.3.2 Grade 3:** Perform subtraction of whole numbers with regrouping ones, tens, and hundreds.

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**Benchmark**

**MA.2.3.3 Grade 3:** Multiply one-digit numbers by one-digit numbers.

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**Benchmark**

**MA.2.3.4 Grade 3:** Memorize multiplications facts through 5.

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**Benchmark**

**MA.2.3.5 Grade 3:** Memorize division facts through 5.

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**Benchmark**

**MA.2.4.1 Grade 4:** Multiply whole numbers by a one-digit factor.

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**Benchmark**

**MA.2.4.2 Grade 4:** Divide whole numbers by divisors to five.

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**Benchmark**

**MA.2.4.3 Grade 4:** Memorize multiplication facts 6 through 10.

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**Benchmark**

**MA.2.4.4 Grade 4:** Memorize division facts through 9.

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**Benchmark**

**MA.2.5.1 Grade 5:** Divide whole numbers by divisors to nine.

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**Benchmark**

**MA.2.5.2 Grade 5:** Multiply two-digit by two digit numbers.

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**Benchmark**

**MA.2.6.1 Grade 6:** Divide whole numbers by multi-digit divisors.

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**Benchmark**

**MA.2.6.2 Grade 6:** Perform and apply addition, subtraction, multiplication, and division on positive decimals.

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**Benchmark**

**MA.2.7.1 Grade 7:** Perform and apply addition, subtraction, multiplication, and division on positive fractions and mixed numbers.

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**Benchmark**

**MA.2.7.2 Grade 7:** Identify relationships and uses for the concepts of ratio, proportion, and percent.

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**Benchmark**

**MA.2.8.1 Grade 8:** Perform and apply addition, subtraction, multiplication, and division on integers.

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**Benchmark**

**MA.2.8.2 Grade 8:** Memorize the correct order of operations for performing arithmetic computations.

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**Benchmark**

**MA.2.A1.1 (Exit) Algebra 1:** Operate on real numbers. (Exit)

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**Benchmark**

**MA.2.A1.2 Algebra 1:** Apply basic counting principles.

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**Benchmark**

**MA.2.A1.3 (Exit) Algebra 1:** Apply the order of operations to algebraic expressions. (Exit)

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**Benchmark**

**MA.2.AA.1 Advanced Algebra:** Use the basic operations on rational expressions, radical expressions, and on complex numbers.

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**Benchmark**

**MA.2.AA.2 Advanced Algebra:** Use operations on matrices.

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**Benchmark**

**MA.2.AA.3 Advanced Algebra:** Develop and apply implicit and recursive formulas for calculating terms in arithmetic and geometric sequences.

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**Benchmark**

**MA.2.AM.1 Applied Math:** Add, Subtract, Multiply and Divide and simplify rational expressions.

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**Benchmark**

**MA.2.CM.2 Consumer Math:** Show a basic knowledge of Federal, State, and Social Security taxes.

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**Benchmark**

**MA.2.CM.3 (Exit) Consumer Math:** Develop the basic meaning of a checking account and how to reconcile a bank statement. (Exit)

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**Benchmark**

**MA.2.CM.4 (Exit) Consumer Math:** Compute simple and compound interest. (Exit)

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**Benchmark**

**MA.2.F.1 Functions, Statistics, Trig:** Use permutations and combinations to solve counting problems.

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**Benchmark**

**MA.2.F.2 Functions, Statistics, Trig:** Develop recurrence relations and implicit relations to model and solve real-world problems.

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**Benchmark**

**MA.2.G.1 Geometry:** Calculates distances/lengths in both 2-dimensional and 3-dimensional applications.

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**Benchmark**

**MA.2.GM.1 General Math:** Perform basic operations on integers.

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**Benchmark**

**MA.2.GM.2 General Math:** Apply a variety of estimation strategies to solve and check reasonableness of results of computation.

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**Benchmark**

**MA.2.GM.3 General Math:** Solve mathematical and real-world problems involving proportional reasoning.(eg. finding percent, increase/decrease)

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**Benchmark**

**MA.2.GM.4 General Math:** Calculate the slope of a line.

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**Benchmark**

**MA.2.PDM.1 Precalculus & Discrete Math:** Use permutations and combinations to solve counting problems.

## Standard

**MA.3: The student understands and applies concepts of measurement.**

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**Benchmark**

**MA.3.0.1 Grade K:** Compare objects and events.

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**Benchmark**

**MA.3.1.1 Grade 1:** Recognize and know the value of pennies, nickels, dimes, and quarters.

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**Benchmark**

**MA.3.1.2 Grade 1:** Tell time to hour and half hour intervals.

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**Benchmark**

**MA.3.1.3 Grade 1:** Measure to the nearest inch and centimeter.

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**Benchmark**

**MA.3.2.1 Grade 2:** Recognize and count all coins through one dollar.

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**Benchmark**

**MA.3.2.2 Grade 2:** Tell time to the quarter hour.

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**Benchmark**

**MA.3.2.3 Grade 2:** Demonstrate units of length, capacity, weight, and temperature.

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**Benchmark**

**MA.3.3.1 Grade 3:** Measure to the nearest  $\frac{1}{2}$  inch.

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**Benchmark**

**MA.3.3.2 Grade 3:** Know the appropriate measurement tools.

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**Benchmark**

**MA.3.3.3 Grade 3:** Recognize and count money through ten dollars.

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**Benchmark**

**MA.3.3.4 Grade 3:** Tell time to the five minute interval.

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**Benchmark**

**MA.3.4.1 Grade 4:** Understand the relationships between measures in order to choose the proper unit of measure.

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**Benchmark**

**MA.3.4.2 Grade 4:** Tell time to the minute.

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**Benchmark**

**MA.3.4.3 Grade 4:** Find elapsed time to the hour.

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**Benchmark**

**MA.3.5.1 Grade 5:** Understand the concept of conversion between units of length, capacity, weight and time.

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**Benchmark**

**MA.3.6.1 Grade 6:** Solve problems involving perimeter of various shapes.

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**Benchmark**

**MA.3.6.2 (Exit) Grade 6:** Select and use appropriate units and tools to find measurements for real-world problems. (Exit)

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**Benchmark**

**MA.3.6.3 Grade 6:** Measure angles using appropriate methods and tools.

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**Benchmark**

**MA.3.7.1 Grade 7:** Demonstrate the concept and solve problems involving the area of various shapes.

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**Benchmark**

**MA.3.7.2 Grade 7:** Solve problems involving the conversion of units in length.

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**Benchmark**

**MA.3.7.3 Grade 7:** Utilize formulas for finding measures. (eg. area, volume, surface area.)

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**Benchmark**

**MA.3.8.1 Grade 8:** Solve problems involving the conversion of units in capacity and weight.

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**Benchmark**

**MA.3.8.2 (Exit) Grade 8:** Convert between units of measure in the Metric System. (Exit)

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**Benchmark**

**MA.3.8.3 (Exit) Grade 8:** Relate measures of length, capacity, and weight from the English System of measure to the Metric System. (Exit)

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**Benchmark**

**MA.3.A1.1 Algebra 1:** Solve problems involving rates and ratios.

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**Benchmark**

**MA.3.A1.2 Algebra 1:** Applies the concept of slope to graphs and real-world problems.

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**Benchmark**

**MA.3.AA.2 Advanced Algebra:** Use indirect methods of measurement to find angles, measures, and lengths.

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**Benchmark**

**MA.3.AM.1 Applied Math:** Use indirect methods of measurement (eg. using estimation, proportional reasoning, right angle trigonometry, formulas).

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**Benchmark**

**MA.3.F.1 Functions, Statistics, Trig:** Compare the various angle measurement systems.

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**Benchmark**

**MA.3.F.2 Functions, Statistics, Trig:** Develop arc length and sector area formulas for the radian measurement system.

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**Benchmark**

**MA.3.G.1 Geometry:** Solve problems that involve measurements of area, surface area, and volume.

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**Benchmark**

**MA.3.G.2 Geometry:** Develop and apply the relationship between the lengths, areas, and volumes of similar figures.

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**Benchmark**

**MA.3.G.3 Geometry:** Recognize and use exact and approximate calculations.

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**Benchmark**

**MA.3.GM.1 (Exit) General Math:** Solve real-world problems involving two and three dimensional measures (eg. area, volume, surface area). (Exit)

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**Benchmark**

**MA.3.GM.2 General Math:** Use appropriate tools to determine measurements with specified accuracy.

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**Benchmark**

**MA3.AA.1 Advanced Algebra:** Convert angle measurement between the degree and radian measurement systems.

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## Standard

**MA.4: The student understands and applies concepts of geometry.**

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**Benchmark**

**MA.4.0.1 Grade K:** Understands the common language of spatial sense. (eg. inside, between, above, below, behind.)

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**Benchmark**

**MA.4.0.2 Grade K:** Recognizes geometric figures. (eg. square, triangle, circle, rectangle.)

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**Benchmark**

**MA.4.1.1 Grade 1:** Understand basic properties of (eg. number of sides, corners) and similarities and differences between simple geometric shapes.

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**Benchmark**

**MA.4.2.1 Grade 2:** Understands geometric language for describing and naming plane and solid shapes (e.g. circle, square, triangle, rectangle, cube, sphere, cylinder, rectangular prism, pyramid.)

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**Benchmark**

**MA.4.3.1 Grade 3:** Explain the concept of symmetry.

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**Benchmark**

**MA.4.3.2 Grade 3:** Know the difference between plane and solid figures.

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**Benchmark**

**MA.4.3.3 Grade 3:** Calculate the perimeter of plane figures.

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**Benchmark**

**MA.4.4.1 Grade 4:** Know the basic geometric language for describing and naming shapes (quadrilateral, pentagon, hexagon, octagon)

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**Benchmark**

**MA.4.4.2 Grade 4:** Identify lines (e.g. parallel, perpendicular, intersecting) and angles (e.g. right, acute, obtuse)

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**Benchmark**

**MA.4.4.3 Grade 4:** Calculate the area of plane figures. (rectangles)

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**Benchmark**

**MA.4.5.1 Grade 5:** Understand characteristics of lines (e.g. parallel, perpendicular, intersecting) and angles. (e.g. right, acute, obtuse.)

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**Benchmark**

**MA.4.5.2 Grade 5:** Know the appropriate tool and unit of measure for measuring angles.

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**Benchmark**

**MA.4.5.3 Grade 5:** Understand the concept of volume.

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**Benchmark**

**MA.4.6.1 Grade 6:** Identify the properties of triangles.

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**Benchmark**

**MA.4.6.2 Grade 6:** Identify the properties of circles.

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**Benchmark**

**MA.4.7.1 Grade 7:** Identify the properties of quadrilaterals.

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**Benchmark**

**MA.4.7.2 Grade 7:** Apply the concept of tessellation.

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**Benchmark**

**MA.4.7.3 Grade 7:** Describe and use the concepts of similarity (eg. scale, proportion) and congruency.

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**Benchmark**

**MA.4.8.1 (Exit) Grade 8:** Identify the properties of polygons. (Exit)

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**Benchmark**

**MA.4.8.2 Grade 8:** Examine geometric transformations of figures (eg. rotations, translations, reflections).

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**Benchmark**

**MA.4.A1.1 (Exit) Algebra 1:** Use the pythagorean theorem and its converse to solve mathematical and real-world problems. (Exit)

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**Benchmark**

**MA.4.A1.2 Algebra 1:** Apply the triangle inequality to real-world problems involving distances.

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**Benchmark**

**MA.4.AA.1 Advanced Algebra:** Use the properties of special right triangles to solve problems.

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**Benchmark**

**MA.4.AA.2 Advanced Algebra:** Use graphical representations to determine symmetry.

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**Benchmark**

**MA.4.AA.3 Advanced Algebra:** Use the right triangle trig ratios to solve problems.

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**Benchmark**

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**MA.4.AM.1 (Exit) Applied Math:** Apply the basic concepts of right angle trigonometry (eg. basic trigonometric ratios such as sine, cosine, and tangent). (Exit)

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**Benchmark**

**MA.4.G.1 Geometry:** Compare the relationships between objects and relations in geometry with objects and relations in algebra.

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**Benchmark**

**MA.4.G.2 Geometry:** Use geometric constructions to model real-world problems.

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**Benchmark**

**MA.4.G.3 Geometry:** Identify congruent and similar figures using transformations.

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**Benchmark**

**MA.4.G.4 (Exit) Geometry:** Analyze the properties of transformations. (Exit)

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**Benchmark**

**MA.4.G.5 Geometry:** Deduce properties of 2-dimensional figures.

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**Benchmark**

**MA.4.G.6 Geometry:** Use inductive/deductive reasoning to make observations about and to verify properties of and relationships among figures.

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**Benchmark**

**MA.4.G.7 Geometry:** Draw 3-dimensional objects.

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**Benchmark**

**MA.4.G.8 Geometry:** Recognize geometry as a system of undefined terms, definitions, postulates, and theorems.

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**Benchmark**

**MA.4.GM.1 General Math:** Demonstrate and apply the Pythagorean Theorem.

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## Standard

**MA.5: The student understands and applies concepts of statistics.**

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**Benchmark**

**MA.5.0.1 Grade K:** Understand that observations about objects can be displayed in simple graphs.

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**Benchmark**

**MA.5.1.1 Grade 1:** Organize data using simple graphs.

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**Benchmark**

**MA.5.2.1 Grade 2:** Solve problems using simple graphs that involve collecting, organizing, and analyzing data.

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**Benchmark**

**MA.5.3.1 Grade 3:** Read and interpret pictographs and bar graphs.

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**Benchmark**

**MA.5.4.1 Grade 4:** Read and interpret line graphs and circle graphs.

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**Benchmark**

**MA.5.5.1 Grade 5:** Read, construct, and interpret data in simple graphs, tables, and charts.

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**Benchmark**

**MA.5.6.1 Grade 6:** Inspect how graphs can be misleading.

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**Benchmark**

**MA.5.6.2 Grade 6:** Create tally/frequency charts and stem and leaf diagrams.

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**Benchmark**

**MA.5.6.3 Grade 6:** Read and interpret data in charts, tables, plots (stem and leaf, scatter), and graphs.(eg. bar, circle)

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**Benchmark**

**MA.5.7.1 (Exit) Grade 7:** Calculate and understand the meaning of mean, median, mode, and range. (Exit)

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**Benchmark**

**MA.5.7.2 Grade 7 Mathematics:** Organize and display data using tables, graphs (eg. bar, line,circle), and plots (eg. scatter).

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**Benchmark**

**MA.5.A1.1 (Exit) Algebra 1:** Construct and draw references from charts/tables/graphs that summarize data from real-world situations. (Exit)

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**Benchmark**

**MA.5.A1.2 Algebra 1:** Recognize that display distortion can affect the interpretations of data.

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**Benchmark**

**MA.5.F.1 Functions, Statistics, Trig:** Apply the measures of central tendency, variability, and correlation.

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**Benchmark**

**MA.5.F.2 Functions, Statistics, Trig Ma:** Select and use the best method of representing and describing a set of data using available technology.

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**Benchmark**

**MA.5.F.3 Functions, Statistics, Trig:** Use mathematical modeling to predict from data.

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**Benchmark**

**MA.5.F.4 Functions, Statistics, Trig:** Show that the concept of randomness and bias in sampling can affect experimental outcomes and statistical interpretations.

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**Benchmark**

**MA.5.F.5 Functions, Statistics, Trig:** Design a statistical experiment to study a problem, conduct the experiment, and interpret and communicate the outcomes.

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**Benchmark**

**MA.5.GM.1 General Math:** Calculate mean, median, and mode.

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**Benchmark**

**MA.5.GM.2 General Math:** Construct and interpret bar, circle, and line graphs.

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**Benchmark**

**MA.5.GM.3 General Math:** Graph points on a coordinate plane.

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## Standard

**MA.6: The student understands and applies concepts of probability.**

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**Benchmark**

**MA.6.1.1 Grade 1:** Understand that some events are more likely to happen than others.

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**Benchmark**

**MA.6.2.1 Grade 2:** Recognize that some events can be predicted and others cannot.

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**Benchmark**

**MA.6.3.1 Grade 3:** Discover that chance refers to the likelihood of an event.

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**Benchmark**

**MA.6.6.1 Grade 6:** Determine probability using simulations or experiments.

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**Benchmark**

**MA.6.7.1 Grade 7:** Recognize the differences between permutations and combinations.

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**Benchmark**

**MA.6.7.2 Grade 7:** Examine how predictions are based on data and probabilities (eg. the difference based on theoretical and experimental probabilities).

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**Benchmark**

**MA.6.7.3 Grade 7:** Determine probability using mathematical/theoretical models (eg. table or tree diagrams, area models, lists, counting principles, sample space).

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**Benchmark**

**MA.6.8.1 Grade 8:** Investigate the concept of complimentary events and mutually exclusive events.

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**Benchmark**

**MA.6.8.2 Grade 8:** Compare the relationship between the numerical expression of a probability (eg. fraction, percentage, odds) and the events that produce these numbers.

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**Benchmark**

**MA.6.A1.1 (Exit) Algebra 1:** Apply the basic terminology of probability and make calculations, both permutations and combinations. (Exit)

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**Benchmark**

**MA.6.A1.2 Algebra 1:** Use experimental methods to determined probabilities.

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**Benchmark**

**MA.6.A1.3 Algebra 1:** Compare and contrast the concepts of probability and relative frequency.

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**Benchmark**

**MA.6.AM.1 Applied Math:** Understand the basics of probability.

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**Benchmark**

**MA.6.F.1 Functions, Statistics, Trig:** Use theoretical and simulation methods to determine probabilities.

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**Benchmark**

**MA.6.F.2 Functions, Statistics, Trig:** Demonstrate the concept of a random variable.

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**Benchmark**

**MA.6.F.3 Functions, Statistics, Trig:** Justify an event as either independent or dependent.

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**Benchmark**

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**MA.6.GM.1 General Math:** Illustrate the concepts of independent and dependent events.

## Standard

**MA.7: The student understands and applies algebraic concepts.**

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**Benchmark**

**MA.6.0.1 Grade K:** Extend simple patterns (eg. of physical objects and geometric shapes.)

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**Benchmark**

**MA.7.1.1 Grade 1:** Relate mathematical symbols to mathematical ideas (+,-,=)

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**Benchmark**

**MA.7.1.2 Grade 1:** Recognize and extend patterns. (e.g. numbers, colors, and shapes.)

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**Benchmark**

**MA.7.2.1 Grade 2 Grade 2/Mathematics:** Relate mathematical symbols to mathematical ideas (+,-,=)

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**Benchmark**

**MA.7.2.2 Grade 2:** Recognize, extend and create patterns.

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**Benchmark**

**MA.7.3.1 Grade 3:** Solve simple open sentences involving operations on whole numbers.

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**Benchmark**

**MA.7.4.1 Grade 4:** Solve simple open sentences involving operations on whole numbers.

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**Benchmark**

**MA.7.5.1 Grade 5:** Solve open sentences involving operations on whole numbers.

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**Benchmark**

**MA.7.6.1 Grade 6:** Recognize that a variable can be used as a representative of a range of values or as a specific unknown.

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**Benchmark**

**MA.7.6.2 Grade 6:** Know that an expression is a mathematical statement using numbers and symbols to represent relationships and real-world situations.

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**Benchmark**

**MA.7.6.3 Grade 6 Grade 6/Mathematics:** Use the coordinate grid for a variety of representations (eg. numbers, figures, points, and lines.)

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**Benchmark**

**MA.7.7.1 Grade 7:** Solve basic and multi-step linear equations with one variable using informal and formal methods.

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**Benchmark**

**MA.7.7.2 Grade 7:** Solve basic inequalities (eg. using number lines to show solutions).

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**Benchmark**

**MA.7.7.3 Grade 7:** Inspect the properties of arithmetic and geometric sequences (eg. linear and exponential patterns).

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**Benchmark**

**MA.7.8.1 (Exit) Grade 8:** Use a variety of methods (eg. tables, graphs, rules, equations, algebraic expressions, inequalities, verbal descriptions, Venn diagrams) to represent relationships. (Exit)

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**Benchmark**

**MA.7.8.2 Grade 8:** Apply the basic properties of and operations on algebraic expressions (e.g. substitution for unknown, order of operations, basic law of exponents, combination of like terms, distributive property, equivalent expressions).

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**Benchmark**

**MA.7.8.3 Grade 8:** Solve linear equations using concrete, informal, and formal methods (e.g. using properties, graphing ordered pairs, using slope-intercept form, using technology).

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**Benchmark**

**MA.7.A1.1 Algebra 1:** Use expressions, equations, and inequalities to represent situations that involve variable quantities.

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**Benchmark**

**MA.7.A1.2 Algebra 1:** Develop the properties of graphs and relationships between a graph and its corresponding equation.

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**Benchmark**

**MA.7.A1.3 Algebra 1:** Uses a variety of models to represent functions, patterns, and relationships.

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**Benchmark**

**MA.7.A1.4 (Exit) Algebra 1:** Uses basic methods to solve linear and quadratic equations, linear inequalities, and systems of equations and inequalities. (Exit)

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**Benchmark**

**MA.7.AA.1 Advanced Algebra:** Develop appropriate terminology and notation used to define functions and their properties.

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**Benchmark**

**MA.7.AA.3 Advanced Algebra:** Develop the basic characteristics and uses of the basic trig functions.

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**Benchmark**

**MA.7.AA.4 Advanced Algebra:** Analyze the general properties and characteristics of a variety of functions.

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**Benchmark**

**MA.7.AA.5 Advanced Algebra:** Use a variety of methods to solve linear and quadratic equations and systems of equations.

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**Benchmark**

**MA.7.AA.6 Advanced Algebra:** Analyze the basic concept of inverse functions and corresponding graphs.

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**Benchmark**

**MA.7.AAb.2 Advanced Algebra:** Develop the concept of a function as the correspondence between the elements of two sets.

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**Benchmark**

**MA.7.AM.1 Applied Math:** Use algebraic formulas to represent patterns.

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**Benchmark**

**MA.7.AM.2 Applied Math:** Use expressions, equations, and inequalities to represent real-world situations.

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**Benchmark**

**MA.7.F.1 Functions, Statistics, Trig:** Identify basic concepts and make application of polynomial functions.

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**Benchmark**

**MA.7.F.2 Functions, Statistics, Trig:** Use a variety of methods to solve complex equations.

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**Benchmark**

**MA.7.F.3 Functions, Statistics, Trig:** Describe the basic concept of inverse trig functions and draw their graphs.

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**Benchmark**

**MA.7.F.4 Functions, Statistics, Trig:** Apply the formulas for sequences and series to real world applications.

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**Benchmark**

**MA.7.GM.1 General Math:** Simplify variable expressions.

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**Benchmark**

**MA.7.GM.2 General Math:** Solve single step equations.

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**Benchmark**

**MA.7.GM.3 General Math:** Solve two-step equations.

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**Benchmark**

**MA.7.PDM.1 Precalculus & Discrete Math:** Analyze graphs of functions.

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**Benchmark**

**MA.7.PDM.2 Precalculus & Discrete Math:** Apply methods to solve equations and inequalities and examine why these methods work.

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**Benchmark**

**MA.7.PDM.3 Precalculus & Discrete:** Examine relationships between integers and polynomials.

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## Standard

**MA.8: The student uses a variety of problem-solving strategies.**

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**Benchmark**

**MA.8.0.1 Grade K Grade:** Use whole number models (numbers and pictures) to represent problems.

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**Benchmark**

**MA.8.1.1 Grade 1:** Explain to others how he/she went about solving a numerical problem.

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**Benchmark**

**MA.8.2.1 Grade 2:** Write equations to solve real world experiences.

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**Benchmark**

**MA.8.3.1 Grade 3:** Choose the correct operation in addition or subtraction word problems.

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**Benchmark**

**MA.8.3.2 Grade 3:** Utilize the four step process in problem solving (eg. understand, plan, solve, and look back.)

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**Benchmark**

**MA.8.3.3 Grade 3:** Choose an appropriate strategy to solve a problem.

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**Benchmark**

**MA.8.4.1 Grade 4:** Choose the correct operation in addition, subtraction, multiplication or division word problems.

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**Benchmark**

**MA.8.4.2 Grade 4:** Utilize the four step process in problem solving.

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**Benchmark**

**MA.8.4.3 Grade 4:** Choose an appropriate strategy to solve a problem.

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**Benchmark**

**MA.8.5.1 Grade 5:** Choose the correct operation in addition, subtraction, multiplication, or division word problems.

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**Benchmark**

**MA.8.5.2 Grade 5:** Utilize the four step process in problem solving.

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**Benchmark**

**MA.8.5.3 Grade 5:** Choose an appropriate strategy to solve a problem.

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**Benchmark**

**MA.8.6.1 Grade 6:** Asses the role of mathematics in our culture and society.

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**Benchmark**

**MA.8.6.2 Grade 6:** Formulate problems from situations within and outside mathematics.

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**Benchmark**

**MA.8.6.3 Grade 6:** Make and evaluate mathematical conjectures and arguments.

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**Benchmark**

**MA.8.6.4 Grade 6:** Represent problem situations in, and translate among oral, written, concrete, pictorial, and graphical forms.

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**Benchmark**

**MA.8.6.5 Grade 6:** Generalize solutions and strategies to new problem situations.

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**Benchmark**

**MA.8.7.1 Grade 7:** Asses the role of mathematics in our culture and society.

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**Benchmark**

**MA.8.7.2 Grade 7:** Formulate problems from situations within and outside mathematics.

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**Benchmark**

**MA.8.7.3 Grade 7:** Make and evaluate mathematical conjectures and arguments.

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**Benchmark**

**MA.8.7.4 Grade 7:** Represent problem situations in, and translate among oral, written, concrete, pictorial, and graphical forms.

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**Benchmark**

**MA.8.7.5 Grade 7:** Generalize solutions and strategies to new problem situations.

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**Benchmark**

**MA.8.8.1 Grade 8:** Asses the role of mathematics in our culture and society.

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**Benchmark**

**MA.8.8.2 Grade 8:** Formulate problems from situations within and outside mathematics.

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**Benchmark**

**MA.8.8.3 Grade 8:** Make and evaluate mathematical conjectures and arguments.

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**Benchmark**

**MA.8.8.4 Grade 8:** Represent problem situations in, and translate among oral, written, concrete, pictorial, and graphical forms.

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**Benchmark**

**MA.8.8.5 Grade 8:** Generalize solutions and strategies to new problem situations.

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**Benchmark**

**MA.8.A1.1 Algebra 1:** Uses a variety of strategies to understand new mathematical content and to develop more efficient solution methods.

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**Benchmark**

**MA.8.A1.2 (Exit) Algebra 1:** Recognize connections between equivalent representations of the same concept. (Exit)

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**Benchmark**

**MA.8.AA.1 Advanced Algebra:** Use formal mathematical language and notation to represent ideas.

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**Benchmark**

**MA.8.AA.2 Advanced Algebra:** Demonstrate the difference between a statement that is verified by proof and one that is verified empirically using examples.

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**Benchmark**

**MA.8.AM.1 (Exit) Applied Math:** Demonstrate multiple problem-solving strategies to solve real-world problems. (Exit)

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**Benchmark**

**MA.8.CM.1 Consumer Math:** Demonstrate knowledge of options available when looking at cars and advantages and disadvantages of each.

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**Benchmark**

**MA.8.CM.2 Consumer Math:** Demonstrate knowledge of health, life, house, and car insurance.

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**Benchmark**

**MA.8.CM.3 Consumer Math:** Demonstrate filling out various tax forms and use a tax schedule.

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**Benchmark**

**MA.8.CM.4 Consumer Math:** Demonstrate knowledge of various types of investments.

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**Benchmark**

**MA.8.CM.5 Consumer Math:** Construct, use, and adjust a budget.

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**Benchmark**

**MA.8.CM.6 Consumer Math:** Know where to go for a loan and how to apply.

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**Benchmark**

**MA.8.CM.7 Consumer Math:** Demonstrate consumer-wise decisions about credit cards, installment buying, and comparison shopping.

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**Benchmark**

**MA.8.F.1 Functions, Statistics, Trig:** Apply integrated math problem solving strategies to solve problems from within and outside mathematical situations.

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**Benchmark**

**MA.8.F.2 Functions, Statistics, Trig:** Apply the components of mathematical modeling to real-world problem situations.

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**Benchmark**

**MA.8.G.1 Geometry:** Demonstrate the concept of a mathematical proof.

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**Benchmark**

**MA.8.G.2 Geometry:** Construct logical verifications or counterexamples to test conjectures.

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**Benchmark**

**MA.8.GM.1 General Math:** Set up and solve problems using proportions.

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**Benchmark**

**MA.8.GM.2 General Math:** Breakdown the language and problem-solving strategies associated with logic problems. (eg. using a Venn Diagram)

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**Benchmark**

**MA.8.GM.3 General Math:** Use a variety of strategies (e.g. identify a pattern, use equivalent representations) to develop more efficient solution methods.

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**Benchmark**

**MA.8.PDM.1 Precalculus & Discrete Math:** Apply mathematical logic and reasoning to problems within and outside mathematics.