Wisconsin Forward Exam

WISCONSIN DEPARTMENT OF PUBLIC INSTRUCTION

Mathematics Item Sampler Grade 5

TABLE OF CONTENTS

THIS PAGE IS INTENTIONALLY BLANK.

MATHEMATICS ITEM SAMPLER OVERVIEW

OVERVIEW

This document contains samples of test items similar to those on the Wisconsin Forward Mathematics Exam. Each sample test item has been through a rigorous review process by DRC, Wisconsin Educators, and a third party, to ensure alignment with the Wisconsin Academic Standards. These items will not be used on the state assessment and may, therefore, be used in Wisconsin for professional development and student practice. The items in this document illustrate a sample of the content and types of items that students will encounter on the Forward Exam. A Summary Data table in the Appendix section identifies the alignment (standard measured), answer key, depth of knowledge, and annotations for each item.

CONNECTION TO THE STANDARDS

Wisconsin Academic Standards for Mathematics are available on the DPI webpage. Test items require students to prove their knowledge and abilities as stated in the standards.

HOW DO I USE THIS BOOK?

Professional Development

Sample items are useful as educators engage in conversations about what students are expected to know and be able to do to demonstrate proficiency on the state assessments relative to the Wisconsin Academic Standards. Sample items can inform discussions about state and local standards, curriculum, instruction, and assessment.

Improving Instruction

Teachers may use sample items in classroom activities that help students understand how to

- review key vocabulary;
- solve problems;
- determine which answer choices are correct, which are incorrect, and why;
- approach long and/or multistep tasks;
- use good test-taking strategies.

Student Practice

Students may perform better and with less anxiety if they are familiar with the format of the test and with the types of items they will be required to answer. The Forward Exam is an online assessment; students will benefit from the use of the Online Tools Training in order to work within the system interface to answer items as they will appear on the assessment, as well as utilize the tools available to them in the online system.

Note: A student's score on the practice test cannot be converted to a scale score, used to predict performance on the Forward Exam, or used to make inferences about the student's learning.

Test Preparation

While using the Item Sampler for test preparation, care should be taken that this is done in a balanced manner and one that helps to enhance student knowledge of subject matter as well as test performance. Please note that test preparation is only useful to the extent that it is also teaching content area knowledge and skills. Therefore, the use of this resource for test preparation is of limited value to students due to the narrow opportunity for content learning. It is very important to ensure that teachers are teaching to the curriculum and not to the test, as teaching to the test narrows the focus of instruction to only that content covered by the test.

Hess' Cognitive Rigor Matrix & Curricular Examples: Applying Webb's Depth-of-Knowledge Levels to Bloom's Cognitive Process Dimensions – *M-Sci*

Revised Bloom's Taxonomy	Webb's DOK Level 1 Recall & Reproduction	Webb's DOK Level 2 Skills & Concepts	Webb's DOK Level 3 Strategic Thinking/ Reasoning	Webb's DOK Level 4 Extended Thinking
Remember Retrieve knowledge from long-term memory, recognize, recall, locate, identify	○ Recall, observe, & recognize facts, principles, properties ○ Recall/ identify conversions among representations or numbers (e.g., customary and metric measures)			
Understand Construct meaning, clarify, paraphrase, represent, translate, illustrate, give examples, classify, categorize, summarize, generalize, infer a logical conclusion (such as from examples given), predict, compare/contrast, match like ideas, explain, construct models	○ Evaluate an expression ○ Locate points on a grid or number line ○ Solve a one-step problem ○ Represent math relationships in words, pictures or symbols ○ Read, write, compare decimals in scientific notation	○ Specify and explain relationships (e.g., non-examples/examples; cause-effect) ○ Make and record observations ○ Explain steps followed ○ Summarize results or concepts ○ Make basic inferences or logical predictions from data/observations ○ Use models /diagrams to represent or explain mathematical concepts ○ Make and explain estimates	○ Use concepts to solve non-routine problems ○ Explain, generalize, or connect ideas using supporting evidence ○ Make and justify conjectures ○ Explain thinking when more than one response is possible ○ Explain phenomena in terms of concepts	○ Relate mathematical or scientific concepts to other content areas, other domains, or other concepts ○ Develop generalizations of the results obtained and the strategies used (from investigation or readings) and apply them to new problem situations
Apply Carry out or use a procedure in a given situation; carry out (apply to a familiar task), or use (apply) to an unfamiliar task	○ Follow simple procedures (recipe-type directions) ○ Calculate, measure, apply a rule (e.g., rounding) ○ Apply algorithm or formula (e.g., area, perimeter) ○ Solve linear equations ○ Make conversions among representations or numbers, or within and between customary and metric measures	○ Select a procedure according to criteria and perform it ○ Solve routine problem applying multiple concepts or decision points ○ Retrieve information from a table, graph, or figure and use it to solve a problem requiring multiple steps ○ Translate between tables, graphs, words, and symbolic notations (e.g., graph data from a table) ○ Construct models given criteria	○ Design investigation for a specific purpose or research question ○ Conduct a designed investigation ○ Use concepts to solve non-routine problems ○ Use & show reasoning, planning, and evidence ○ Translate between problem & symbolic notation when not a direct translation	○ Select or devise approach among many alternatives to solve a problem ○ Conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze Break into constituent parts, determine how parts relate, differentiate between relevant-irrelevant, distinguish, focus, select, organize, outline, find coherence, deconstruct	○ Retrieve information from a table or graph to answer a question ○ Identify whether specific information is contained in graphic representations (e.g., table, graph, T-chart, diagram) ○ Identify a pattern/trend	○ Categorize, classify materials, data, figures based on characteristics ○ Organize or order data ○ Compare/ contrast figures or data ○ Select appropriate graph and organize & display data ○ Interpret data from a simple graph ○ Extend a pattern	○ Compare information within or across data sets or texts ○ Analyze and draw conclusions from data, citing evidence ○ Generalize a pattern ○ Interpret data from complex graph ○ Analyze similarities/differences between procedures or solutions	○ Analyze multiple sources of evidence ○ Analyze complex/abstract themes ○ Gather, analyze, and evaluate information
Evaluate Make judgments based on criteria, check, detect inconsistencies or fallacies, judge, critique			○ Cite evidence and develop a logical argument for concepts or solutions ○ Describe, compare, and contrast solution methods ○ Verify reasonableness of results	○ Gather, analyze, & evaluate information to draw conclusions ○ Apply understanding in a novel way, provide argument or justification for the application
Create Reorganize elements into new patterns/structures, generate, hypothesize, design, plan, construct, produce	○ Brainstorm ideas, concepts, or perspectives related to a topic	○ Generate conjectures or hypotheses based on observations or prior knowledge and experience	○ Synthesize information within one data set, source, or text ○ Formulate an original problem given a situation ○ Develop a scientific/mathematical model for a complex situation	○ Synthesize information across multiple sources or texts ○ Design a mathematical model to inform and solve a practical or abstract situation

ITEM TYPES

The Wisconsin Forward Exam has multiple types of test items. However, because this item sampler is in a format that can be printed, the majority of its items are multiple-choice. In the Forward Exam, there will be a more diverse array of item types, including the ones described below.

Selected-Response (SR) Items

Selected-Response (SR) items are an efficient method for measuring a broad range of content, and can be used to assess a variety of skills. Three types of SR items are used on the online assessments: Multiple-Choice (MC), Enhanced Selected-Response (ESR), and Evidence-Based Selected-Response (EBSR). In all cases, SR items require that a student determines the correct answer(s) to the item posed from a provided list. While it is still possible for a student to perform some work directly related to determining the correct answer, the student is not required to generate the content of the answer when responding to a Selected-Response item. An exception to this requirement is Mathematics Short-Response/Gridded-Response items where students will be required to enter a short alphanumeric response.

Multiple-Choice (MC) Items

Multiple-Choice (MC) items on Wisconsin's assessments have four answer choices, including three distractors and one correct answer. Distractors for Mathematics represent common misconceptions, incorrect logic, incorrect application of an algorithm, computational errors, etc. Distractors for English Language Arts (ELA) are written to represent a common misinterpretation, predisposition, unsound reasoning, casual reading, etc. A correct response to an MC item is worth one raw point. The process skills, directives, and action statements within an MC item also specifically align with the Wisconsin Academic Standards. Multiple-Choice items are present in all grades and are used with all content areas.

Multiple-Choice items can be further defined by being linked to, or independent from, a stimulus source. Items that operate independent of a stimulus are also known as "stand-alone MC." Stand-alone items may still have tables, graphs, or other information used in support of the stem. English Language Arts uses a mixture of MC items linked to a stimulus passage and some that are stand-alone. For Mathematics, all MC items are considered stand-alone.

Enhanced Selected-Response (ESR) Items

The Enhanced Selected-Response (ESR) items are multi-part autoscored items that may consist of varying combinations of Multiple-Choice, Multiple-Response, Gridded-Response, Completion or Short-Answer, and Technology-Enhanced items that explore in greater depth and cognitive complexity the knowledge, skills, and abilities specified by the standards of each content area. Typically, this item type has a common focus and explores authentic problem-solving skills. An example of a Statistics and Probability Mathematics ESR item would utilize a data-table stimulus with Part A using a Technology-Enhanced (TE) graphing tool to create a bar graph of the data presented and Part B asking students to calculate the mean of the data using a Short-Response item.

Two-Part Evidence-Based Selected-Response (EBSR) Items

The Evidence-Based Selected-Response (EBSR) items have two parts and are designed to elicit a response based on what a student has read from a stimulus passage. EBSR items may be linked to a stimulus passage or to a stimulus passage set. There are several variations of two-part EBSR items, but all two-part EBSR items have an Accuracy piece and an Evidence piece.

The Accuracy piece of the item is Part A. Part A of a typical EBSR item will be similar to a standard MC test item. A student analyzes a passage and chooses a single, best (correct) answer from four answer choices. Part B of a typical EBSR item will elicit evidence from the stimulus passage and will require that the student selects one or more correct answers based on the response the student provided to Part A. Part B is also different from Part A in that it may have five or six answer options rather than just four answer options typical of an MC item and more than one option may be correct.

Technology-Enhanced (TE) Items

Technology-Enhanced (TE) item types share the same functional structure as traditional paper and pencil test items; however, the expansive features and functions of a computer-based medium allow for the incorporation of technical enhancements into traditional elements of a test item, such as the item stem, the stimulus (if any), the response area, or a combination of all three. TE items are used in the content areas of ELA, Mathematics, and Science.

Item types such as drag-and-drop, hot spot, and in-line selection of multiple answers from drop-down menus broaden item presentation with engaging, interactive open-ended items.

A wide variety of TE item types will be present on the Wisconsin Forward Exam, including, but not limited to:

- **Clock Input**, where a student is able to add an hour hand and a minute hand to the clock;
- **Angle Draw Input**, where given a base line, the student can represent an angle;
- **Short Input**, where there are many types of short inputs that can be used (The number of characters is usually limited to a relatively small number in order to facilitate auto-scoring. The types of characters allowed can also be limited to text only, numbers only, or a mix. An equation editor can be utilized to assist the student in creating something as basic as a fraction or something more complex. The available symbols and templates in the equation builder can be customized for a testing program. Certain Short Input items can also be used in a paper-based test (PBT) as a Gridded-Response item.);
- **Bar Graph Input**, where students can produce bar graphs with prepopulated titles, labels, and scales, or the system can allow the student to populate them (The number of bars and the color of the bars is predetermined by the system. A reset feature is available that allows the student to start over from the original configuration.);
- **Number Line Input**, where students can create a graph that might involve plotting points only or points and lines (Both solid and open “dots” are available as well as line segments and rays. Number line graphs can have prepopulated titles, labels, and scales or can allow the student to populate them.);
- **Coordinate Graph Input**, which allows for the graphing and labeling of points and lines (Regions, determined by plotted lines, can be shaded. Solid and open “dots” as well as solid and dashed lines are available to the student. Coordinate graphs can have prepopulated titles, labels, and scales or can allow the student to populate them.);
- **Line Plot Input**, which is used as another way to graphically represent data (The basic structure is provided for the student. Certain labeling on the line plot can be done by the student. A reset feature is available that allows the student to start over from the original configuration.);
- **List Input**, a combination of the short input described earlier that allows the student to add input boxes (For example, it can be used for describing the steps in a process without revealing to the student the number of steps needed. The added input boxes can be rearranged and/or deleted.);
- **Drag-and-Drop Input**, a wide variety of ways are available to utilize a drag-and-drop input (The main difference between it and a drag-and-paste is that each dragable entity can be used only once with a drag-and-drop input. A reset feature is available that allows the student to start over from the original configuration.);

- **Drag-and-Paste Input**, a wide variety of ways are available to utilize drag-and-paste input (The main difference between it and a drag-and-drop is that each dragable entity can be used more than once with a drag-and-paste input. A reset feature is available that allows the student to start over from the original configuration.);
- **Drop-Down List Input**, allows for the creation of a situation where a great deal of information about a student's grasp of a concept can be determined with a single item (Students can be asked to choose from three function types, four number of real zero responses, and two inverse function responses. For one function alone, this provides 24 possible answer combinations. With the three functions, a considerable amount of information can be gained, making this almost an open-ended item type.);
- **Pictograph using Drag-and-Paste**, actually another example of drag-and-paste, but is worth mentioning on its own as it is a type of graphing often used at lower grade levels;
- **Circle Graph**, a graph that allows the student to create and label the "wedges" that represent the data (Circle graphs can have a prepopulated title or can allow the student to populate it. The color of the "wedges" is predetermined by the system.);
- **Matching**, allows for the use of text or graphics as the matching objects (The student clicks on one object and then clicks on a second object to connect them.);
- **Highlighting Text**, allows for designated text to be highlighted in a word, phrase, sentence, or paragraph; and the
- **Graphic Modification Hot Spot**, allows for one image to replace another image when a hot spot is clicked.

Text-Dependent Analysis (TDA) Items

The English Language Arts (ELA) section of the Forward Exam presents students with a Text-Dependent Analysis (TDA) item. A TDA is a text-based analysis based on a single passage or a multiple passage set that each student has read during the assessment. The passage or passage set will consist of either literary or informational text. In order to successfully answer a TDA, students must analyze and use information from the passage(s) to plan a comprehensive, holistic response. Students will then write their response including supporting evidence from the passage(s). Students will have up to 5,000 characters to formulate their response. Students' responses are scored using a rubric that takes into account both the composition and the conventions of the student's writing.

The TDA portion of the Forward Exam requires students to read the text and then respond in writing in one of two ways:

- identifying and explaining a theme or central idea, using textual evidence to support the claim about what that theme or central idea is, or
- analyzing the development of an event, character, central ideas, or theme, using textual evidence to support the explanation and analysis.

TDA Item Samplers are available at https://dpi.wi.gov/assessment/forward/sample-items.

THIS PAGE IS INTENTIONALLY BLANK.

Answer the items below.

1. Which statement is true?

A. A rhombus is always a square.

B. A rectangle is always a rhombus.

C. A square is always a quadrilateral.

D. A parallelogram is always a rectangle.

2. What is 32.408 written in expanded form?

A. $3 \times 10 + 2 \times 1 + 4 \times 10 + 8 \times 1000$

B. $3 \times 10 + 2 \times 1 + 4 \times \frac{1}{10} + 8 \times \frac{1}{100}$

C. $3 \times 10 + 2 \times 1 + 4 \times \frac{1}{10} + 8 \times \frac{1}{1000}$

D. $3 \times 10 + 2 \times 1 + 4 \times \frac{1}{100} + 8 \times \frac{1}{1000}$

Go on to the next page.

3. Margaret walked $\frac{5}{8}$ mile around the track. Then she ran $\frac{9}{10}$ mile around the track. How many miles did Margaret walk and run around the track?

4. Which expression represents "4 times the difference of 64 and 18"?

A. $4 \times 64 + 18$

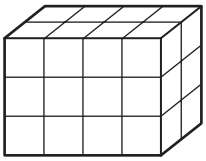
B. $4 \times (64 + 18)$

C. $4 \times 64 - 18$

D. $4 \times (64 - 18)$

Go on to the next page.

5. A rectangular prism made from unit cubes is shown.



What is the volume, in cubic units, of the rectangular prism?

A. 7

B. 12

C. 24

D. 26

6. The table has four statements about the coordinate plane. Determine whether each statement is true or false.

	True	**False**
The origin is the point where the *x*-axis and *y*-axis intersect.		
The *x*-axis and the *y*-axis form perpendicular lines.		
The first number in an ordered pair tells how far to travel in the direction of the *y*-axis.		
A point represented by the ordered pair (0, 6) is on the *y*-axis.		

Go on to the next page.

7. Silvia bought a rectangular piece of land that is $2\frac{1}{3}$ miles long and $\frac{3}{4}$ mile wide. How many square miles of land did Silvia buy?

A. $1\frac{3}{4}$

B. $2\frac{1}{4}$

C. $3\frac{1}{12}$

D. $6\frac{1}{6}$

8. An expression is shown.

$$5 \times (8 + 15 \div 3) + 7$$

What is the value of the expression?

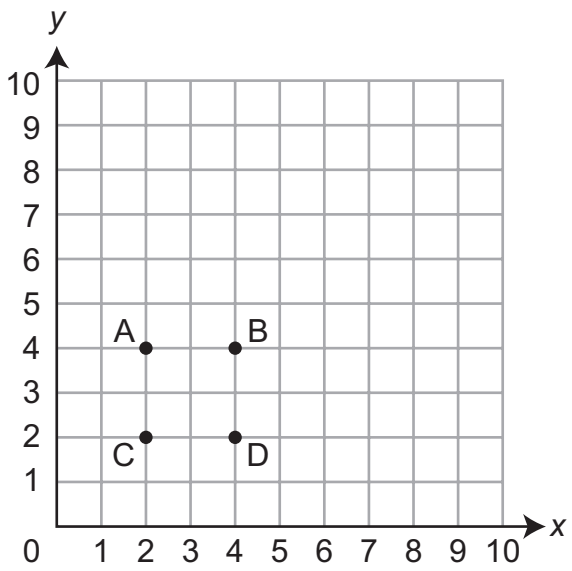
STOP.

STOP.

STOP.

Answer the items below.

1. Points A, B, C, and D are plotted on a coordinate grid as shown.



Which point is located at (4, 2)?

A. A

B. B

C. C

D. D

Go on to the next page.

2. Stan participated in the shot put throwing contest. His first throw traveled 8.96 **meters**. His second throw traveled 9 **centimeters** farther than his first throw. How far, in **meters**, did Stan's second throw travel?

A. 8.969

B. 9.05

C. 9.86

D. 17.96

3. Andre ran the 40-yard dash in 4.385 seconds. What is 4.385 rounded to the nearest hundredth?

Go on to the next page.

4. Alex used $\frac{3}{4}$ cup of brown sugar and $1\frac{2}{3}$ cups of white sugar to bake some cookies. What is the total amount of sugar, in cups, Alex used to bake the cookies?

A. $1\frac{1}{4}$

B. $1\frac{5}{7}$

C. $2\frac{5}{12}$

D. $2\frac{2}{3}$

5. The table shows some of the numbers in pattern B and pattern N.

Pattern B	4	8	12	?	20
Pattern N	?	12	18	24	30

Which statement correctly describes the relationship between the corresponding numbers in pattern B and pattern N?

A. The numbers in pattern N are 3 times the corresponding numbers in pattern B.

B. The numbers in pattern B are 4 less than the corresponding numbers in pattern N.

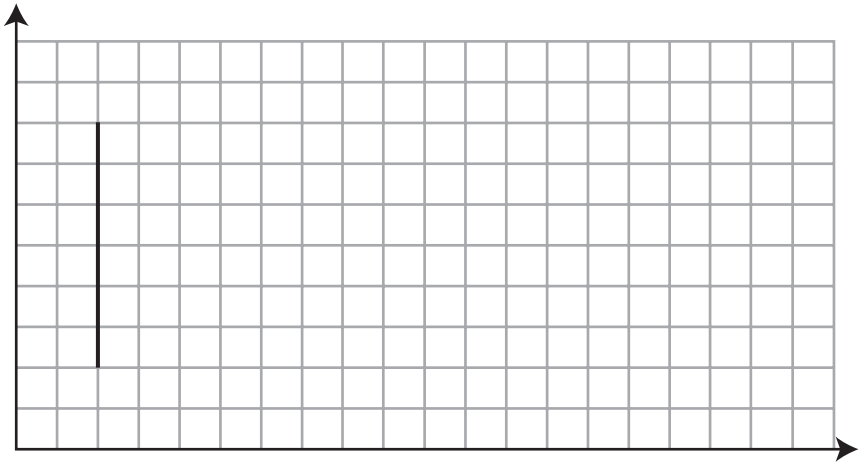
C. The numbers in pattern B divided by the corresponding numbers in pattern N equal $\frac{2}{3}$.

D. The numbers in pattern B divided by the corresponding numbers in pattern N equal $1\frac{1}{2}$.

Go on to the next page.

6. A fish tank is in the shape of a rectangular prism. The volume of the fish tank can be found by multiplying the area of the base by the height. The volume of the fish tank is 600 cubic inches. The height of the fish tank is 10 inches. Draw a shape on the grid to represent the base of the fish tank. Each square on the grid represents 1 square inch. One side of the base has already been drawn.

Amanda's Fish Tank



7. The Janis School District ordered 27 cases of dry-erase markers. Each case contains 48 boxes of markers. How many boxes of markers did the Janis School District order?

A. 324

B. 432

C. 856

D. 1,296

STOP.

STOP.

STOP.

SUMMARY DATA

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
Session 1				
1	5.G.3	C	1	The question asks the student to categorize quadrilaterals. A. Incorrect. The student relates a rhombus to a square because they both have equal side lengths. B. Incorrect. The student relates a rhombus to a rectangle because they are both quadrilaterals. C. Correct. A square and a quadrilateral have four sides. D. Incorrect. The student relates a parallelogram to a rectangle because the opposite sides of a rectangle are parallel.
2	5.NBT.3a	C	1	The question asks the student to recognize a number written in expanded form. A. Incorrect. The student represents the decimal values as whole numbers. B. Incorrect. The student uses 8 in the hundredths place. C. Correct. The student expands the value correctly based on place value. D. Incorrect. The student uses 4 in the hundredths place.
3	5.NF.2	Exemplar: $1\frac{21}{40}$	2	The question asks the student to add fractions with different denominators. To receive full credit, the student must enter $1\frac{21}{40}$ or an equivalent value.

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
4	5.OA.2	D	1	The question asks the student to recognize a numeric expression given a verbal description. A. Incorrect. The student uses addition to represent the difference and does not include parentheses. B. Incorrect. The student uses addition to represent the difference. C. Incorrect. The student does not include parentheses. D. Correct. The student uses parentheses to group the difference of 64 and 18.
5	5.MD.4	C	1	The question asks the student to determine the number of cubic units in a rectangular prism. A. Incorrect. The student adds the side lengths. B. Incorrect. The student counts half of the unit cubes. C. Correct. The student counts the correct number of unit cubes. D. Incorrect. The student counts the squares.
6	5.G.1	See Annotations	1	The question asks the student to recognize attributes of the coordinate plane. To receive full credit, the student must select True, True, False, True.

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
7	5.NF.6	A	2	The question asks the student to determine the area of a rectangle. A. Correct. The student multiplies $2\frac{1}{3} \times \frac{3}{4}$. B. Incorrect. The student multiplies $\frac{1}{3} \times \frac{3}{4}$ and adds the product to two. C. Incorrect. The student adds $2\frac{1}{3} + \frac{3}{4}$. D. Incorrect. The student adds $2\frac{1}{3} + \frac{3}{4} + 2\frac{1}{3} + \frac{3}{4}$.
8	5.OA.1	Exemplar: 72	1	The question asks the student to evaluate the expression. To receive full credit, the student must enter 72 or an equivalent value.

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
Session 2				
1	5.G.1	D	1	The question asks the student to recognize an ordered pair on a coordinate grid. A. Incorrect. The student sequences the ordered pair as (*y*, *x*). B. Incorrect. The student identifies the *x*-coordinate as 4. C. Incorrect. The student identifies the *y*-coordinate as 2. D. Correct. The student sequences the ordered pair as (*x*, *y*).
2	5.MD.1	B	2	The question asks the student to convert centimeters to meters. A. Incorrect. The student puts 9 at the end of the first measurement. B. Correct. The student converts 9 centimeters to 0.09 meters and adds it to the first measurement. C. Incorrect. The student converts 9 centimeters to 0.9 meters and adds it to the first measurement. D. Incorrect. The student adds 9 to the beginning of the first measurement.
3	5.NBT.4	Exemplar: 4.39	1	The question asks the student to round a decimal value. To receive full credit, the student must enter 4.39.

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
4	5.NF.2	C	2	The question asks the student to add fractions with different denominators. A. Incorrect. The student incorrectly cross-simplifies the 3 from both fractions. B. Incorrect. The student adds the numerator and denominator digits. C. Correct. The student uses 12 as a common denominator to add the fractions. D. Incorrect. The student incorrectly converts the fractions when finding a common denominator.
5	5.OA.3	C	2	The question asks the student to compare two number patterns. A. Incorrect. The student multiplies the first value in the table for pattern B by 3 to get the first value shown in the table for pattern N. B. Incorrect. The student uses the second set of corresponding numbers and subtracts 4 from 12 to get 8. C. Correct. The student uses a pattern that applies to each set of corresponding numbers in the table. D. Incorrect. The student describes the relationship between corresponding numbers from pattern N to pattern B.
6	5.MD.5	See Annotations	3	The question asks the student to construct the base of a rectangular prism. To receive full credit, the student must construct a 6-by-10 rectangle on the grid.

Grade 5

Sample Number	Alignment	Answer Key	Depth of Knowledge	Annotations
7	5.NBT.5	D	2	The question asks the student to multiply two-digit numbers. A. Incorrect. The student multiplies 27 × 48 and does not use 0 as a placeholder when using vertical multiplication. B. Incorrect. The student multiplies 48 × 27 and does not use 0 as a placeholder when using vertical multiplication. C. Incorrect. The student multiplies the ones digits and the tens digits. D. Correct. The student multiplies 27 × 48.

Mathematics
Item Sampler
Grade 5