



Transitional Colorado Assessment Program (TCAP) Assessment Framework Mathematics – Grade 7

The assessment frameworks specify the content that will be eligible for assessment in the 2012 and 2013 TCAP by aligning the assessment objectives from the Colorado Model Content Standards (old standards) with the Colorado Academic Standards (new standards). TCAP supports the transition to the CAS during the next two years as a gradual approach to statewide measuring of student achievement of the new standards.

Please remember that the TCAP frameworks, and thus TCAP, are not inclusive of **all** of the Colorado Academic Standards (CAS). **Districts should, however, still transition to the full range of the new standards as the complete set of CAS will be considered eligible content for inclusion in the new 2014 assessment.**

The frameworks are organized as indicated in the table below:

Standard	Indicates the broad knowledge skills that all students should be acquiring in Colorado schools at grade level. Each standard is assessed every year.		
Benchmark	Tactical descriptions of the knowledge and skills students should acquire by each grade level assessed by the TCAP.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
Specific knowledge and skills eligible for inclusion on TCAP for each grade level.	Provides the code(s) from the Colorado Academic Standards (CAS) that correspond(s) to the assessment objective.	Provides the text from the CAS which correspond(s) to the assessment objective.	Provides clarifying information.

The following may assist in understanding the revised frameworks:

- As the new standards are mastery based, any assessment objective that is aligned to a standard or a mathematical practice from the Colorado Academic Standards at the relevant grade level or below is eligible for assessment on the TCAP.
- A CAS may be aligned to multiple assessment objectives. To ensure a reasonable document length per grade, some instances of multiple CAS alignments have been omitted.



- Some assessment objectives, or parts of assessment objectives, do not explicitly align with the CAS but will still be assessed. Where this occurs, it is noted with language such as “this will continue to be assessed.” The concepts from these assessment objectives are also compiled in a table at the bottom of each framework for easy reference. The purpose of continuing to assess non-CAS aligned objectives is to ensure the reliability and comparability of the TCAP to prior year’s assessments.
- Assessment objectives and parts of assessment objectives that will no longer be assessed have been struck through and are included in the revised frameworks for purposes of comparison to the prior frameworks only.
- A key to the CAS Alignment Code can be by following this link:
http://www.cde.state.co.us/cdeassess/UAS/AdoptedAcademicStandards/CAS_Reference_system.pdf

The revised frameworks directly build off of the work done on the original Colorado Student Assessment Program (CSAP) frameworks and reflect a joint endeavor between the Office of Assessment, Research and Evaluation and the content specialists from the Office of Academic and Instructional Support.



Standard 1	Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 1	Demonstrate meanings for integers, rational numbers, percents, exponents, square roots and pi (π) using physical materials and technology in problem-solving situations.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Recognize and use equivalent representations of positive rational numbers.	MA10-GR.7-S.2-GLE.1-EO.a	Use properties of operations to generate equivalent expressions. (CCSS: 7.EE)	
	MA10-GR.4-S.1-GLE.2-EO.a (i-ii)	Use ideas of fraction equivalence and ordering to: (CCSS: 4.NF) i. Explain equivalence of fractions using drawings and models. (CCSS: 4.NF.1) ii. Use the principle of fraction equivalence to recognize and generate equivalent fractions. (CCSS: 4.NF.1)	
	MA10-GR.4-S.1-GLE.1-EO.b.ii	Use decimal notation for fractions with denominators 10 or 100. (CCSS: 4.NF.6)	
b. Use models to represent integers.	MA10-GR.6-S.1-GLE.3-EO.b (i-vi)	Use number line diagrams and coordinate axes to represent points on the line and in the plane with negative number coordinates. (CCSS: 6.NS.6) i. Describe a rational number as a point on the number line. (CCSS: 6.NS.6) ii. Use opposite signs of numbers to indicate locations on opposite sides of 0 on the number line. (CCSS: 6.NS.6a) iii. Identify that the opposite of the opposite of a number is the number itself. (CCSS: 6.NS.6a) iv. Explain when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. (CCSS: 6.NS.6b) v. Find and position integers and other rational numbers on a horizontal or vertical number line diagram. (CCSS: 6.NS.6c) vi. Find and position pairs of integers and other rational numbers on a coordinate plane. (CCSS: 6.NS.6c)	This is part of the standard for mathematical practice, "Model with mathematics".
c. Use exponents to indicate how many times a base is used as a factor for positive integers.	MA10-GR.6-S.2-GLE.1-EO.a	Write and evaluate numerical expressions involving whole-number exponents. (CCSS: 6.EE.1)	



Standard 1	Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 2	Read, write and order integers, rational numbers and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π .		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Read, write, order and compare positive rational numbers and integers.	MA10-GR.6-S.1-GLE.3-EO.c	Order and find absolute value of rational numbers. (CCSS: 6.NS.7)	
	MA10-GR.4-S.1-GLE.2-EO.a.iii	Compare two fractions with different numerators and different denominators, and justify the conclusions. (CCSS: 4.NF.2)	
b. Locate positive rational numbers and integers on a number line.	MA10-GR.6-S.1-GLE.3-EO.b (i-vi)	<p>Use number line diagrams and coordinate axes to represent points on the line and in the plane with negative number coordinates. (CCSS: 6.NS.6)</p> <ul style="list-style-type: none"> i. Describe a rational number as a point on the number line. (CCSS: 6.NS.6) ii. Use opposite signs of numbers to indicate locations on opposite sides of 0 on the number line. (CCSS: 6.NS.6a) iii. Identify that the opposite of the opposite of a number is the number itself. (CCSS: 6.NS.6a) iv. Explain when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. (CCSS: 6.NS.6b) v. Find and position integers and other rational numbers on a horizontal or vertical number line diagram. (CCSS: 6.NS.6c) vi. Find and position pairs of integers and other rational numbers on a coordinate plane. (CCSS: 6.NS.6c) 	

Standard 1	Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 3	Apply number theory concepts (for example, primes, factors, multiples) to represent numbers in various ways.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Describe numbers by their characteristics (for example, even, odd, prime, composite, divisibility, square).	MA10-GR.4-S.2-GLE.1-EO.b	Apply concepts of squares, primes, composites, factors, and multiples to solve problems.	



Standard 1			
Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 4			
Use the relationships among fractions, decimals, and percents, including the concepts of ratio and proportion, in problem-solving situations.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Use the relationships among fractions, decimals and percents including the concepts of ratio and proportion, in problem-solving situations.	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	
	MA10-GR.7-S.1-GLE.1-EO.a	Analyze proportional relationships and use them to solve real-world and mathematical problems. (CCSS: 7.RP)	
	MA10-GR.7-S.1-GLE.1-EO.d	Use proportional relationships to solve multistep ratio and percent problems. (CCSS: 7.RP.3)	

Standard 1			
Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 5			
Develop, test, and explain conjectures about properties of integers and rational numbers.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
<i>No objectives assessed at this level on the TCAP.</i>			

Standard 1			
Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 6			
Use number sense to estimate and justify the reasonableness of solutions to problems involving integers, rational numbers, and common irrational numbers such as $\sqrt{2}$, $\sqrt{5}$, and π .			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Estimate, solve and justify the reasonableness of solutions to problems involving positive rational numbers or integers.	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	This is part of the standard for mathematical practice, "Attend to precision".



Standard 2	Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 1	Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and standard algebraic notation.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Represent, describe, and analyze numeric or geometric patterns involving common positive rational numbers or integers using tables, graphs, rules, or symbols.	MA10-GR.6-S.2-GLE.2-EO.g (i-iii)	<p>Represent and analyze quantitative relationships between dependent and independent variables. (CCSS: 6.EE)</p> <ul style="list-style-type: none"> i. Use variables to represent two quantities in a real-world problem that change in relationship to one another. (CCSS: 6.EE.9) ii. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. (CCSS: 6.EE.9) iii. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (CCSS: 6.EE.9) 	
	MA10-GR.7-S.2-GLE.2-EO.a.	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form, using tools strategically. (CCSS: 7.EE.3)	
	MA10-GR.4-S.2-GLE.1-EO.a.i	Use number relationships to find the missing number in a sequence. (CCSS: 4.OA.5)	



Standard 2	Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 2	Describe patterns using variables, expressions, equations, and inequalities in problem-solving situations.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Solve problems by representing and analyzing patterns involving positive rational numbers or integers using tables, graphs, or rules.	MA10-GR.7-S.2-GLE.2-EO.c	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (CCSS: 7.EE.4)	
	MA10-GR.6-S.2-GLE.2-EO.g (i-iii)	Represent and analyze quantitative relationships between dependent and independent variables. (CCSS: 6.EE) <ul style="list-style-type: none"> i. Use variables to represent two quantities in a real-world problem that change in relationship to one another. (CCSS: 6.EE.9) ii. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. (CCSS: 6.EE.9) iii. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (CCSS: 6.EE.9) 	
	MA10-GR.6-S.2-GLE.2-EO.d	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p , q and x are all nonnegative rational numbers. (CCSS: 6.EE.7)	
	MA10-GR.4-S.2-GLE.1-EO.a.i	Use number relationships to find the missing number in a sequence. (CCSS: 4.OA.5)	



Standard 2	Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 3	Analyze functional relationships to explain how a change in one quantity results in a change in another (for example, how the area of a circle changes as the radius increases, or how a person’s height changes over time).		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Predict and describe how a change in one quantity results in a change in another quantity in a linear relationship.	MA10-GR.6-S.2-GLE.2-EO.g (i-iii)	Represent and analyze quantitative relationships between dependent and independent variables. (CCSS: 6.EE) <ul style="list-style-type: none"> i. Use variables to represent two quantities in a real-world problem that change in relationship to one another. (CCSS: 6.EE.9) ii. Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. (CCSS: 6.EE.9) iii. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (CCSS: 6.EE.9) 	Students need to understand the meaning of the words “constant rate”.
	MA10-GR.7-S.1-GLE.1-EO.c.i	Determine whether two quantities are in a proportional relationship. (CCSS: 7.RP.2a)	

Standard 2	Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 4	Distinguish between linear and nonlinear functions through informal investigations.		
<i>No objectives assessed at this level on the TCAP.</i>			



Standard 2	Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 5	Solve simple linear equations in problem-solving situations using a variety of methods (informal, formal, and graphical) and a variety of tools (physical materials, calculators, and computers).		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Solve simple linear equations in problem-solving situations using a variety of methods (informal, formal, or graphic).	MA10-GR.7-S.2-GLE.2-EO.c (i-ii)	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities (CCSS: 7.EE.4) <ul style="list-style-type: none"> i. Fluently 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. (CCSS: 7.EE.4a) ii. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. (CCSS: 7.EE.4a) 	
	MA10-GR.6-S.2-GLE.2-EO.g.iii	Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. (CCSS: 6.EE.9)	
b. Translate written words to algebraic expressions/equations and conversely, algebraic expressions/equations to words.	MA10-GR.7-S.2-GLE.2-EO.c	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities. (CCSS: 7.EE.4)	



Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 1		Read and construct displays of data using appropriate techniques (for example, line graphs, circle graphs, scatter plots, box plots, stem-and-leaf plots) and appropriate technology.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Construct a histogram or stem and leaf from a set of given data.	MA10-GR.6-S.3-GLE.1-EO.d (i)	Summarize and describe distributions. (CCSS: 6.SP) i. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4)	Stem and leaf plots are not explicitly in the CAS at 7 th grade or below. However, they will continue to be assessed.
b. Read, interpret and draw conclusions from histograms, circle graphs, stem and leaf plots, and scatter plots.	MA10-GR.6-S.3-GLE.1-EO.d (i-ii and 1-4)	Summarize and describe distributions. (CCSS: 6.SP) i. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4) ii. Summarize numerical data sets in relation to their context. (CCSS: 6.SP.5) 1. Report the number of observations. (CCSS: 6.SP.5a) 2. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement. (CCSS: 6.SP.5b) 3. Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (CCSS: 6.SP.5c) 4. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (CCSS: 6.SP.5d)	Circle graphs, stem and leaf plots and scatter plots are not in the CAS at 7 th grade or below. However, they will continue to be assessed.



Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 2		Display and use measures of central tendency, such as mean, median and mode and measures of variability, such as range and quartiles.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Given a display of data (for example, line plot, stem and leaf plot, list of data), determine the mean, mode, median and range.	MA10-GR.6-S.3-GLE.1-EO.d (i-ii and 1-4)	<p>Summarize and describe distributions. (CCSS: 6.SP)</p> <ul style="list-style-type: none"> i. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4) ii. Summarize numerical data sets in relation to their context. (CCSS: 6.SP.5) <ul style="list-style-type: none"> 1. Report the number of observations. (CCSS: 6.SP.5a) 2. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement. (CCSS: 6.SP.5b) 3. Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (CCSS: 6.SP.5c) 4. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (CCSS: 6.SP.5d) 	Stem and leaf plots and mode are not in the CAS. However, they will continue to be assessed.



Standard 3	Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 3	Evaluate arguments that are based on statistical claims		
a. Evaluate arguments that are based on measures of central tendency or data displays.	MA10-GR.6-S.3-GLE.1-EO.d (i-ii and 1-4)	<p>Summarize and describe distributions. (CCSS: 6.SP)</p> <ul style="list-style-type: none"> i. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4) ii. Summarize numerical data sets in relation to their context. (CCSS: 6.SP.5) <ul style="list-style-type: none"> 1. Report the number of observations. (CCSS: 6.SP.5a) 2. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement. (CCSS: 6.SP.5b) 3. Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (CCSS: 6.SP.5c) 4. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (CCSS: 6.SP.5d) 	This is part of the standard for mathematical practice, “Construct viable arguments and critique the reasoning of others”.



Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 4		Formulate hypotheses, drawing conclusions, and making convincing arguments based on data analysis.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Analyze data and draw conclusions to predict outcomes based on data displays such as histograms and stem and leaf plots.	MA10-GR.6-S.3-GLE.1-EO.d (i-ii and 1-4)	<p>Summarize and describe distributions. (CCSS: 6.SP)</p> <ul style="list-style-type: none"> i. Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4) ii. Summarize numerical data sets in relation to their context. (CCSS: 6.SP.5) <ul style="list-style-type: none"> 1. Report the number of observations. (CCSS: 6.SP.5a) 2. Describe the nature of the attribute under investigation, including how it was measured and its units of measurement. (CCSS: 6.SP.5b) 3. Give quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. (CCSS: 6.SP.5c) 4. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered. (CCSS: 6.SP.5d) 	This is part of the standard for mathematical practice, "Construct viable arguments and critique the reasoning of others". Stem and leaf plots are not in the CAS. However, they will continue to be assessed.

Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 5		Determine probabilities through experiments or simulations.	
<i>No objectives assessed at this level on the TCAP.</i>			



Standard 3	Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 6	Make predictions and compare results using both experimental and theoretical probability drawn from real-world problems.		
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Report the probability of an event in fraction, decimal and percent form.	MA10-GR.7-S.3-GLE.2-EO.a	Explain that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. (CCSS: 7.SP.5)	
	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	
b. Determine the probability of simple independent events (for example, tossing a coin and rolling a die).	MA10-GR.7-S.3-GLE.2-EO.d (i-iv)	<p>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (CCSS: 7.SP.8)</p> <ul style="list-style-type: none"> i. Explain that the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (CCSS: 7.SP.8a) ii. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. (CCSS: 7.SP.8b) iii. For an event described in everyday language identify the outcomes in the sample space which compose the event. (CCSS: 7.SP.8b) iv. Design and use a simulation to generate frequencies for compound events. (CCSS: 7.SP.8c) 	



Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 6		Make predictions and compare results using both experimental and theoretical probability drawn from real-world problems.	
c. Make predictions based on theoretical probability.	MA10-GR.7-S.3-GLE.2-EO.c (i-iii)	<p>Develop a probability model and use it to find probabilities of events. (CCSS: 7.SP.7)</p> <ul style="list-style-type: none"> i. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy. (CCSS: 7.SP.7) ii. Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. (CCSS: 7.SP.7a) iii. Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. (CCSS: 7.SP.7b) 	

Standard 3		Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 7		Using counting strategies to determine all the possible outcomes from an experiment (for example, the number of ways students can line up to have their picture taken).	
a. Determine the number of possible outcomes from a given event using a variety of strategies, such as: tree diagrams, or organized lists.	MA10-GR.7-S.3-GLE.2-EO.d (i-iv)	<p>Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation. (CCSS: 7.SP.8)</p> <ul style="list-style-type: none"> i. Explain that the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (CCSS: 7.SP.8a) ii. Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. (CCSS: 7.SP.8b) iii. For an event described in everyday language identify the outcomes in the sample space which compose the event. (CCSS: 7.SP.8b) iv. Design and use a simulation to generate frequencies for compound events. (CCSS: 7.SP.8c) 	



Standard 4			
Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 1			
Construct two-and three-dimensional models using a variety of materials and tools.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
<i>No objectives assessed at this level on the TCAP.</i>			

Standard 4			
Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 2			
Describe, analyze and reason informally about the properties (for example, parallelism, perpendicularity, congruence) of two- and three-dimensional figures.			
a. Describe, analyze and reason informally about the attributes of two- and three-dimensional shapes (for example, angles, sides, edges, faces, vertices).	MA10-GR.4-S.4-GLE.2-EO.c	Classify and identify two-dimensional figures according to attributes of line relationships or angle size. (CCSS: 4.G.2)	The CAS do not refer to three dimensional figures in this way at 7 th grade or below. However, three dimensional figures within this context will continue to be assessed.
	MA10-GR.5-S.4-GLE.2-EO.c	Classify two-dimensional figures into categories based on their properties. (CCSS: 5.G)	

Standard 4			
Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 3			
Apply the concept of ratio, proportion and similarity in problem-solving situations			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Identify and compare similar shapes using ratio, proportion, or scale factor.	MA10-GR.7-S.1-GLE.1-EO.a	Analyze proportional relationships and use them to solve real-world and mathematical problems. (CCSS: 7.RP)	Similar shapes are not explicitly in the CAS at 7 th grade or below. However, they will continue to be assessed.
	MA10-GR.7-S.1-GLE.1-EO.b	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. (CCSS: 7.RP.1)	

Standard 4			
Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 4			
Solve problems using coordinate geometry.			
a. Construct a coordinate graph and plot ordered integer pairs in all four quadrants.	MA10-GR.6-S.1-GLE.3-EO.d	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane including the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. (CCSS: 6.NS.8)	



Standard 4		Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 5		Solving problems involving perimeter and area in two dimensions, and involving surface area and volume in three dimensions.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Solve problems involving the circumference of a circle (formulas not provided).	MA10-GR.7-S.4-GLE.2-EO.a	State the formulas for the area and circumference of a circle and use them to solve problems. (CCSS: 7.G.4)	
b. Solve problems involving the areas of circles, triangles, and parallelograms (formulas not provided).	MA10-GR.7-S.4-GLE.2-EO.d	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (CCSS: 7.G.6)	
	MA10-GR.7-S.4-GLE.2-EO.a	State the formulas for the area and circumference of a circle and use them to solve problems. (CCSS: 7.G.4)	
c. Solve problems involving the surface area of rectangular prisms (formulas not provided).	MA10-GR.7-S.4-GLE.2-EO.d	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (CCSS: 7.G.6)	

Standard 4		Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 6		Transforming geometric figures using reflections, translations, and rotations to explore congruence.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Use reflections, translations, and/or rotations, to determine congruence between figures.			This is not explicitly in the CAS at 7 th grade or below. However, congruence will continue to be assessed.



Standard 5			
Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.			
Benchmark 1			
Estimate, use and describe measures of distance, perimeter, area, volume, capacity, weight, mass, and angle comparison.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Estimate the area of irregular shapes, angle measurement, or weight of common objects.	MA10-GR.3-S.4-GLE.3-EO.a	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects. (CCSS: 3.MD)	This is part of the standard for mathematical practice, "Attend to precision."
	MA10-GR.6-S.4-GLE.1-EO.a.i	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. (CCSS: 6.G.1)	
	MA10-GR.7-S.4-GLE.2-EO.c	Use properties of supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. (CCSS: 7.G.5)	

Standard 5			
Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.			
Benchmark 2			
Estimate, make, and use direct and indirect measurements to describe and make comparisons.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Estimate, make and use direct and indirect measurements to describe and make comparisons.			This is not explicitly in the CAS at 7 th grade or below.



Standard 5				Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.
Benchmark 3				Read and interpret various scales including those based on number lines, graphs, and maps.
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment	
a. Read and interpret scales on number lines, graphs and maps (for example, given a map and a scale, determine the distance between two points on the map).	MA10-GR.4-S.4-GLE.1-EO.a.iv	Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale. (CCSS: 4.MD.2)		
	MA10-GR.7-S.4-GLE.1-EO.a.i	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale. (CCSS: 7.G.1)		
	MA10-GR.7-S.1-GLE.1-EO.b	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. (CCSS: 7.RP.1)		
b. Select the appropriate scale for a given problem (for example, using the appropriate scale when setting up a graph or intervals on a histogram).	MA10-GR.6-S.3-GLE.1-EO.d.i	Display numerical data in plots on a number line, including dot plots, histograms, and box plots. (CCSS: 6.SP.4)	The CAS do not explicitly indicate that students should select an appropriate scale but it is implied when constructing a graph.	

Standard 5				Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.
Benchmark 4				Develop and use formulas and procedures to solve problems involving measurement.
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment	
a. Develop and use procedures or formulas to solve problems involving area of polygons (for example, trapezoids, regular hexagons, regular octagons).	MA10-GR.6-S.4-GLE.1-EO.a (i-ii)	Develop and apply formulas and procedures for area of plane figures. (CCSS: 6.G.1) i. Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. (CCSS: 6.G.1) ii. Apply these techniques in the context of solving real-world and mathematical problems. (CCSS: 6.G.1)		
	MA10-GR.7-S.4-GLE.2-EO.d	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (CCSS: 7.G.6)		



Standard 5			
Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.			
Benchmark 5			
Describe how a change in an object's linear dimensions affects its perimeter, area, and volume.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Describe how a change in an object's linear dimensions affects its perimeter and area (for example, how a change in the radius or diameter will affect the circumference and area of a circle).	MA10-GR.7-S.1-GLE.1-EO.b	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. (CCSS: 7.RP.1)	
	MA10-GR.7-S.4-GLE.2-EO.a	State the formulas for the area and circumference of a circle and use them to solve problems. (CCSS: 7.G.4)	

Standard 5			
Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.			
Benchmark 6			
Select and use appropriate units and tools to measure to the degree of accuracy required in a particular problem-solving situation.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Select and use appropriate units and tools to measure to the degree of accuracy required in a particular problem-solving situation (for example, reconstruct a replica of a given figure).			This is part of the standard for mathematical practices, "Use appropriate tools strategically" and "Attend to precision".



Standard 6		Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 1		Use models to explain how ratios, proportions, and percents can be used to solve real-world problems.	
a. Use concrete materials or pictures to explain how ratios, proportion, and percents can be used to solve real world problems.	MA10-GR.7-S.1-GLE.1-EO.a	Analyze proportional relationships and use them to solve real-world and mathematical problems. (CCSS: 7.RP)	This part of the standard for mathematical practice, "Model with Mathematics".
	MA10-GR.7-S.1-GLE.1-EO.d	Use proportional relationships to solve multistep ratio and percent problems. (CCSS: 7.RP.3)	

Standard 6		Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.	
Benchmark 2		Construct, use and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers.	
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Apply order of operations (including exponents with positive rational numbers.	MA10-GR.6-S.2-GLE.1-EO.b.iv	Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order (Order of Operations). (CCSS: 6.EE.2c)	
	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	
b. Add, subtract, multiply, and divide positive rational numbers or integers.	MA10-GR.7-S.1-GLE.2-EO.c	Solve real-world and mathematical problems involving the four operations with rational numbers. (CCSS: 7.NS.3)	



Standard 6	Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 2	Construct, use and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers.		
c. Explain strategies to add, subtract and multiply positive rational numbers.	MA10-GR.7-S.1-GLE.2-EO.a (i-viii)	<p>Apply understandings of addition and subtraction to add and subtract rational numbers including integers. (CCSS: 7.NS.1)</p> <ul style="list-style-type: none"> i. Represent addition and subtraction on a horizontal or vertical number line diagram. (CCSS: 7.NS.1) ii. Describe situations in which opposite quantities combine to make 0. (CCSS: 7.NS.1a) iii. Demonstrate $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. (CCSS: 7.NS.1b) iv. Show that a number and its opposite have a sum of 0 (are additive inverses). (CCSS: 7.NS.1b) v. Interpret sums of rational numbers by describing real-world contexts. (CCSS: 7.NS.1c) vi. Demonstrate subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. (CCSS: 7.NS.1c) vii. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts. (CCSS: 7.NS.1c) viii. Apply properties of operations as strategies to add and subtract rational numbers. (CCSS: 7.NS.1d) 	



Standard 6	Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 2	Construct, use and explain procedures to compute and estimate with whole numbers, fractions, decimals, and integers.		
<p>Assessment objective “c” continued: Explain strategies to add, subtract and multiply positive rational numbers.</p>	<p>MA10-GR.7-S.1-GLE.2-EO.b (i-vi)</p>	<p>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers including integers. (CCSS: 7.NS.2)</p> <ul style="list-style-type: none"> i. Apply properties of operations to multiplication of rational numbers. (CCSS: 7.NS.2a) ii. Interpret products of rational numbers by describing real-world contexts. (CCSS: 7.NS.2a) iii. Apply properties of operations to divide integers. (CCSS: 7.NS.2b) iv. Apply properties of operations as strategies to multiply and divide rational numbers. (CCSS: 7.NS.2c) v. Convert a rational number to a decimal using long division. (CCSS: 7.NS.2d) vi. Show that the decimal form of a rational number terminates in 0s or eventually repeats. (CCSS: 7.NS.2d). 	



Standard 6			
Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 3			
Develop, apply and explain a variety of different estimation strategies in problem-solving situations, and explain why an estimate may be acceptable in place of an exact answer.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Explain why an estimate may be acceptable in place of an exact answer.	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	This is part of the standard for mathematical practice, "Attend to precision".
b. Solve problems using estimation and justify choice of techniques.	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	This is part of the standard for mathematical practice, "Construct viable arguments and critique the reasoning of others" and "Attend to precision."

Standard 6			
Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.			
Benchmark 4			
Select and use appropriate methods for computing with commonly used fractions and decimals, percents, and integers in problem-solving situations from among mental arithmetic, estimation, paper-and-pencil, calculator, and computer methods, and determining whether the results are reasonable.			
Assessment Objective	CAS Alignment Code	CAS Expectation Text	Comment
a. Determine what information is necessary or missing in a problem-solving situation.	MA10-GR.7-S.1-GLE.2-EO.c	Solve real-world and mathematical problems involving the four operations with rational numbers. (CCSS: 7.NS.3)	This is part of the standard for mathematical practice, "Make sense of problems and persevere in solving them".
b. Solve problems involving positive rational numbers and/or integers.	MA10-GR.7-S.1-GLE.2-EO.c	Solve real-world and mathematical problems involving the four operations with rational numbers. (CCSS: 7.NS.3).	



Standard 6	Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.		
Benchmark 4	Select and use appropriate methods for computing with commonly used fractions and decimals, percents, and integers in problem-solving situations from among mental arithmetic, estimation, paper-and-pencil, calculator, and computer methods, and determining whether the results are reasonable.		
c. Create a situation that matches a given number sentence involving positive rational numbers or integers, excluding division of fractions and decimals.			Although this assessment objective is not explicitly addressed in the CAS, it will continue to be assessed.
d. Justify the reasonableness of a solution in a problem-solving situation.	MA10-GR.7-S.2-GLE.2-EO.b	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate, and assess the reasonableness of answers using mental computation and estimation strategies. (CCSS: 7.EE.3)	This is part of the standard for mathematical practice, "Construct viable arguments and critique the reasoning of others".

Note: Some assessment objectives or parts of assessment objectives are not contained within the Colorado Academic Standards at or below this grade level but will continue to be assessed by the TCAP in 7th grade. The concepts from these objectives are reflected in the table below.

Grade 7 Mathematics	Relevant Assessment Objective(s)
Understand the meaning of the words "constant rate"	2.3a
Stem and leaf plots, circle graphs and scatter plots	3.1a; 3.1b; 3.2a; 3.4a
Three dimensional figures	4.2a
Similar shapes	4.3a
Congruence	4.6a
Creating a situation that matches a given number sentence	6.4c