MassMATE Symposium

Common Core State Standards
Grades 6 – 8

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May 25, 2011

Goal

Explore the new math framework and its impact of on the middle school math program

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- Focus on place value, operations, and fractions in early grades
- Increased attention to proportionality, probability and statistics in middle grades
- In depth study of linearity and introduction of functions in Grade 8

QUESTIONS

With the redefining of Algebra 1 and Algebra 2 at the high school level, what is happening to the middle school math program?

What is Algebra 1 in grade 8?

2011 Massachusetts Curriculum Framework for Mathematics "New" Vocabulary and Acronyms

CCSS	**Common Core State Standards**
Course Pathways	**Traditional (Alg. 1 & 2, Geometry)** **Integrated (Math 1, 2, 3)** **Compacted (Honors/Accelerated)**
Standards	**Define what students should understand and be able to do**
Clusters	**Groups of related standards**
Domains	**Larger groups of related standards (Formerly Strands)**
PARCC	**Partnership for the Assessment of Readiness for College and Careers (will probably replace MCAS)**
RTTT$	**Race to the Top Money**

Compose **Decompose**	**Inverse operations** **Geometric Shapes/Parts** **Equations/Tables/Charts/Graphs**

Organized by Domains Rather than Strands

Pre-K-8 Domains Progression										
Domains	**PK**	**K**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Counting and Cardinality	**MA**									
Operations and Algebraic Thinking	**MA**									
Number and Operations in Base Ten										
Number and Operations - Fractions										
Ratios and Proportional Relationships										
The Number System							**MA**			
Expressions and Equations										
Functions										
Geometry	**MA**									
Measurement and Data	**MA**									
Statistics and Probability										

$$728 = 7 \text{ hundreds } 2 \text{ tens } 8 \text{ ones} = 6 \text{ hundreds } 12 \text{ tens } 8 \text{ ones}$$
$$453 = 4 \text{ hundreds } 5 \text{ tens } 3 \text{ ones} = 4 \text{ hundreds } 5 \text{ tens } 3 \text{ ones}$$
$$2 \text{ hundreds } 7 \text{ tens } 5 \text{ ones} = 275$$

We check by adding the remainder to the subtrahend. Their sum should equal the minuend.

EXERCISES

1. Subtract and check:

a.	2	9	8	3	10	11	4	9	13	6	8
	0	5	8	2	4	8	1	8	6	5	6
b.	7	9	12	6	7	10	11	14	5	6	10
	7	6	5	4	6	7	9	7	3	1	9
c.	10	5	15	8	12	16	9	7	16	10	8
	1	2	7	1	8	7	2	3	8	6	2
d.	1	6	7	6	9	17	0	11	12	17	12
	1	3	4	6	4	8	0	5	3	9	7
e.	11	9	4	5	11	9	10	8	13	10	16
	2	1	2	4	4	3	5	3	4	2	9
f.	12	10	13	14	5	12	15	14	11	18	14
	9	8	7	9	1	6	8	5	6	9	6
g.	10	7	4	14	11	9	7	11	4	8	13
	3	1	3	8	7	9	2	3	4	5	8
h.	15	7	6	8	13	12	8	13	5	9	15
	6	5	2	4	5	4	7	9	0	7	9

2. Find the missing numbers:

a. $16 - 9 = \square$ c. $? + 6 = 14$ e. $n + 7 = 15$ g. $8 + n = 13$ i. $? + 3 = 4$
b. $13 - 5 = n$ d. $4 + \square = 8$ f. $12 - 7 = ?$ h. $10 - \square = \square$ j. $n + 5 = 11$

3. Subtract and check:

a.	59	63	88	95	82	47	86	70
	7	8	23	78	57	27	83	24
b.	347	984	825	617	500	902	316	603
	26	565	179	598	344	496	85	405
c.	5,238	9,386	3,752	8,126	5,174	9,145	6,000	7,594
	4,125	2,931	57	4,077	1,886	9	5,842	3,748
d.	9,285	1,527	8,467	7,418	8,641	4,529	8,506	2,016
	6	49	2,053	3,156	7,936	1,780	4,748	860

Algebra 1

Instructional time should focus on three critical areas

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1. By the end of eighth grade students:

- **Have learned to solve linear equations in one variable**
- **Have applied graphical and algebraic methods to analyze and solve systems of linear equations in two variables.**

In this course students:

- **Analyze and explain the process of solving an equation and justify the process used in solving a system of equations.**
- **Develop fluency writing, interpreting, and translating between various forms of linear equations and inequalities, and using them to solve problems.**
- **Master the solution of linear equations and apply related solution techniques and the laws of exponents to the creation and solution of simple exponential equations.**

Algebra 1

2. In working with functions, students:

- **Define, evaluate, and compare functions, and use them to model relationships between quantities, students:**
- **Will learn function notation and develop the concepts of domain and range.**
- **Focus on linear, quadratic, and exponential functions, including sequences.**
- **Explore absolute value, step, and piecewise-defined functions.**
- **Interpret functions given graphically, numerically, symbolically, and verbally.**
- **Translate between representations, and understand the limitations of various representations.**
- **Build on and extend their understanding of integer exponents to consider exponential functions.**
- **Compare and contrast linear and exponential functions, distinguishing between additive and multiplicative change.**
- **Explore systems of equations and inequalities, and find and interpret their solutions.**
- **Interpret arithmetic sequences as linear functions and geometric sequences as exponential functions.**

Algebra 1

3. Students:

- **Extend the laws of exponents to rational exponents involving square and cube roots and apply this new understanding of number.**
- **Strengthen their ability to see structure in and create quadratic and exponential expressions.**
- **Create and solve equations, inequalities, and systems of equations involving quadratic expressions.**
- **Become facile with algebraic manipulation, including rearranging and collecting terms, factoring, identifying and canceling common factors in rational expressions.**
- **Consider quadratic functions, comparing the key characteristics of quadratic functions to those of linear and exponential functions and select from among these functions to model phenomena.**
- **Learn to anticipate the graph of a quadratic function by interpreting various forms of quadratic expressions.**
- **Identify the real solutions of a quadratic equation as the zeros of a related quadratic function.**
- **Expand their experience with functions to include more specialized functions —absolute value, step, and those that are piecewise-defined.**

Algebra 1

4. Building upon prior students' prior experiences with data, students:

- **Explore a more formal means of assessing how a model fits data.**
- **Use regression techniques to describe approximately linear relationships between quantities.**
- **Use graphical representations and knowledge of the context to make judgments about the appropriateness of linear models.**
- **Look at residuals to analyze the goodness of fit using linear models.**

Grade 8

Instructional time should focus on four critical areas:

1. Formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations, students:

- **Use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems.**
- **Recognize equations for proportions (y/x = m or y = mx) as special linear equations (y = mx + b), understanding that the constant of proportionality (m) is the slope, and the graphs are lines through the origin.**
- **Understand that the slope (m) of a line is a constant rate of change, so that if the input or x-coordinate changes by an amount A, the output or y-coordinate changes by the amount m x A.**
- **Use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom).**
- **Strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation.**
- **Solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line.**
- **Use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.**

Grade 8

Instructional time should focus on four critical areas:

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2. Grasping the concept of a function and using functions to describe quantitative relationships students:

- **Grasp the concept of a function as a rule that assigns to each input exactly one output.**

- **Understand that functions describe situations where one quantity determines another.**

- **Translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations)**

- **Describe how aspects of the function are reflected in the different representations.**

Grade 8

Instructional time should focus on four critical areas:

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3. Analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem, students:

- **Use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems.**
- **Show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines.**
- **Understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways.**
- **Apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons.**
- **Complete their work on volume by solving problems involving cones, cylinders, and spheres.**

Grade 7

Instructional time should focus on four critical areas:

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1. Developing understanding of and applying proportional relationships, students:

- **Extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems.**
- **Use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease.**
- **Solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects.**
- **Graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope.**
- **Distinguish proportional relationships from other relationships.**

Grade 7

Instructional time should focus on four critical areas:

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2. Developing understanding of operations with rational numbers and working with expressions and linear equations, students:

•Develop a unified understanding of number, recognizing fractions, decimals (that have a finite or a repeating decimal representation), and percents as different representations of rational numbers.
•Extend addition, subtraction, multiplication, and division to all rational numbers, maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division.
***•By applying these properties, and by viewing negative numbers in terms of everyday contexts (e.g., amounts owed or temperatures below zero), students* explain and interpret the rules for adding, subtracting, multiplying, and dividing with negative numbers.**
•Use the arithmetic of rational numbers as they formulate expressions and equations in one variable and use these equations to solve problems.

Grade 7

Instructional time should focus on four critical areas:

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3. Solving problems involving scale drawings and informal geometric constructions, and working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume, students:

- **Continue their work with area from Grade 6, solving problems involving the area and circumference of a circle and surface area of three-dimensional objects.**
- ***In preparation for work on congruence and similarity in Grade 8 they* reason about relationships among two-dimensional figures using scale drawings and informal geometric constructions.**
- **Gain familiarity with the relationships between angles formed by intersecting lines**
- **Work with three-dimensional figures, relating them to two-dimensional figures by examining cross-sections.**
- **Solve real-world and mathematical problems involving area, surface area, and volume of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes and right prisms.**

Grade 7

Instructional time should focus on four critical areas:

4. Drawing inferences about populations based on samples, students:

- **Build on their previous work with single data distributions to compare two data distributions and address questions about differences between populations. Compound events: For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?**

- **Begin informal work with random sampling to generate data sets and learn about the importance of representative samples for drawing inferences.**

Grade 6

Instructional time should focus on four critical areas:

1. **Connecting ratio and rate to whole number multiplication and division and using concepts of ratio and rate to solve problems, students:**

- **Use reasoning about multiplication and division to solve ratio and rate problems about quantities.**
- ***By viewing equivalent ratios and rates as deriving from, and extending, pairs of rows (or columns) in the multiplication table, and by analyzing simple drawings that indicate the relative size of quantities, students*** **connect their understanding of multiplication and division with ratios and rates.**
- **Expand the scope of problems for which they can use multiplication and division to solve problems.**
- **Connect ratios and fractions.**
- **Solve a wide variety of problems involving ratios and rates.**

Grade 6

Instructional time should focus on four critical areas:

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2. Completing understanding of division of fractions and extending the notion of number to the system of rational numbers, which includes negative numbers, students:

- **Use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense.**

- **Use these operations to solve problems.**

- **Extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers.**

- **Reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.**

Grade 6

Instructional time should focus on four critical areas:

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3. Writing, interpreting, and using expressions and equations, students:

- Understand the use of variables in mathematical expressions.
- Write expressions and equations that correspond to given situations, evaluate expressions, and use expressions and formulas to solve problems.
- Understand that expressions in different forms can be equivalent, and use the properties of operations to rewrite expressions in equivalent forms.
- Know that the solutions of an equation are the values of the variables that make the equation true.
- Use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations.
- Construct and analyze tables, such as tables of quantities that are in equivalent ratios, and they use equations (such as 3x = y) to describe relationships between quantities.

Grade 6

Instructional time should focus on four critical areas:

4. Developing understanding of statistical thinking, students:

- ***Building on and reinforcing their understanding of number,*** **they begin to develop their ability to think statistically.**
- **Recognize that a data distribution may not have a definite center and that different ways to measure center yield different values.**
- **The median measures center in the sense that it is roughly the middle value.**
- **The mean measures center in the sense that it is the value that each data point would take on if the total of the data values were redistributed equally, and also in the sense that it is a balance point. Recognize that a measure of variability (interquartile range or mean absolute deviation) can also be useful for summarizing data because two very different sets of data can have the same mean and median yet be distinguished by their variability.**
- **Learn to describe and summarize numerical data sets, identifying clusters, peaks, gaps, and symmetry, considering the context in which the data were collected.**

General Comments of Algebra 1 Standards

Includes identifying structure of expressions and rewriting them.
Introduce rational exponents involving square and cube roots in Algebra I and continue with other rational exponents in Algebra II.
Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).(Note: linear, quadratic and exponential expressions)
Factor quadratic equations to find the zeros of the function; complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
Focus on adding and multiplying polynomial expressions, factor or expand polynomial expressions to identify and collect like terms, apply the distributive property.
Requires recognizing non-real roots using the quadratic formula but does not require writing complex roots.
Graph exponential functions showing intercepts; does not include the study of conic equations

General Comments of Grade 8 Standards

Identifies the distinction between rational and irrational numbers and their decimal representations
Specifies finding approximations of irrational numbers and locating them on a number line. For example, by truncating the decimal expansion of $\sqrt{2}$ show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.
When working with powers and roots, it includes working with negative integer exponents. In addition, it includes working with cube roots
Requires operations with numbers expressed in scientific notation. (Decimal notation and scientific notation can be used simultaneously).
Requires comparison of two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
Relates slope and similar triangles. (Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane)
Requires interpretation of slope and y-intercept in context

General Comments of Grade 8 Standards (continued)

Equations: requires examples of linear equations with one solution, infinitely many solutions and no solution. Solve linear equations using rational number coefficients. (Does not include linear inequalities in grade 8…see grade 7)
Introduces the concept of function; interprets linear equation as a function; requires reading information about a relationship from a variety of displays; requires creating a graph that exhibits the qualitative features of a function
Use transformations to prove congruence (Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations)
Requires explanation of a proof of the Pythagorean Theorem and its converse and relates the Pythagorean Theorem to distance
Requires students to "know" formulas: volume, surface area of including spheres, cones and cylinders.
Requires students to "know" formulas: volume, surface area of including spheres, cones and cylinders.
Specifies bivariate data (scatter plots) and specifies investigation of patterns of clustering, outliers, and positive and negative associations

General Comments of Grade 6 Standards

Requires the use of rate "language"
Specifies working with percents in word problems
Specifies use of fractions in word problems,includes mixed numbers
Specifies division with all multi-digit numbers (including negatives) and the use of standard algorithm
Specifies operations with all multi-digit decimals (including negatives) and the use of standard algorithm
Number theory is extended to prime factorization and relatively prime, opposites of numbers, absolute value
Relates the location of ordered pairs in terms of reflections across axes of the coordinate plane
Interprets inequalities through relative position on the number line (distance).
Requires use of mathematical terminology for parts of expressions: sum, term, factor, product, quotient, coefficient.
Extends the previous understandings of number … to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers.

General Comments of Grade 7 Standards

Utilize a variety of methods for solving proportional relationships: table, graph, line
Solve multi-step percent problems: tax, simple interest, mark-ups, markdowns, etc.
Computations: subtract with negative integers, multiplication and division of rational numbers, convert rational numbers, complex fractions
Add, subtract, factor, and expand linear expressions with rational coefficients.
Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. (also inequalities)
Explore patterns to include the introduction of arithmetic and geometric sequences, which will be further extended in high school coursework.
Compute actual lengths and areas from a scale drawing and reproduce a scale drawing at a different scale.
Construct triangles given measures of angles.

General Comments of Grade 7 Standards (continued)

Find an unknown angle measure related to complementary and supplementary angles
Work with surface area of spheres in preparation for work in high school.
Find the numerical probability of a chance event
Find probabilities of compound events using organized lists, tables, tree diagrams, and *simulation*.

Standards new to grade 6

Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions y + y + y and 3y are equivalent because they name the same number regardless of which number y stands for.
Understand solving an equation or inequality as a process of answering a question: which values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions; represent solutions of such inequalities on number line diagrams.
Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers. For example, "How old am I?" is not a statistical question, but "How old are the students in my school?" is a statistical question because one anticipates variability in students' ages.

Standards new to grade 7

Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."
Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem.
Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

Standards new to grade 7

Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.
Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

Standards new to grade 8

Analyze and solve pairs of simultaneous linear equations
Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and 6.
Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.
Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.
Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.

Major Impacts or Expansions to "Grade 8 Math"

Defines rational numbers through decimal expansion; MA 2000 did not make this distinction
Uses rational approximations of irrational numbers to compare rational and irrational numbers; MA 2000 did not make this distinction
Includes negative exponents; MA 2000 did not introduce negative exponents until Algebra II
Requires evaluation of square and cube roots in solutions of problems; MA 2000 evaluated square and cube roots in Algebra I
Specifies the relationship between proportions and slope;"old" standards did not relate proportions to unit rate or slope; slope is also used for similar triangles.
Specifies working with linear equations with rational coeffients (this was not part of math 8 or Algebra 1)
Solve simultaneous equations
The term "function" is introduced and developed

Standards moved from grade 8 to grade 7

Extend, represent, analyze, and generalize a variety of patterns with tables, graphs, words, and, when possible, symbolic expressions.
Use a straight edge, compass, or other tools to formulate and test conjectures, and to draw geometric figures.
Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.
Describe the characteristics and limitations of a data sample. Identify different ways of selecting a sample, e.g., convenience sampling, responses to a survey, random sampling.
Use tree diagrams, tables, organized lists, basic combinatorics ("fundamental counting principle"), and area models to compute probabilities for simple compound events, e.g., multiple coin tosses or rolls of dice.

Standards moved from grade 8 to grade 6

Evaluate simple algebraic expressions for given variable values, e.g., 3a2-b for a=3 and b=7.
Recognize and draw two-dimensional representations of three-dimensional objects, e.g., nets, projections, and perspective drawings.
Find, describe, and interpret appropriate measures of central tendency (mean, median, and mode) and spread (range) that represent a set of data.

Standards moved from grade 7 to grade 6

Compare, order, estimate, and translate among integers, fractions and mixed numbers (i.e., rational numbers), decimals, and percents.
Evaluate simple algebraic expressions for given variable values, e.g., 3a2 – b for a = 3 and b = 7.
Graph points and identify coordinates of points on the Cartesian coordinate plane (all four quadrants).
Select, create, interpret, and utilize the following tabular and graphical representations of data: circle graphs, Venn Diagrams, stem and leaf plots, tables and charts.

Standards moved from grade 7 to grade 8

Represent numbers in scientific notation (positive powers of ten only) and use that notation in problem situations.
Classify figures in terms of congruence and similarity, and apply these relationships to the solution of problems.
Predict the results of translations and reflections of figures on unmarked or coordinate plans and draw the transformed figure.

Standards moved from grade 6 to grade 7

Use the number line to model addition and subtraction of integers.
Estimate results of computations with whole numbers, and with positive fractions, mixed numbers, decimals, and percents (including positive and negative rational numbers)
Identify, measure, and describe circles and the relationships of the radius, diameter, circumference, and area (e.g., d = 2r, p = C/d), and use the concepts to solve problems. (standard now requires students to know the formulas.)
Use tree diagrams and other models (e.g., lists and tables) to represent possible or actual outcomes of trials. Analyze the outcomes.
Predict the probability of outcomes of simple experiments (e.g., tossing a coin, rolling a die) and test the predictions. Use appropriate ratios between 0 and 1 to represent the probability of the outcome and associate the probability with the likelihood of the event.

Standards moved from grade 6 to grades 4 or 5

Identify polygons based on their properties, including types of interior angles, perpendicular or parallel sides, and congruence of sides, e.g., squares, rectangles, rhombuses, parallelograms, trapezoids, and isosceles, equilateral, and right triangles. (Grade 5)
Identify relationships among points, lines, and planes, e.g., intersecting, parallel, perpendicular. (Grade 4)
Identify types of symmetry, including line and rotational. (Grade 4)
Identify, measure, describe, classify, and construct various angles, triangles, and quadrilaterals. (Grade 4)

Standards no longer found at grade 6

Demonstrate an understanding of place value to billions and thousandths. (does not include place value standards after Grade 5)
Represent and compare very large (billions) and very small (thousandths) positive numbers in various forms such as expanded notation without exponents, e.g., 9724 = 9 x 1000 + 7 x 100 + 2 x 10 + 4.

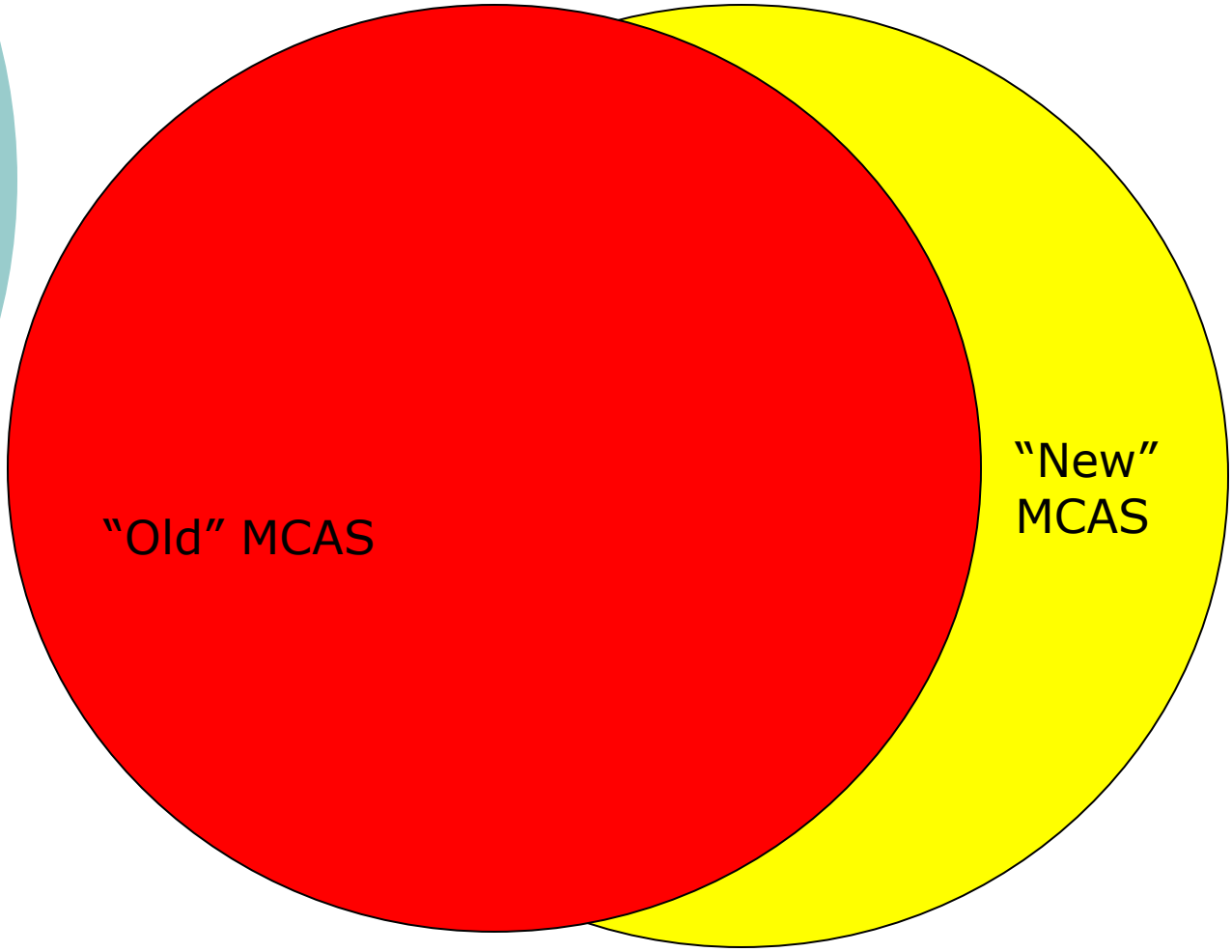
Standards no longer found at grade 7

Analyze, apply, and explain the relationship between the number of sides and the sums of the interior angle measures of polygons.
Identify three-dimensional figures (e.g., prisms, pyramids) by their physical appearance, distinguishing attributes, and spatial relationships such as parallel faces.
Given the formulas, convert from one system of measurement to another. Use technology as appropriate.

Standards no longer found at grade 8

Given the formulas, convert from one system of measurement to another. Use technology as appropriate.(does not convert between measurement systems)

MCAS Assessment and Transition



2000/2004 Mathematics Framework- Grade 6, 7, and 8 Standards assessable on 2012 MCAS Test

Grade 6	Grade 7	Grade 8
*6.N.1	7.N.1	*8.N.1
*6.N.4	*7.N.2	*8.N.2
*6.N.5	*7.N.4	*8.N.3
*6.N.6	*7.N.6	*8.N.4
*6.N.7	*7.N.7	8.N.6
*6.N.8	*7.N.9	*8.N.7
*6.N.9	*7.P.1	8.N.8
6.N.10	7.P.2	*8.N.9
*6.N.13	*7.P.3	*8.N.12
*6.N.14	*7.P.4	8.P.1
*6.P.2	*7.P.5	*8.P.4
*6.P.3	*7.P.6	*8.P.5
*6.P.4	*7.G.2	*8.P.6
*6.P.5	*7.G.3	*8.P.7
*6.P.6	7.G.4	*8.P.8
*6.P.7	*7.G.5	*8.P.9
6.G.1	*7.M.3	*8.P.10
6.G.2	*7.D.2	*8.G.1
6.G.3	*7.D.3	*8.G.2
*6.G.4		*8.G.3
*6.G.9	Shaded regions will be	*8.G.4
*6.M.1	tested in 2012, but are	*8.G.6
*6.M.3	NOT part of the common	*8.M.3
*6.M.4	core. They will be	*8.M.4
*6.M.5	eliminated in future	*8.M.5
*6.M.6	years.	*8.D.2
*6.D.1		
*6.D.2		

Curriculum Implications?

What is Algebra 1 in the eighth grade?

What is math 8?

How do we adjust from a spiral curriculum to a mastery curriculum?

How do we reconcile math 8 with Algebra 1?

Where does acceleration begin?

Are there book implications?

Continuing Updates

Massachusetts Math Frameworks
http://www.doe.mass.edu/candi/commoncore/

Links:
Overview Focus slides
Assessment Transition Plans

Side by side comparisons:
Comparison of the Pre-Kindergarten to Grade 8 2011 Massachusetts standards with the standards of the Math Curriculum Framework (2000) and Supplement (2004)

Comparison of the new 2011 mathematics model high school course standards with the high school mathematics course standards in the Massachusetts Mathematics Curriculum Framework (2000).