Test Specifications

New Mexico Measures of Student Success and Achievement (NM-MSSA)

Mathematics

Purpose

- Part of a Balanced Assessment System
- Claims/Score Interpretation and Use Statements

Test Specifications

- Reporting Categories and Test Blueprint
- Cognitive Complexity
- Test Design
- Fairness
- Additional NM-MSSA Considerations

Item Specifications

- Alignment
- Item Types
- Sample Items

Purpose

Part of a Balanced Assessment System

The NM-MSSA is New Mexico's statewide summative assessment for Mathematics and English Language Arts, administered at the end of grades 3-8. As the NM-MSSA is a single measure at the end of a grade band, interpretations and uses of NM-MSSA scores should be supplemented with additional measures, including information from classroom summative and formative assessments in mathematics and English Language Arts as well as interim assessments.

Formative assessment may include the use of the Cognia Formative Assessments, which is a collection of formative assessment materials for grades 3–8 being provided by Cognia during the term of the contract with the state to administer the NM-MSSA. The materials are aligned to the CCSS and therefore to the New Mexico *Common Core State Standards*.

Claims/Score Interpretation and Use Statements

The NM-MSSA is designed to measure whether students are on track to be ready for college or career, as defined by the State, by showing they have mastered the New Mexico *Commons Core State Standards.*

In addition to the overall scale score, student performance on three mathematical content subdomains and two mathematical practices subdomains is reported as noted in the reporting categories subsection in the following pages.

See the Score Interpretation and Use (SIU) documents for the complete set of NM-MSSA score interpretation and use statements. These documents can be accessed at https://newmexico.onlinehelp.cognia.org/resources-nm-mssa/.

Test Specifications – Reporting Categories and Test Blueprint

Reporting Categories

The reporting categories for the NM-MSSA are based on the clusters of standards found in the New Mexico *Common Core State Standards* for both content and practices as noted below.

Reporting Categories
Grades 3-5

- Operations and Algebraic Thinking
- Number & Operations in Base 10/Number & Operations -Fractions
- Measurement and Data/Geometry

Grade 6-7

- Ratios & Proportional Relationships
- The Number System/Expressions & Equations
- Geometry/Statistics & Probability

Grade 8

- Functions
- The Number System/Expressions & Equations
- Geometry/Statistics & Probability

Grades 3-8

- Problem Solving (MP1); Reasoning & Argument (MP 3/4)
- Modeling (MP4); Structure & Repeated Reasoning (MP 7/8)

Percentages for the distribution of operational (core) test points for each of the reporting categories reflect the distribution in the standards, so as not to over- or underrepresent content. The internal test blueprint has specifications for inclusion on the core forms.

Core Test Blueprints

Specifications for the full test blueprints for the construction of the core forms reflect the reporting category specifications, as well as percentage requirements for each cluster. These constructs represent key aspects of the standards to which items are aligned; as such, the percentage of operational (core) test points for each should be maintained from year to year.

Note that percentages for (a) content clusters and (b) mathematical practices are calculated independently. An individual item may contribute to multiple parts of the blueprint.

Operational Test Blueprint

	Mathematics Grade 3, 4, 5	Grade 3		Grade 4		Grade 5	
		# of Core Pts	% of Core Pts	# of Core Pts	% of Core Pts	# of Core Pts	% of Core Pts
Concepts & Procedures	Operations and Algebraic Thinking	12-18	27-40%	10-16	22-36%	7-11	16-24%
	Number & Operations in Base 10	5-7	11-16%	8-10	17-22%	7-13	16-29%
	Number & Operations-Fractions	8-10	18-22%	10-16	22-36%	11-15	24-33%
	Measurement and Data	11-15	24-33%	6-10	13-22%	10-14	22-31%
	Geometry	3-5	7-11%	3-5	7-11%	4-8	9-18%
	Subtotal	**45**	**100%**	**45**	**100%**	**45**	**100%**
Practices	Problem Solving*	≥ 8	≥ 17%	≥ 8	≥ 17%	≥ 8	≥ 17%
	Reasoning* & Argument						
	Modeling*	≥ 8	≥ 17%	≥ 8	≥ 17%	≥ 8	≥ 17%
	Structure & Repeated Reasoning*						
	Total	**51****		**51****		**51****	

	Mathematics Grade 6, 7	Grade 6		Grade 7		Mathematics Grade 8	Grade 8	
		# of Core Pts	% of Core Pts	# of Core Pts	% of Core Pts		# of Core Pts	% of Core Pts
Concepts & Procedures	Ratios & Proportional Relationships	8-12	17-25%	8-12	17-25%	Functions	10-16	20-33%
	The Number System	8-12	17-25%	6	13%	The Number System	4	8%
	Expressions & Equations	8-12	17-25%	8-16	17-33%	Expressions & Equations	11-17	22-35%
	Geometry	6-10	13-21%	6-10	13-21%	Geometry	10-16	20-33%
	Statistics & Probability	6-10	13-21%	10-12	21-25%	Statistics & Probability	10-12	20-24%
	Subtotal	**48**	**100%**	**48**	**100%**	**Subtotal**	**49**	**100%**
Practices	Problem Solving*	≥ 8	≥ 16%	≥ 8	≥ 16%	Problem Solving*	≥ 8	≥ 16%
	Reasoning* & Argument					Reasoning* & Argument		
	Modeling*	≥ 8	≥ 16%	≥ 8	≥ 16%	Modeling*	≥ 8	≥ 16%
	Structure & Repeated Reasoning*					Structure & Repeated Reasoning*		
	Total	**54****		**54****		**Total**	**55****	

*All or most items dually coded to Concepts and Procedures and Mathematical Practices standards

**Constructed response items are scored for both Concepts & Procedures and Mathematical Practices. A total of six points from the Mathematical Practices rubric contribute to a student's overall score.

Test Specifications – Cognitive Complexity

Percentages for the distribution of operational (core) test points across the cognitive complexity levels (DOK classification) are noted in the table below.

Depth of Knowledge Distribution

DOK	Grade					
	3	4	5	6	7	8
Level 1	5-25%	5-25%	5-25%	5-25%	0-20%	0-30%
Level 2	50-80%	50-80%	50-80%	50-80%	50-80%	50-80%
Level 3	5-30%	5-30%	5-30%	5-30%	5-30%	5-30%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Test Specifications – Test Design

Assessable Standards

The NM-MSSA assesses the New Mexico *Common Core State Standards* as follows:

- Grade 3 test: All standards in grade 3.
- Grade 4 test: All standards in grade 4.
- Grade 5 test: All standards in grade 5.
- Grade 6 test: All standards in grade 6.
- Grade 7 test: All standards in grade 7.
- Grade 8 test: All standards in grade 8.

Test Design - Student Experience

The *Student Testing Experience* tables on the following pages provide a summary of the number of items and points by item type, usage (i.e., operational items or field test items), and estimated testing time for each grade's NM-MSSA assessment.

As shown in the test design tables, the types of items on the NM-MSSA are 1-point machine-scored items (MS-1), 3-point constructed response items (CR-3), and 6-point constructed response items (CR-6). Additional item type descriptions and sample items can be found in the item specifications section on page 16.

Each NM-MSSA test is administered in two sessions. The test form contains both core operational items and matrix field test items. The core operational items are items administered to all students taking that core form, and that count toward student score. Matrix field test items are items administered to subsets of students to "try out" performance (with different students receiving different field test items), and therefore do not count toward student score.

Student Testing Experience (Full Form)

Mathematics Grade 3,4,5	Discrete Items			Total Items	Total Points	
	MS-1	CR-3	CR-6		Min	Max
Core Operational Items	33	2	2	37	51	51
Matrix Operational Items	0	0	0	0	0	0
Matrix Field Test Items	5	1		6	8	11
Total Student Experience	**38**	**5**		**43**	**59**	**62**
				Estimated Test Time (min)		120

Mathematics Grade 6,7	Discrete Items			Total Items	Total Points	
	MS-1	CR-3	CR-6		Min	Max
Core Operational Items	36	2	2	40	54	54
Matrix Operational Items	0	0	0	0	0	0
Matrix Field Test Items	5	1		6	8	11
Total Student Experience	**41**	**5**		**46**	**62**	**65**
				Estimated Test Time (min)		120

Mathematics Grade 8	Discrete Items			Total Items	Total Points	
	MS-1	CR-3	CR-6		Min	Max
Core Operational Items	37	2	2	41	55	55
Matrix Operational Items	0	0	0	0	0	0
Matrix Field Test Items	5	1		6	8	11
Total Student Experience	**42**	**5**		**47**	**63**	**66**
				Estimated Test Time (min)		120

Test Specifications – Fairness

Fairness is defined as the extent to which the test scores are valid for different groups of test takers. Consideration of universal design, bias, and sensitivity guidelines support the construction of fair, valid assessments.

Universal Design for Assessments

The concept of Universal Design for Assessments focuses on developing content and assessments that reach the widest population of students possible. Stimuli and items on the NM-MSSA are designed to simply and clearly present tasks and to provide maximum readability, comprehensibility, and legibility. The seven elements of Universal Design for Assessments are based on the original UDL guiding principles:

Universal Design for Assessments

Principle	Explanation
Inclusive Assessment Population	Tests designed for state, district, or school accountability must include every student except those in the alternate assessment, and this is reflected in assessment design and field-testing procedures.
Precisely Defined Constructs	The specific constructs tested must be clearly defined so that all construct-irrelevant cognitive, sensory, emotional, and physical barriers are removed.
Accessible, Non-Biased Items	Accessibility is built into items from the beginning, and bias review procedures ensure that quality is retained in all items.
Amenable to Accommodations	Test design facilitates the use of needed accommodations (e.g., all items can be brailled).
Simple, Clear, and Intuitive Instructions and Procedures	All instructions and procedures are simple, clear, and presented in understandable language.
Maximum Readability and Comprehensibility	A variety of readability and plain language guidelines are followed (e.g., sentence length and number of difficult words kept to a minimum) for readable and comprehensible text.
Maximum Legibility	Characteristics that ensure easy decipherability are applied to text, tables, figures, and illustrations, and to response formats.

Bias

The concept of Bias is defined as the presence of some characteristic of an item that results in differential performance for two individuals of the same ability but from different ethnic, sex, cultural, or religious groups.

Bias can occur whenever content offends or disadvantages a student or group of students due to gender, race, regional background, socioeconomic status, or any other such classification.

Test developers take care to craft content in a way that does not misrepresent specific groups or rest on assumptions made about specific groups, that in turn could negatively impact how students interpret content.

- Stimulus and item content on the NM-MSSA must not present stereotypes or unfair representations of gender, race, ethnicity, disability, culture, or religion.
- Stimulus and item content on the NM-MSSA should not depend on overly-experiential information such as knowledge of technology, consumer goods, pop culture, geographic locations, or sports and extracurricular activities. While these topics are not completely excluded from use, care must be taken to ensure that the items are presented in a way that does not require a level of knowledge that would not be held by all students.

Sensitivity

Sensitivity refers to the presence of content that is contrary to the acceptable norms of the students, educators, parents, or other members of the community that may interact with the assessment. Sensitive subject matter can impact student performance or attitudes toward testing, and hence, their test scores.

Consideration of bias and sensitivity issues is very important when developing content for an assessment. Test developers must ensure that stimuli and items are free of content that will negatively affect a student's performance not because of what the student knows and can do but because the content evokes an emotional response from that student (or is in some other way distracting to the student).

Subjects/contexts that are likely to prompt emotional distress on the part of students cannot be used on the NM-MSSA (e.g., war, violence, human death or debilitating disease, animal-based medical research). Careful judgment should be applied to standards that cover topics that may be considered controversial by some groups (e.g., evolution examples, population dynamics including death/extinction, environmental impact). Those standards represent content knowledge to be assessed, but the assessment must be done in a sensitive, unbiased way.

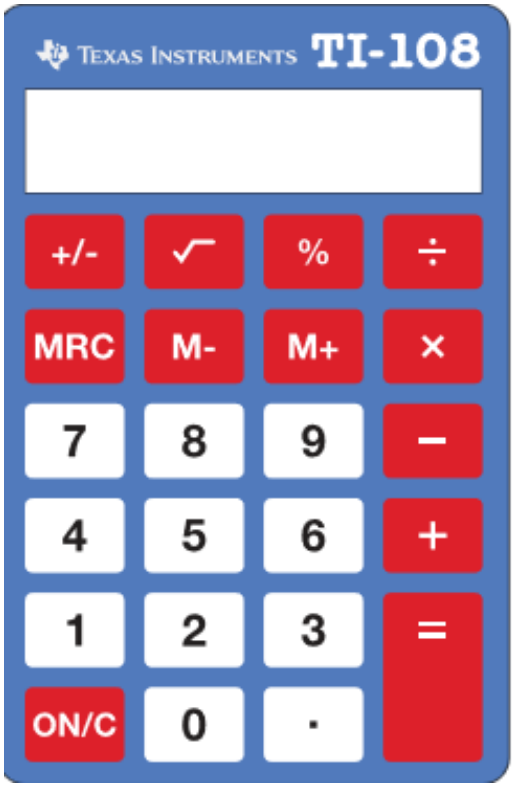
Test Specifications – Additional NM-MSSA Considerations

Calculator Use

Students in grades 3–6 who are taking the paper-pencil test can use their own four-function calculator with a square root key during Session 2. Students in grades 7–8 who are taking the paper-pencil test can use their own scientific calculator during Session 2. The memory on any hand-held calculator must be cleared before the test begins.

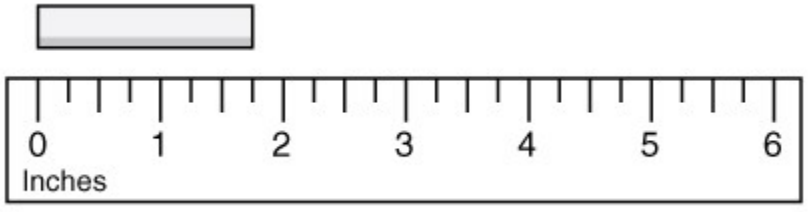
Students may not use their own calculators for the online test unless it is an approved accommodation. The images below show the calculators that are available for use in the online testing platform.

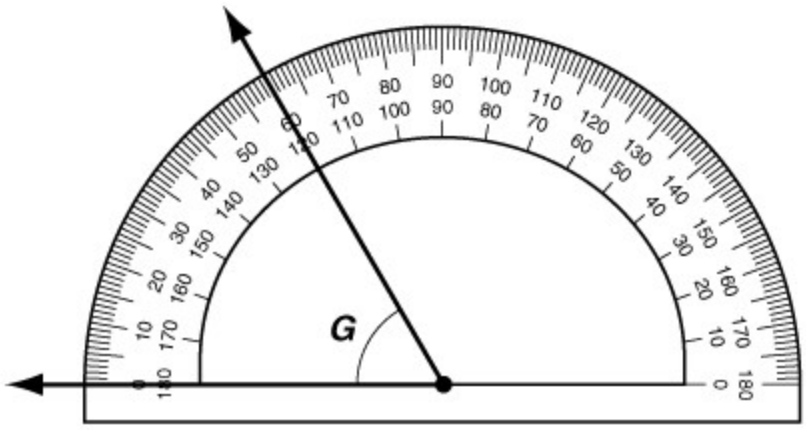
NM-MSSA Calculator Use in Mathematics		
Grade	**Session 1**	**Session 2**
3	None	Basic
4	None	Basic
5	None	Basic
6	None	Basic
7	None	Scientific
8	None	Scientific

Basic	Scientific
	

Rulers and Protractors

For Spring 2021, a ruler or protractor will be embedded within a graphic for items that require students to measure lengths of objects or angles. Below are some examples of the embedded tools that could be found within the items.





Reference Sheets

Reference sheets are not included. Depending on the targeted rigor and complexity of an item, a formula may be embedded within an item.

Practice Test

A full-length practice test mirroring the operational test design is available beginning in the 2020-2021 school year. The practice tests and supporting materials can be accessed at https://newmexico.onlinehelp.cognia.org/practice-tests-nm-mssa/.

Item Specifications

Alignment

The items on the NM-MSSA are aligned to the New Mexico *Common Core State Standards*.

Each item is aligned to one of the content standards in NMCCSS. Also, the majority of the items are also aligned to a mathematical practices standard in the NMCCSS.

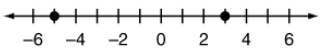
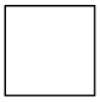
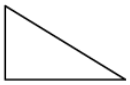
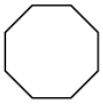
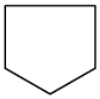
Item Types

The types of items on the NM-MSSA are 1-point machine-scored items (MS-1), 3-point constructed response items (CR-3), and 4-point constructed response items (CR-4):

- MS-1 items are worth 1 point. These items may be multiple choice or multiple select.
- Constructed response items (CRs) are worth either 3 or 6 points. These items require students to write an extended response to a prompt. The prompt may be a single prompt, or more typically, the items are written with multiple, scaffolded parts for students to respond to. These items are hand-scored, with scorers using a multi-trait rubric and scoring notes to evaluate responses. The CR-3 items are evaluated using a content rubric on a scale from 0–2 and a practices rubric on a scale from 0-1. The CR-6 items are evaluated using a content rubric on a scale from 0–4 and a practices rubric on a scale from 0-2.

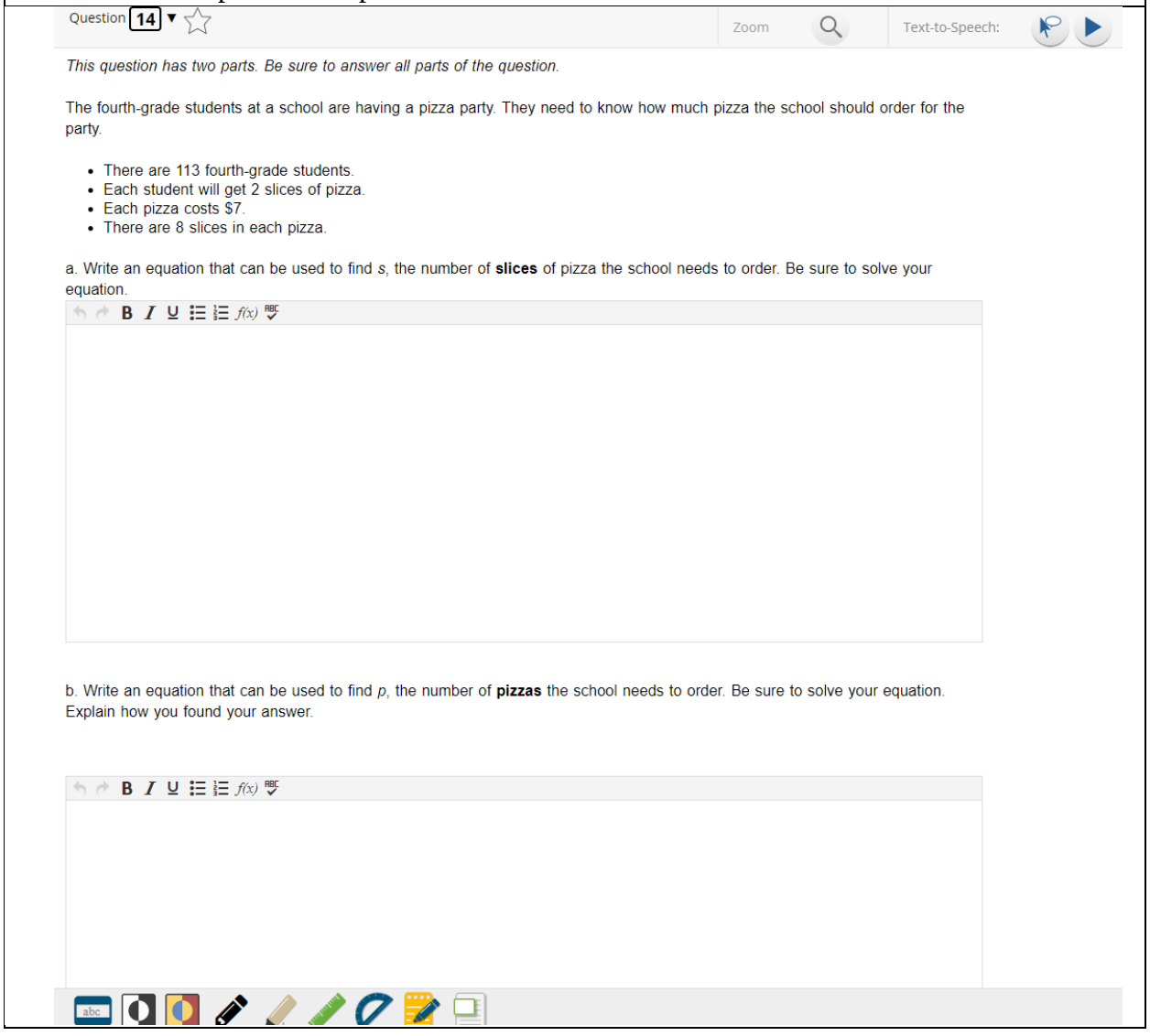
Sample Items

- MS-1 items are worth 1 point. These items may be multiple choice or multiple select. For multiple select items in grades 3-5, the number of choices to select will be given in the item stem. For multiple select items in grades 6-8, the item stem will direct students to "select all that apply."

Multiple Choice	Multiple Select
Question 8 ▼ ☆ Two points are shown on this number line.  Which expression represents the distance between the two points? Ⓐ $\lvert -5 \rvert - \lvert 3 \rvert$ Ⓑ $\lvert 3 \rvert - \lvert -5 \rvert$ Ⓒ $\lvert -5 - 3 \rvert$ Ⓓ $\lvert 3 - 5 \rvert$	Question 24 ▼ ☆ Select the **two** shapes that have the same number of lines of symmetry. Ⓐ  Ⓑ  Ⓒ  Ⓓ  Ⓔ 

- CR-3 items are worth a total of 3 points. These items require students to write an extended response to a prompt. The prompt may be a single prompt, or more typically, the items are written with multiple, scaffolded parts for students to respond to. These items are hand-scored, with scorers using a multi-trait rubric and scoring notes to evaluate responses. The CR-3 items are evaluated using a content rubric on a scale from 0–2 and a practices rubric on a scale from 0-1.

Constructed Response Sample



- CR-6 items are worth a total of 6 points. These items require students to write an extended response to a prompt. The prompt may be a single prompt, or more typically, the items are written with multiple, scaffolded parts for students to respond to. These items are hand-scored, with scorers using a multi-trait rubric and scoring notes to evaluate responses. The CR-6 items are evaluated using a content rubric on a scale from 0–4 and a practices rubric on a scale from 0-2.

Constructed Response Sample

Question 18 ▼ ☆ Zoom Text-to-Speec

This question has three parts. Be sure to answer all parts of the question.

The length of a rectangle is 4 units more than 3 times its width.

a. Write an equation in terms of the width, w, that represents the perimeter, P, of the rectangle. Write your equation in its simplest form.

b. If the width of the rectangle is 10 units, what is the perimeter, in units? Show your work or explain how you know.

A second rectangle has a length of 15 units and a perimeter of 64 units.

c. What is the width, w, in units, of the second rectangle? Use an equation to show your work or explain how you know.

Appendix A – Mathematical Practices

Cognia Assessments Mathematics
Mathematical Practices
Focus statements and clarifying bullets

1 Make sense of problems and persevere in solving them.

Focus 1A: Entry into a problem

Determines the form (quantity or measure) of the solution to the mathematical or real-life problem, analyzes the givens to extract only the pertinent information needed to solve the mathematical or real-life problem, and analyzes the givens to identify missing information needed to solve the mathematical or real-life problem.

- Explain the meaning of a problem
- Look for entry points to its solution
- Analyze givens, constraints, relationships, and goals for extraneous or missing information
- Make conjectures about the form and meaning of the solution

Focus 1B: Solution path

Determines and uses an appropriate solution path including the identification and appropriate use of tools to solve a well-posed mathematical or real-life problem.

- Plan a solution pathway rather than simply jumping into a solution attempt
- Consider analogous problems
- Try special cases and simpler forms of the original problem in order to gain insight into its solution
- Monitor and evaluate progress and change course if necessary
- Transform representations to get the information they need
- Understand the approaches of others to solving complex problems and identify correspondences between different approaches

Focus 1C: Appropriate solution to a problem

Determines whether the solution to a well-posed mathematical or real-life problem is accurate and/or realistic.

- Check solutions to problems using a different method
- Ensure the solution makes sense
- Verify the necessary precision is used in the solution
- Analyze the problem to ensure the proper units are specified in the solution

2 Reason abstractly and quantitatively.

Focus 2A: Decontextualize and manipulate

Abstracts a given situation, represents it symbolically, and manipulates the symbols.

- Decontextualize—
    - To abstract a given situation
    - To represent it symbolically
    - To manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents
    - Create a coherent representation of the problem at hand

Focus 2B: Contextualize

Shows understanding of the referents for the symbols involved in a mathematical sentence representing a situation.

- Contextualize—
    - To pause as needed during the manipulation process in order to probe into the referents for the symbols involved
- Consider the units involved

Focus 2C: Quantitative reasoning

Knows and uses different properties of operations and objects and shows understanding of the meaning of the quantities.

- Make sense of quantities and their relationships in problem situations
- Attend to the meaning of quantities, not just how to compute them
- Know and flexibly use different properties of operations and objects

3 Construct viable arguments and critique the reasoning of others.

Focus 3A: Construct arguments

Makes and defends arguments.

- Understand and use stated assumptions, definitions, and previously established results in constructing arguments
- Communicate arguments properly to others
- Reason inductively about data, making plausible arguments that take into account the context from which the data arose
- Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions whereas middle school and high school students learn to determine domains to which an argument applies

Focus 3B: Evaluate arguments

Evaluates arguments.

- Respond to the arguments of others
- Compare the effectiveness of two plausible arguments
- Distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is
- Listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments

4 Model with mathematics.

Focus 4A: Create models.

Creates an appropriate model.

- Identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas

Focus 4B: Interpret and analyze models.

Interprets and analyzes models.

- Analyze relationships mathematically to draw conclusions
- Improve models if they have not served its purpose
- Interpret their mathematical results in the context of the situation
- Explain correspondences between equations, verbal descriptions, tables, and graphs

Focus 4C: Use the model to solve problems.

Uses a model to solve a problem.

- Apply the mathematics they know to solve problems arising in everyday life, society, and the workplace
- Use models to develop designs, predict outcomes, describe phenomena, solve problems, and explain causes and effects
- Make assumptions and approximations to simplify a complicated situation
- Reflect on whether the results make sense
- Draw diagrams of important features and relationships, graph data, and search for regularity or trends
- Rely on using models to help conceptualize and solve a problem

7 Look for and make use of structure.

Focus 7/8A: Structure

Look for and make use of structure.

- Use the structure of an expression to rewrite it in another form
- Step back for an overview and shift perspective
- See complicated things as single objects or as being composed of several objects
- Use the geometric attributes of figures to classify/sort
- Use mathematical properties of numbers, operations, and equality to explain and analyze mathematical or real-world problems
- Recognize the elements of effective data representation for a data set
- Use familiar/known structures to see something in a different way
- Use structure of numbers and shapes to identify relationships between them

8 Look for and express regularity in repeated reasoning.

Focus 7/8B: Repeated Reasoning

Look for and express regularity in repeated reasoning.

- Discern a pattern (e.g. the less you subtract, the greater the difference)
- Notice if calculations result in repeated values (e.g., notice when there is a repeating decimal)
- Look both for general methods and for shortcuts
- Abstract general principles from repeated phenomena (e.g., slope, formulas for area or perimeter, correlation)