NEBRASKA STATE ACCOUNTABILITY

MATHEMATICS ITEM AND SCORING SAMPLER

GRADE 7

Nebraska State Accountability assessments are administered by the Nebraska Department of Education (NDE).
301 Centennial Mall South – P.O. Box 94987 – Lincoln, Nebraska 68509 – (402) 471-2495

INFORMATION ABOUT THE ITEM AND SCORING SAMPLER

ITEMS

GENERAL INTRODUCTION

The Nebraska Department of Education provides districts and schools with tools to assist in delivering focused instructional programs aligned to the state assessment system. These tools include Table of Specifications documents, administration manuals, and content-based item and scoring samplers. This Item and Scoring Sampler is a useful tool for Nebraska educators in the preparation of local instructional programs and the statewide NeSA-MATH.

SAMPLER CONTENTS

This sampler contains test questions (items) that have been written to align to the assessment indicators that are based on the Nebraska College- and Career-Ready Mathematics Standards. The test questions provide a simulation of the types of items that will appear on an operational Nebraska College- and Career-Ready NeSA-MATH. Each sample test question has been through a rigorous review process to ensure alignment with the assessment indicators.

PURPOSE AND USES

The purpose of the sampler is to expose teachers and administrators to new item types and to show how these items align to the revised Nebraska College- and Career-Ready Mathematics Standards. Many of the items provided in the sampler will be accessible to students in the form of MATH Practice Tests, Guided Practice Tests, and Online Tools Training resources.

ITEM FORMAT AND SCORING GUIDELINES

The Nebraska College- and Career-Ready NeSA-MATH has two types of test questions. The types of test questions are Multiple-Choice (MC) and Auto-Scored Constructed Response (ASCR).

MULTIPLE CHOICE (MC):

All MC items have four answer choices, including three distractors and one correct answer. Distractors represent common miscalculations, incorrect logic, common misinterpretations, unsound reasoning, etc. A correct response to an MC item is worth one point.

AUTO-SCORED CONSTRUCTED RESPONSE (ASCR):

ASCR item types provide a new forum in which to address higher-level thinking skills without the use of hand-scored test questions. Using the expansive features and functions of online testing, developers will incorporate technical enhancements to the test question, the response area, and/or the stimulus. Item types may include drag-and-drop, hot-spot, and in-line selection of multiple answers from drop-down menus. Students will be able to manipulate information within dynamic tasks such as dragging and pasting elements, using manipulatives, and selecting multiple answers from a variety of presentation methods. Each ASCR test question is worth 2 points.

DEPTH OF KNOWLEDGE

In addition to being aligned to the standards, the sample items included in this sampler were also developed with a particular emphasis on cognitive complexity, or Depth of Knowledge (DOK). The DOK level is also provided for each item in this sampler in the Item Information Table. DOK measures the level of cognitive demand required to complete an assessment item. The following descriptions show the expectations of the DOK levels in greater detail.

Level 1 (Recall) includes the recall of information such as a fact, definition, term, or a simple procedure, as well as performing a simple algorithm or applying a formula. That is, in mathematics, a one-step, well-defined, and straight algorithmic procedure should be included at this lowest level. Other key words that signify Level 1 include "identify," "recall," "recognize," "use," and "measure." Verbs such as "describe" and "explain" could be classified at different levels, depending on what is to be described and explained.

Level 2 (Skill/Concept) includes the engagement of some mental processing beyond a habitual response. A Level 2 assessment item requires students to make some decisions as to how to approach the problem or activity, whereas Level 1 requires students to demonstrate a rote response, perform a well-known algorithm, follow a set procedure (like a recipe), or perform a clearly defined series of steps. Keywords that generally distinguish a Level 2 item include "classify," "organize," "estimate," "make observations," "collect and display data," and "compare data." These actions imply more than one step. For example, to compare data requires first identifying characteristics of objects or phenomena and then grouping or ordering the objects. Some action verbs, such as "explain," "describe," or "interpret," could be classified at different levels depending on the object of the action. For example, interpreting information from a simple graph, or reading information from the graph, also are at Level 2. Interpreting information from a complex graph that requires some decisions on what features of the graph need to be considered and how information from the graph can be aggregated is at Level 3. Level 2 activities are not limited only to number skills, but may involve visualization skills and probability skills. Other Level 2 activities include noticing or describing non-trivial patterns; explaining the purpose and use of experimental procedures; carrying out experimental procedures; making observations and collecting data; classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.

Level 3 (Strategic Thinking) requires reasoning, planning, using evidence, and a higher level of thinking than the previous two levels. In most instances, requiring students to explain their thinking is at Level 3. Activities that require students to make conjectures are also at this level. The cognitive demands at Level 3 are complex and abstract. The complexity does not result from the fact that there are multiple answers, a possibility for both Levels 1 and 2, but because the task requires more demanding reasoning. An activity, however, that has more than one possible answer and requires students to justify the response they give would most likely be at Level 3. Other Level 3 activities include drawing conclusions from observations, citing evidence and developing a logical argument for concepts, explaining phenomena in terms of concepts, and deciding which concepts to apply in order to solve a complex problem.

ITEM AND SCORING SAMPLER FORMAT

Sample questions are provided in this sampler, along with any related stimulus information such as a passage or graphic. Following each test question is an item information table.

Example Response Item Information Table

Item Information		
Alignment	Assigned Indicator	Assigned indicator definition
Answer Key	Correct Answer	**Option Annotations**
Depth of Knowledge	Assigned DOK	Brief answer option analysis or rationale
Focus	Skill/Task	

The NeSA-MATH is administered primarily online. Although there is a paper-pencil format, the examples in this sampler include samples of students' responses in online format.

ADDITIONAL INFORMATION

For more information related to the Nebraska plan and schedule for making the transition to NeSA-Mathematics, see http://www.education.ne.gov/Assessment and select the link on the left titled "CCR MATH Transition."

MULTIPLE-CHOICE ITEMS

1. The height of a plant is 9 inches. The plant grows $\frac{1}{8}$ inch each day. Which equation shows how to find the height of the plant, in inches, y, after x days?

A. $y = 0.125x + 9$

B. $y = 9x + 0.125$

C. $y = \frac{9}{8}x$

D. $y = \frac{1}{72}x$

Item Information		
Alignment	MA 7.2.3.b	Write a two-step equation to represent real-world problems involving rational numbers in any form.
Answer Key	A	**Option Annotations**
Depth of Knowledge	2	The student is asked to write an equation to represent the given situation. Option A is the correct answer since the rate of change is $\frac{1}{8}$ or 0.125, and the initial value is 9. Option B is incorrect since the rate of change and initial value are reversed in $y = 9x + 0.125$. Option C is incorrect since the rate of change and initial value are multiplied to create an incorrect rate of change of $\frac{9}{8}$. Option D is incorrect since the rate of change and the inverse of the initial value are multiplied to create an incorrect rate of change of $\frac{1}{72}$.
Focus	Writing Two-Step Equation to Represent Real-World Problem	

2. Sam can finish a running course in 6.5 minutes. His goal is to reduce his time to 5 minutes. Which inequality represents the times, t, Sam could achieve that meet his goal?

A. $t \geq 5$

B. $t \leq 5$

C. $t \geq 1.5$

D. $t \leq 1.5$

Item Information		
Alignment	MA 7.2.3.d	Solve real-world problems with inequalities.
Answer Key	B	**Option Annotations**
Depth of Knowledge	1	The student is asked to solve the problem by creating an inequality that represents the given situation. Option B is the correct answer since the solution set of the inequality $t \leq 5$ includes all values less than or equal to 5. Option A is incorrect since the solution set of the inequality $t \geq 5$ includes all values greater than or equal to 5. Option C is incorrect since the solution set of the inequality $t \geq 1.5$ includes all values greater than or equal to 1.5 (*note: 1.5 is the difference of 6.5 and 5). Option D is incorrect since the solution set of the inequality $t \leq 1.5$ includes all values less than or equal to 1.5.
Focus	Real-World Inequalities	

3. A store sells all of its products at a price 15% greater than the price the store paid for the product. How much does the store sell a product for when the store paid $120 for the product?

A. $102

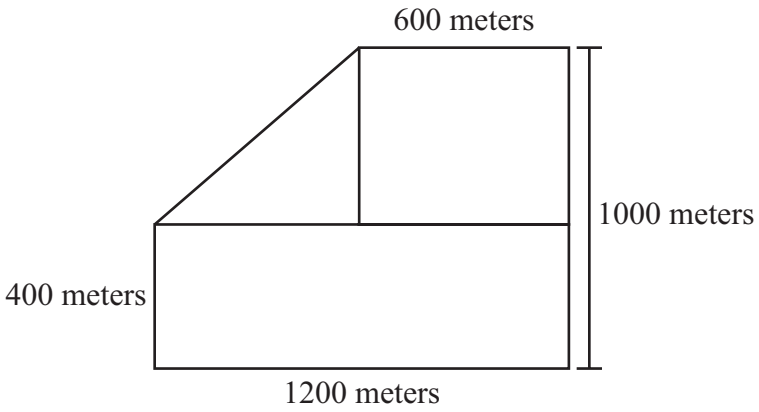
B. $135

C. $138

D. $180

Item Information		
Alignment	MA 7.2.3.e	Use proportional relationships to solve real-world problems, including percent problems (e.g., % increase, % decrease, mark-up, tip, simple interest).
Answer Key	C	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the problem by finding the price of an item with a 15% mark-up. Option C is the correct answer since the proportion $\frac{115}{100} = \frac{x}{120}$ can be used to find $x = 138$. Option A is incorrect since 102 is the value of a 15% mark-down. Option B is incorrect since 135 is the sum of 15 and 120. Option D is incorrect since 180 is the product of 18 (15% of 120) and 10.
Focus	Solving Real-World Problems with Percent Mark-Up	

4. Use the figure below to answer the question.



The figure shows three pieces of land available for development. What is the total area of the land available for development?

A. 840,000 m^2

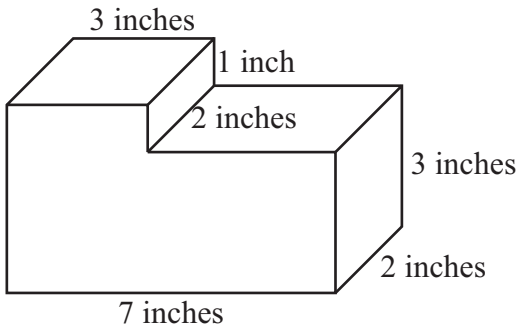
B. 1,020,000 m^2

C. 1,080,000 m^2

D. 1,200,000 m^2

Item Information		
Alignment	MA 7.3.3.a	Solve real-world problems involving perimeter and area of composite shapes made from triangles, quadrilaterals and polygons.
Answer Key	B	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the problem by finding the area of the figure shown. Option B is the correct answer since 1,200 • 400 = 480,000 (area of bottom rectangle), 600 • 600 = 360,000 (area of top right square), 300 • 600 = 180,000 (area of triangle), and 480,000 + 360,000 + 180,000 = 1,020,000. Option A is incorrect since 480,000 is the sum of the areas of the rectangles only. Option C is incorrect since 1,080,000 is the value of (600 • 1,000) + (400 • 1,200), assuming overlapping rectangles. Option D is incorrect since 1,200,000 is the area of a 1,200 by 1,000 rectangle.
Focus	Solving Real-World Problems with Area of Composite Shapes	

5. Use the diagram of a block below to answer the question.



What is the surface area of the block?

A. 48 square inches

B. 92 square inches

C. 104 square inches

D. 116 square inches

Item Information		
Alignment	MA 7.3.3.b	Solve real-world problems involving surface area and volume of composite shapes made from rectangular and triangular prisms.
Answer Key	B	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the problem by finding the surface area of the figure shown. Option B is the correct answer since 21 + 21 + 14 + 14 + 6 + 6 = 82 (surface area of bottom prism), 6 + 6 + 3 + 3 + 2 + 2 = 22 (surface are of top prism), 82 + 22 = 104 (combined surface area of the prisms), and 104 – 6 – 6 = 92 (surface area of figure minus overlaps). Option A is incorrect since 48 is the value of the volume of the figure. Option C is incorrect since 104 is the combined surface area of the prisms, not accounting for the area of overlap. Option D is incorrect since 116 is the value of 104 + 6 + 6 where the overlapped areas are added instead of subtracted.
Focus	Solving Real-World Problems with Surface Area of Composite Shapes	

6. What is the value of the expression $2g + h$ when $g = 3.5$ and $h = 7$?

A. 6.2

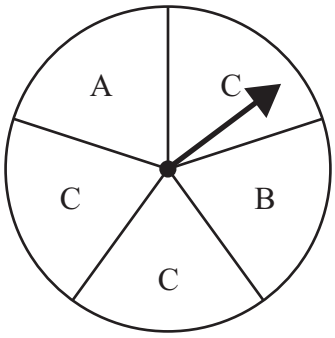
B. 10.7

C. 14

D. 21

Item Information		
Alignment	MA 7.2.2.c	Given the value of the variable(s), evaluate algebraic expressions (including absolute value).
Answer Key	C	**Option Annotations**
Depth of Knowledge	1	The student is asked to find the value of the expression given the values of the variables. Option C is the correct answer since 2(3.5) + 7 = 7 + 7 = 14. Options A, B, and D are incorrect since those are not the values of the expression when it is evaluated with the given values of the variables.
Focus	Evaluating Algebraic Expressions Given Value of Variables	

7. Use the picture below to answer the question.



What is the probability of spinning a C?

A. $\frac{1}{5}$

B. $\frac{1}{3}$

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

D. $\frac{3}{5}$

Item Information		
Alignment	MA 7.4.3.b	Describe the theoretical probability of an event using a fraction, percentage, and decimal.
Answer Key	D	**Option Annotations**
Depth of Knowledge	1	The student is asked to use the picture to find the probability of a given event. Option D is the correct answer since $\frac{3}{5}$ means there are 3 parts labeled "C" out of a total of 5 equal parts. Option A is incorrect since $\frac{1}{5}$ means there is only 1 part labeled "C" out of a total of 5 equal parts. Option B is incorrect since $\frac{1}{3}$ means there is 1 part labeled "C" out of a total of 3 equal parts. Option C is incorrect since $\frac{2}{5}$ means there are 2 parts labeled "C" out of a total of 5 equal parts.
Focus	Representing Theoretical Probability with Fraction	

8. Tiffany bought 12 songs for $1.09 per song. Which equation shows the BEST estimate of the total cost?

A. $10 \times \$1 = \$10$

B. $10 \times \$2 = \$20$

C. $12 \times \$1 = \$12$

D. $12 \times \$2 = \$24$

Item Information		
Alignment	MA 7.1.2.e	Estimate and check reasonableness of answers using appropriate strategies and tools.
Answer Key	C	**Option Annotations**
Depth of Knowledge	1	The student is asked to identify the equation that shows the best estimate of the product of 12 and 1.09 to the nearest whole number. Option C is the correct answer since 12 is already a whole number and 1.09 is closer to 1 than 2. Option A is incorrect since using the whole number 12 is more accurate than rounding to 10. Option B is incorrect since using the whole number 12 is more accurate than rounding to 10, and 1.09 is closer to 1 than 2. Option D is incorrect since 1.09 is closer to 1 than 2.
Focus	Estimating with Equations	

9. Which inequality is equivalent to $p + \frac{1}{4} \geq \frac{5}{8}$?

A. $p \leq \frac{3}{8}$

B. $p \geq \frac{3}{8}$

C. $p \leq \frac{7}{8}$

D. $p \geq \frac{7}{8}$

Item Information		
Alignment	MA 7.2.2.e	Solve one-step inequalities involving integers and rational numbers and represent solutions on a number line.
Answer Key	B	**Option Annotations**
Depth of Knowledge	1	The student is asked to solve the inequality. Option B is the correct answer since $p + \frac{1}{4} \geq \frac{5}{8}$, $p + \frac{1}{4} - \frac{1}{4} \geq \frac{5}{8} - \frac{1}{4}$, $p \geq \frac{3}{8}$. Option A is incorrect since $p \leq \frac{3}{8}$ is the solution to the inequality $p + \frac{1}{4} \leq \frac{5}{8}$, $p + \frac{1}{4} - \frac{1}{4} \leq \frac{5}{8} - \frac{1}{4}$, and $p \leq \frac{3}{8}$. Option C is incorrect since $p \leq \frac{7}{8}$ is the solution to the inequality $p - \frac{1}{4} \leq \frac{5}{8}$, $p - \frac{1}{4} + \frac{1}{4} \leq \frac{5}{8} + \frac{1}{4}$, and $p \leq \frac{7}{8}$. Option D is incorrect since $p \geq \frac{7}{8}$ is the solution to the inequality $p - \frac{1}{4} \geq \frac{5}{8}$, $p - \frac{1}{4} + \frac{1}{4} \geq \frac{5}{8} + \frac{1}{4}$, and $p \geq \frac{7}{8}$.
Focus	Solving One-Step Inequalities with Fractions	

10. What is the value of $0.3 + \frac{1}{5}$?

A. $\frac{1}{8}$

B. 0.45

C. 0.5

D. $\frac{4}{5}$

Item Information		
Alignment	MA 7.1.2.b	Add, subtract, multiply, and divide rational numbers (e.g., positive and negative fractions, decimals, and integers).
Answer Key	C	**Option Annotations**
Depth of Knowledge	1	The student is asked to find the sum of 0.3 and $\frac{1}{5}$. Option C is the correct answer since $\frac{1}{5} = 0.2$, and $0.3 + 0.2 = 0.5$, OR $0.3 = \frac{3}{10}$, and $\frac{1}{5} = \frac{2}{10}$, then $\frac{3}{10} + \frac{2}{10} = \frac{5}{10} = 0.5$. Option A is incorrect since the 3 from 0.3 is added to denominator 5 to make 8 in $\frac{1}{8}$. Option B is incorrect since 0.3 is added to numerator 1 (as 0.1) to make 0.4, and denominator 5 is treated as 0.05 to make $0.4 + 0.05 = 0.45$. Option D is incorrect since the 3 from 0.3 is added to numerator 1 to make 4 in $\frac{4}{5}$.
Focus	Adding Rational Numbers	

11. Use the picture below to answer the question.

On a street, a car can travel no more than 35 miles per hour. Which inequality represents this situation?

A. $s < 35$

B. $s \leq 35$

C. $s > 35$

D. $s \geq 35$

Item Information		
Alignment	MA 7.2.1.a	Describe and create an inequality from words and pictures (e.g., one-step, one-variable).
Answer Key	B	**Option Annotations**
Depth of Knowledge	1	The student is asked to create an inequality that represents the given situation. Option B is the correct answer since the solution set to $s \leq 35$ includes all values less than or equal to 35. Option A is incorrect since the solution set to $s < 35$ includes only values less than 35. Option C is incorrect since the solution set to $s > 35$ includes all values greater than 35. Option D is incorrect since the solution set to $s \geq 35$ includes all values greater than or equal to 35.
Focus	Creating Inequalities from Words	

12. A student is equally likely to select pizza, nachos, or chicken for lunch. What is the probability the student does not select chicken?

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

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

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

D. 1

Item Information		
Alignment	MA 7.4.3.h	Identify complementary events and calculate their probabilities.
Answer Key	C	**Option Annotations**
Depth of Knowledge	2	The student is asked to find the probability of the given complementary event. Option B is the correct answer since $\frac{2}{3}$ is the probability of selecting the 2 lunch choices that are in the complement (pizza and nachos) out of a total of 3 lunch choices. Option A is incorrect since $\frac{1}{3}$ is the probability of selecting chicken. Option B is incorrect since $\frac{1}{2}$ is the probability of selecting 1 lunch choice out of a total of 2 lunch choices. Option D is incorrect since 1 is the probability of selecting pizzas, nachos, or chicken.
Focus	Calculating Probabilities of Complementary Events	

13. Use the proportion below to answer the question.

$$\frac{4}{5} = \frac{25}{x}$$

What is the value of x?

A. $4\frac{1}{5}$

B. 20

C. 26

D. $31\frac{1}{4}$

Item Information		
Alignment	MA 7.1.2.a	Solve problems using proportions and ratios (e.g., cross products, percents, tables, equations, and graphs).
Answer Key	D	**Option Annotations**
Depth of Knowledge	2	The student is asked to find the value of the variable in the proportion shown. Option D is the correct answer since $\frac{4}{5} = \frac{25}{x}$, $4x = 125$, $\frac{4x}{4} = \frac{125}{4}$, $x = 31\frac{1}{4}$. Option A is incorrect since $x = 4\frac{1}{5}$ is the solution to $5(x + \frac{4}{5}) = 25$, $\frac{5(x+\frac{4}{5})}{5} = \frac{25}{5}$, $x + \frac{4}{5} = 5$, $x + \frac{4}{5} - \frac{4}{5} = 5 - \frac{4}{5}$, $x = 4\frac{1}{5}$. Option B is incorrect since $x = 20$ is the solution to $\frac{4}{5} = \frac{x}{25}$, $5x = 100$, $\frac{5x}{5} = \frac{100}{5}$, $x = 20$. Option C is incorrect since $x = 26$ is the solution to $4 + x = 5 + 25$, $4 - 4 + x = 30 - 4$, $x = 26$.
Focus	Solving Proportions	

14. What is the value of x in $\frac{1}{2}(6x - 4) = 9$?

A. $1\frac{2}{3}$

B. $2\frac{1}{3}$

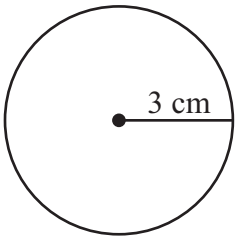
C. $3\frac{2}{3}$

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

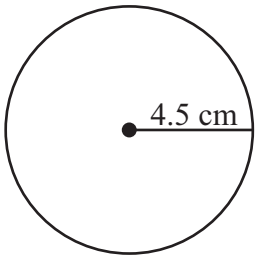
Item Information		
Alignment	MA 7.2.2.a	Solve equations using the distributive property and combining like terms.
Answer Key	C	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the equation to find the value of the variable. Option C is the correct answer since $\frac{1}{2}(6x - 4) = 9$, $3x - 2 = 9$, $3x - 2 + 2 = 9 + 2$, $3x = 11$, $\frac{3x}{3} = \frac{11}{3}$, $x = 3\frac{2}{3}$. Option A is incorrect since $x = 1\frac{2}{3}$ is the solution to $\frac{1}{2}(6x + 8) = 9$, $3x + 4 = 9$, $3x + 4 - 4 = 9 - 4$, $3x = 5$, $\frac{3x}{3} = \frac{5}{3}$, $x = 1\frac{2}{3}$. Option B is incorrect since $x = 2\frac{1}{3}$ is the solution to $\frac{1}{2}(6x + 4) = 9$, $3x + 2 = 9$, $3x + 2 - 2 = 9 - 2$, $3x = 7$, $\frac{3x}{3} = \frac{7}{3}$, $x = 2\frac{1}{3}$. Option D is incorrect since $x = 4\frac{1}{3}$ is the solution to $\frac{1}{2}(6x - 8) = 9$, $3x - 4 = 9$, $3x - 4 + 4 = 9 + 4$, $3x = 13$, $\frac{3x}{3} = \frac{13}{3}$, $x = 4\frac{1}{3}$.
Focus	Solving Equations Using the Distributive Property	

15. Which circle has an area of approximately 28.26 square centimeters?

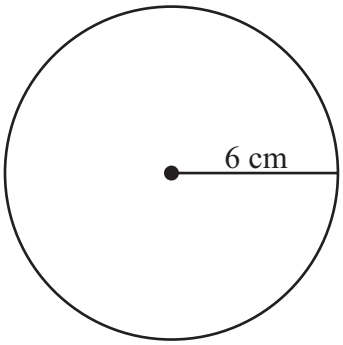
A.



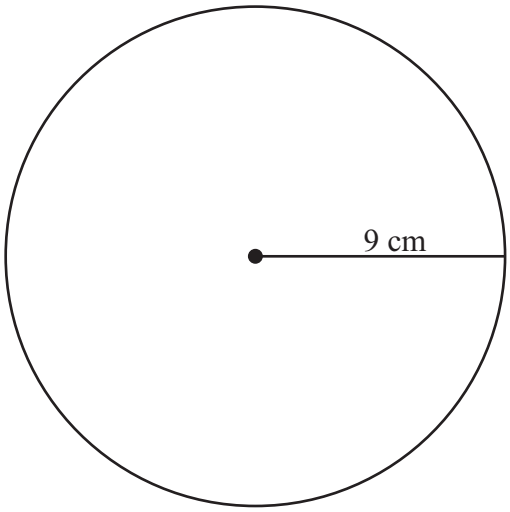
B.



C.



D.



Item Information		
Alignment	MA 7.3.3.c	Determine the area and circumference of circles both on and off the coordinate plane.
Answer Key	A	**Option Annotations**
Depth of Knowledge	2	The student is asked to identify the circle that has an area of approximately 28.26 square cm.
Focus	Area of Circles	Option A is the correct answer since $3.14(3^3) = 3.14(9) = 28.26$.
		Option B is incorrect since $3.14(4.5^2) = 3.14(20.25) = 63.59$.
		Option C is incorrect since $3.14(6^2) = 3.14(36) = 113.04$.
		Option D is incorrect since $3.14(9^2) = 3.14(81) = 254.34$.

16. Jim is creating a scale drawing of an airplane. The scale factor is one inch equals seven feet. The length of the actual airplane is 52 feet. What is the length of the airplane in the scale drawing?

A. $\frac{7}{52}$ inch

B. $7\frac{3}{7}$ inches

C. 45 inches

D. 59 inches

Item Information		
Alignment	MA 7.2.3.f	Solve real-world problems involving scale drawings using a proportional relationship.
Answer Key	B	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the problem using the given scale factor. Option B is the correct answer since $\frac{1}{7} = \frac{x}{52}$, $7x = 52$, $\frac{7x}{7} = \frac{52}{7}$, $x = 7\frac{3}{7}$. Option A is incorrect since the fraction $\frac{52}{7}$ is inverted as $\frac{7}{52}$. Option C is incorrect since the scale factor is treated as a subtrahend of 7, as in $52 - 7 = 45$. Option D is incorrect since the scale factor is treated as an addend of 7, as in $52 + 7 = 59$.
Focus	Scale Drawings	

17. Juan spins two different fair spinners. One spinner has numbers 1–8. The other has letters A–F. What is the probability that one spinner will land on 3 and the other will land on C?

A. $\frac{1}{48}$

B. $\frac{1}{16}$

C. $\frac{1}{14}$

D. $\frac{1}{7}$

Item Information		
Alignment	MA 7.4.3.c	Find theoretical probabilities for independent events.
Answer Key	A	**Option Annotations**
Depth of Knowledge	2	The student is asked to find the theoretical probability of the independent events given. Option A is the correct answer since the probability of one spinner landing on 3 is $\frac{1}{8}$ and the probability of the other spinner landing on C is $\frac{1}{6}$, and $\frac{1}{8} \bullet \frac{1}{6} = \frac{1}{48}$. Option B is incorrect since the denominator represents the total number of possible outcomes, and 16 is not the total number of outcomes. Option C is incorrect since the denominators 6 and 8 are added to make 14 in $\frac{1}{14}$. Option D is incorrect since the fractions $\frac{1}{6}$ and $\frac{1}{8}$ are averaged to make $\frac{1}{7}$.
Focus	Finding Theoretical Probabilities for Independent Events	

18. Use the table below to answer the question.

Elizabeth's Number Cube Experiment

Number	Tally	Total
1	||	2
2	|	1
3	||	2
4	||||	4
5	~~||||~~ |	6
6	|||	3
	Total	18

The table shows Elizabeth's results from rolling a fair number cube. How does the set of data from Elizabeth's experiment compare to the theoretical probability?

A. The number 1 occurred more than expected.

B. The number 4 occurred more than expected.

C. The number 5 occurred less than expected.

D. The number 6 occurred less than expected.

Item Information		
Alignment	MA 7.4.3.f	Compare and contrast theoretical and experimental probabilities.
Answer Key	B	**Option Annotations**
Depth of Knowledge	2	The student is asked to compare the experimental and theoretical probabilities for the given situation. Option B is the correct answer since the number four occurred 4 times, which is more than the expected occurrence (based on theoretical probability) of 3 times. Option A is incorrect since the number one occurred 2 times, which is less than the expected occurrence of 3 times. Option C is incorrect since the number five occurred 6 times, which is more than the expected occurrence of 3 times. Option D is incorrect since the number six occurred 3 times, which is the expected occurrence.
Focus	Comparing Theoretical and Experimental Probabilities	

19. What is the value of k when $4 - 2k = -3$?

A. $k = -3.5$

B. $k = -0.5$

C. $k = 0.5$

D. $k = 3.5$

Item Information		
Alignment	MA 7.2.2.d	Solve two-step equations involving rational numbers which include the integers.
Answer Key	D	**Option Annotations**
Depth of Knowledge	2	The student is asked to solve the equation to find the value of the variable. Option D is the correct answer since $4 - 2k = -3$, $4 - 4 - 2k = -3 - 4$, $-2k = -7$, $k = \frac{-7}{-2}$, or $k = 3.5$. Option A is incorrect since –3.5 is the opposite of the value of the variable. Option B is incorrect since $k = -0.5$ is the solution to $-4 - 2k = -3$, $-4 + 4 - 2k = -3 + 4$, $-2k = 1$, $k = -\frac{1}{2}$, or $k = -0.5$. Option C is incorrect since 0.5 is the opposite of the value of the variable in option B.
Focus	Solving Two-Step Equations with Integers	

20. Amy purchased a gaming device for $99.99. She also purchased 3 games for $11.99 each and x games for $14.99 each. She spent a total of $165.94. Which equation can be used to find x?

A. $99.99 - 11.99(3) - 14.99x = 165.94$

B. $99.99 - 11.99x - 14.99(3) = 165.94$

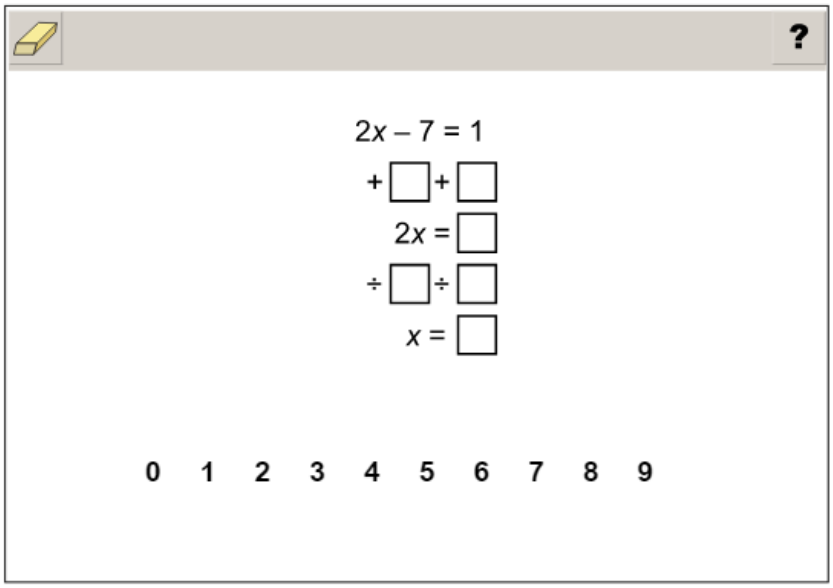
C. $99.99 + 11.99(3) + 14.99x = 165.94$

D. $99.99 + 11.99x + 14.99(3) = 165.94$

Item Information		
Alignment	MA 7.2.3.a	Describe and write linear equations from words and tables.
Answer Key	C	**Option Annotations**
Depth of Knowledge	3	The student is asked to write an equation that represents the given situation. Option C is the correct answer since the equation shows the numbers of games bought at each price correctly multiplied and the cost of the games added to the cost of the gaming device. Option A is incorrect since the equation shows the cost of the games subtracted from the cost of the gaming device. Option B is incorrect since the equation shows the numbers of games bought at each price in reverse, and the cost of the games subtracted from the cost of the gaming device. Option D is incorrect since the equation shows the numbers of games bought at each price in reverse.
Focus	Writing Linear Equations from Words	

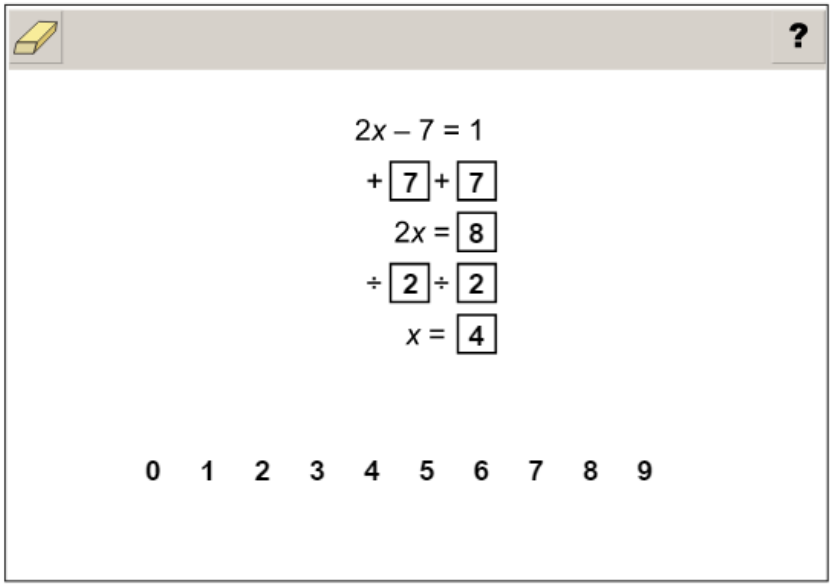
AUTO-SCORED CONSTRUCTED RESPONSE ITEMS

21. Move the numbers into the boxes to show the steps in solving the equation.



Answer Key – Completed Correct Response

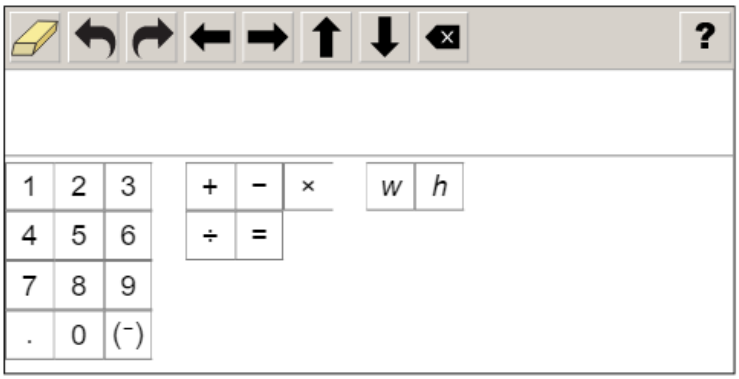
Move the numbers into the boxes to show the steps in solving the equation.



Item Information		
Alignment	MA 7.2.2.d	Solve two-step equations involving rational numbers which include the integers.
Answer Key	See Completed Correct Response	**Option Annotations** The student is asked to move numbers into the boxes to show the steps in solving the given equation. The number 7 belongs in both of the top boxes since the first step in solving the equation is adding 7 to both sides of the equal sign. The number 8 belongs in the box in the second row since 1 + 7 = 8. The number 2 belongs in both boxes in the third row since dividing by 2 on both sides of the equal sign is the next step in solving the equation. The number 4 belongs in the bottom box since 8 ÷ 2 = 4, and 4 is the solution to the equation.
Depth of Knowledge	1	
Focus	Solving Two-Step Equations	

22. The water in a pool drains at a rate of 7 inches per hour. When full, the water in the pool is 56 inches deep.

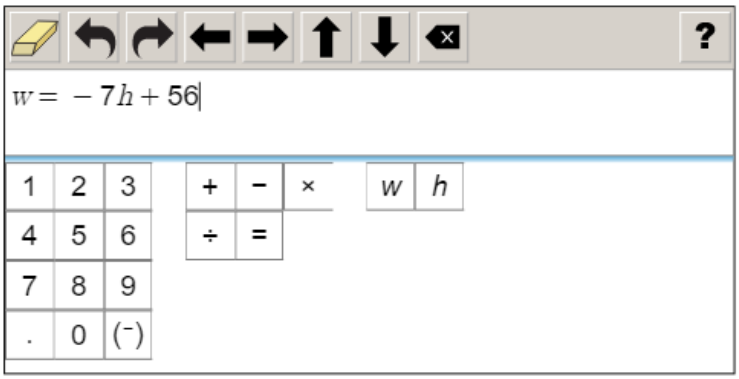
Enter an equation that represents the height of the water, *w*, after it has been draining for *h* hours.



Answer Key – Completed Correct Response

The water in a pool drains at a rate of 7 inches per hour. When full, the water in the pool is 56 inches deep.

Enter an equation that represents the height of the water, *w*, after it has been draining for *h* hours.



Item Information		
Alignment	MA 7.2.3.a	Describe and write linear equations from words and tables.
Answer Key	See Completed Correct Response	**Option Annotations** The student is asked to write an equation that describes the given situation. The equation that should be entered is $w = -7h + 56$ or equivalent, since the rate of change is –7 and the initial value is 56.
Depth of Knowledge	2	
Focus	Writing Linear Equations	

23. **Use the circle graph below to answer the question.**

The circle graph shows all of the different expenses Jane has during her first semester at college. Select **all** of the statements that are true. Select **all**.

(a) More than 50% of Jane's expenses is her tuition.

(b) Jane spends about the same amount on housing as food.

(c) Jane spends more on misc. than books.

(d) Close to 25% of Jane's expenses are food and housing.

(e) Less than 75% of Jane's expenses are tuition and housing.

Answer Key – Completed Correct Response

Use the circle graph below to answer the question.

The circle graph shows all of the different expenses Jane has during her first semester at college. Select **all** of the statements that are true. Select **all**.

(a) More than 50% of Jane's expenses is her tuition.

(b) Jane spends about the same amount on housing as food.

(c) Jane spends more on misc. than books.

(d) Close to 25% of Jane's expenses are food and housing.

(e) Less than 75% of Jane's expenses are tuition and housing.

Item Information		
Alignment	MA 7.4.2.a	Solve problems using information presented in circle graphs.
Answer Key	B, D, E	**Option Annotations**
Depth of Knowledge	2	The student is asked to use the information in the circle graph to determine which statements are true. Options B, D, and E are the correct answers since the statements are true. Option A is incorrect since less than 50% of Jane's expenses is her tuition. Option C is incorrect since Jane spends less on misc. than books.
Focus	Solving Problems with Circle Graphs	

NeSA-MATHEMATICS
ITEM AND SCORING SAMPLER
GRADE 7