MATHEMATICS

Description of Test Format and Organization

The Georgia Milestones EOG assessment is primarily a criterion-referenced test, designed to provide information about how well a student has mastered the grade-level state-adopted content standards in Mathematics. Each student will receive one of four proficiency levels, depending on how well the student has mastered the content standards. In addition to criterion-referenced information, the Georgia Milestones measures will also include a limited sample of nationally norm-referenced items to provide a signal of how Georgia students are achieving relative to their peers nationally. The norm-referenced information provided is supplementary to the criterion-referenced proficiency designation and will not be utilized in any manner other than to serve as a barometer of national comparison. Only the criterion-referenced scores and proficiency designations will be utilized in the accountability metrics associated with the assessment program (such as student growth measures, educator effectiveness measures, or the CCRPI).

The Grade 7 Mathematics EOG assessment consists of a total of 73 items, 64 of which are operational items (and contribute to a student's criterion-referenced and/or norm-referenced score) and 9 of which are field test items (newly written items that are being tried out and do not contribute to the student's score). The criterion-referenced score, and proficiency designation, is comprised of 53 items, for a total of 58 points. Students will respond to a variety of item types, including selected-response, constructed-response, and extended constructed-response items. Of the 64 operational items, 20 will be norm-referenced and will provide a national comparison in the form of a national percentile rank. Nine of the items have been verified as aligned to the course content standards by Georgia educators and will therefore contribute to the criterion-referenced proficiency designation. The other 11 items will contribute only to the national percentile rank and be provided as supplemental information. Only items that are aligned to the state-adopted content standards will be utilized to inform the criterion-referenced score.

With the inclusion of the norm-referenced items, students may encounter items for which they have not received direct instruction. These items will not contribute to the student's criterion-referenced proficiency designation; only items that align to the course content standards will contribute to the criterion-referenced score. Students should be instructed to try their best should they ask about an item that is not aligned to the content they have learned as part of the course.

Grade 7 Mathematics EOG Assessment Design

Description	Number of Items	Points for CR[1] Score	Points for NRT[2] Feedback
CR Selected-Response Items	41	41	0
NRT Selected-Response Items	20[3]	9[4]	20
CR Constructed-Response Items	3	8	0
CR Field Test Items	9	0	0
Total Items/Points[5]	**73**	**58**	**20**

[1]CR—Criterion-Referenced: items aligned to state-adopted content standards
[2]NRT—Norm-Referenced Test: items that will yield a national comparison; may or may not be aligned to state-adopted content standards
[3]Of these items, 9 will contribute to both the CR scores and NRT feedback. The other 11 of these items will contribute to NRT feedback only and will not impact the student's proficiency designation, scale score, or grade conversion.
[4]Alignment of national NRT items to course content standards was verified by a committee of Georgia educators. Only approved, aligned NRT items will contribute to a student's CR proficiency designation, scale score, and grade conversion score.
[5]Total number of items contributing to CR score: 53; total points: 58; total number of items contributing to NRT feedback: 20; total points: 20

The test will be given in two sections. Section 1 is divided into two parts. Students may have up to 80 minutes per section to complete Sections 1 and 2. The total estimated testing time for the Grade 7 Mathematics EOG assessment ranges from approximately 120 to 160 minutes. Total testing time describes the amount of time students have to complete the assessment. It does not take into account the time required for the test examiner to complete pre-administration and post-administration activities (such as reading the standardized directions to students). Sections 1 and 2 must be scheduled to be administered on the same day in one test session following the district's testing protocols for the EOG measures (in keeping with state guidance).

During the Mathematics EOG assessment, a formula sheet will be available for students to use. There is an example of the formula sheet in the Additional Sample Items section of this guide. Another feature of the Grade 7 Mathematics EOG assessment is that students may use a scientific calculator in Part 1 of Section 1 and in all of Section 2.

Content Measured

The Grade 7 Mathematics assessment will measure the standards that are enumerated for Grade 7 as described on www.georgiastandards.org.

The content of the assessment is organized into five groupings, or domains, of standards for the purposes of providing feedback on student performance. A content domain is a reporting category that *broadly* describes and defines the content of the course, as measured by the EOG assessment. The standards for Grade 7 Mathematics are grouped into five domains: Ratios and Proportional Relationships, The Number System, Equations and Expressions, Geometry, and Statistics and Probability. Each domain was created by organizing standards that share similar content characteristics. The content

standards describe the level of expertise that Grade 7 Mathematics educators should strive to develop in their students. Educators should refer to the content standards for a full understanding of the knowledge, concepts, and skills subject to be assessed on the EOG assessment.

The approximate proportional number of points associated with each domain is shown in the following table. A range of cognitive levels will be represented on the Grade 7 Mathematic s EOG assessment. Educators should always use the content standards when planning instruction.

Grade 7 Mathematics: Domain Structures and Content Weights

Domain	Standard		Approximate Weight
Rations and Proportional Relationships	MCC7RP1 MCC7RP2 MCC7RP3		19%
The Number System	MCC7NS1 MCC7NS2 MCC7NS3		21%
Equations and Expressions	MCC7EE1 MCC7EE2 MCC7EE3 MCC7EE4		17%
Geometry	MCC7G1 MCC7G2 MCC7G3	MCC7G4 MCC7G5 MCC7G3	23%
Statistics and Probability	MCC7SP1 MCC7SP2 MCC7SP3 MCC7SP4	MCC7SP5 MCC7SP6 MCC7SP7 MCC7SP8	20%

Item Types

The Mathematics portion of the Grade 7 EOG assessment consists of selected-response, constructed-response, and extended constructed-response items.

A selected-response item, sometimes called a multiple-choice item, is defined as a question, problem, or statement that appears on a test followed by several answer choices, sometimes called options or response choices. The incorrect choices, called distractors, usually reflect common errors. The student's task is to choose, from the alternatives provided, the best answer to the question posed in the stem (the question). The Mathematics selected-response items will have four answer choices.

A constructed-response item asks a question and solicits the student to provide a response he or she constructs on his or her own, as opposed to selecting from options provided. The constructed-response items on the EOG assessment will be worth two points. Partial credit may be awarded.

An extended constructed-response item is a specific type of constructed-response item that elicits a longer, more detailed response from the student than a two-point constructed-response item. The extended constructed-response items on the EOG assessment will be worth four points. Partial credit may be awarded.

Mathematics Example Items

Example items, which are representative of three DOK levels across various Grade 7 Mathematics content domains, are provided on the following pages. **All example and sample items contained in this guide are the property of the Georgia Department of Education.**

Example Item 1

DOK Level: 1

Mathematics Grade 7 Content Domain: Statistics & Probability

Standard: MCC7SP5. Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around $\frac{1}{2}$ indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.

Which of these probability values indicates an event that is MOST LIKELY to happen?

A $\frac{1}{17}$

B $\frac{3}{17}$

C $\frac{3}{20}$

D $\frac{17}{20}$

Correct Answer: D

Explanation of Correct Answer: The correct answer is choice (D) $\frac{17}{20}$. Choice (A) is incorrect because it is the probability value that is least likely. Choices (B) and (C) are incorrect because they represent the probabilities of events that are less likely. Both fractions are less than $\frac{17}{20}$.

Example Item 2

DOK Level: 2

Mathematics Grade 7 Content Domain: Ratio & Proportional Relationships

Standard: MCC7RP2. Recognize and represent proportional relationships between quantities. c. Represent proportional relationships by equations.

A package of Little Bites dog cookies costs $9.20.

Which equation can be used to find the total cost, *c*, of *p* packages of dog cookies?

A $c = p + 9.20$

B $c = p - 9.20$

C $c = \frac{p}{9.20}$

D $c = 9.20p$

Correct Answer: D

Explanation of Correct Answer: The correct answer is choice (D) $c = 9.20p$. Choice (D) is correct because the total cost and the number of packages are in a proportional relationship, so the total cost is the product of the cost per package and the number of packages. Choice (A) is incorrect because it adds the number of packages and the price. Choice (B) is incorrect because it subtracts the price from the number of packages. Choice (C) is incorrect because it divides the number of packages by the cost per package, instead of multiplying.

Example Item 3

DOK Level: 3

Mathematics Grade 7 Content Domain: The Number System

Standard: MCC7NS2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers. a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

Which rational numbers when multiplied by $-\frac{1}{2}$ will result in a positive rational number as the product and why?

A   any negative rational number because the product of two negative rational numbers is a positive rational number

B   any even rational number because the product of a rational number and an even rational number is a positive rational number

C   any rational number greater than $\frac{1}{2}$ because the product of two rational numbers takes the sign of the greater rational number

D   any rational number greater than 0 because the product of a negative rational number and a positive rational number is a positive rational number

Correct Answer: A

Explanation of Correct Answer: The correct answer is choice (A) any negative rational number because the product of two negative rational numbers is a positive number. Choice (B) is incorrect because it assumes that the even/odd property of a number determines the sign of the number. Choice (C) is incorrect because it confuses the rules of addition and multiplication. Choice (D) is incorrect because it misstates the rule for multiplication of rational numbers.

Mathematics Additional Sample Items

This section has two parts. The first part is a set of 10 sample items for the Mathematics portion of the EOG assessment. The second part contains a table that shows for each item the standard assessed, the DOK level, the correct answer (key), and a rationale/explanation about the key and distractors. The sample items can be utilized as a mini-test to familiarize students with the item formats found on the assessment. **All example and sample items contained in this guide are the property of the Georgia Department of Education.**

Below are formulas you may find useful as you work the problems. However, some of the formulas may not be used. You may refer to this page as you take the test.

Circumference

$C = \pi d$ or $C = 2\pi r$ $\pi \approx 3.14$

Area

Rectangle $A = bh$ or $A = lw$

Triangle $A = \frac{1}{2}bh$

Circle $A = \pi r^2$

Pythagorean Theorem

$a^2 + b^2 = c^2$

Mean

$$\overline{x} = \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n}$$

Mean Absolute Deviation

$$\frac{\text{Total Distance (of all values from the mean value)}}{\text{Number of values}}$$

Interquartile Range: the difference between the first quartile and third quartile of a set of data

Volume

Right Prism $V = (\text{area of base}) \times (\text{height})$

Cylinder $V = \pi r^2 h$

Sphere $V = \frac{4}{3}\pi r^3$

Cone $V = \frac{1}{3}\pi r^2 h$

Item 1

Alicia shoots a basketball at a hoop 100 times. She hits the backboard and misses with $\frac{2}{5}$ of her shots, hits the rim and misses with 32% of her shots, and makes a basket with the rest of her shots.

How many baskets does she make?

A   68
B   40
C   32
D   28

Item 2

Of the 60 students who auditioned in a singing contest, 40% were asked to come back for a second audition. After the second audition, 6 students were asked to come back for a final audition.

What percentage of the students from the second audition were asked to come back for the final audition?

A   4%
B   10%
C   15%
D   25%

Item 3

**Figure 1 is a right rectangular pyramid, and Figure 2 is a right rectangular prism.**
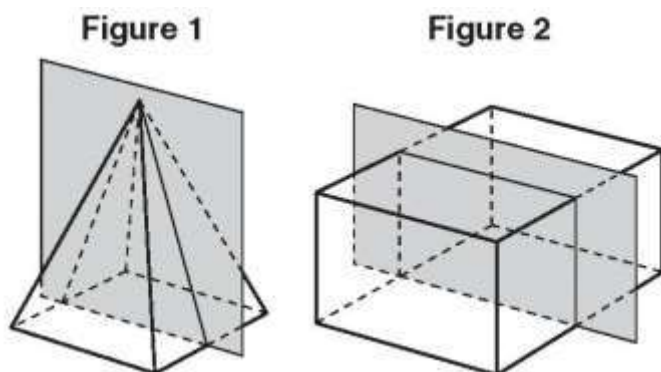
Which statement describes the cross-sections of each figure created by the shaded planes?

A   The cross-sections of both figures are rectangles.
B   The cross-sections of both figures are parallelograms that are not rectangles.
C   The cross-section of Figure 1 is a triangle, and the cross-section of Figure 2 is a rectangle.
D   The cross-section of Figure 1 is a trapezoid, and the cross-section of Figure 2 is a rectangle.

Item 4

Andrea made a spinner with a letter marked on each section. She said the probability of the arrow landing on *G* is $\frac{1}{4}$.

Which spinner could be the one that Andrea made?

A

B

C

D
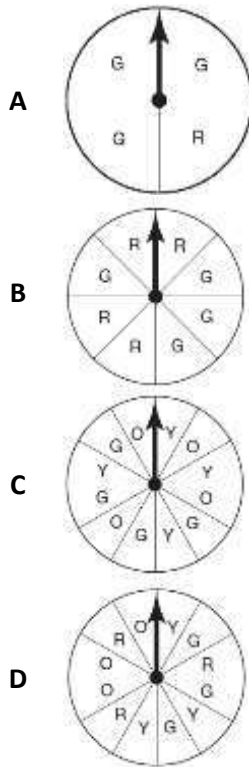
Item 5

Tara had $1\frac{5}{8}$ pounds of dried nuts. She ate $\frac{1}{4}$ pound of dried nuts each day for 6 days.

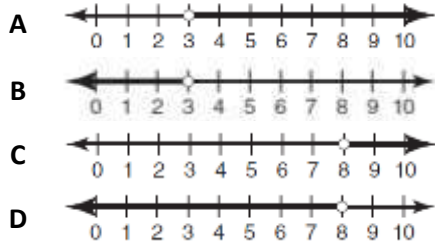How many pounds of dried nuts did Tara have left after 6 days?

A $\frac{1}{8}$

B $\frac{7}{8}$

C $1\frac{1}{2}$

D $1\frac{3}{8}$

Item 6

Look at the inequality.

$2x + 5 < 11$

Which number line shows the solution to this inequality?

A

B

C

D

Item 7

A processing machine crushes $3\frac{1}{4}$ kilograms of dry fruits in $\frac{3}{4}$ minute.

What is the rate, in kilograms per minute, at which the machine crushes dry fruits?

A $\frac{3}{13}$

B $\frac{16}{39}$

C $2\frac{7}{16}$

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

Item 8

A circle has a diameter of 14.5 inches.

Using 3.14 for π, what is the circumference of the circle, rounded to the nearest hundredth of an inch?

A   22.77 inches
B   45.53 inches
C   91.06 inches
D   165.05 inches

Item 9

A volcano in the ocean rises approximately 14,000 feet above sea level. Its base is approximately 20,000 feet below sea level.

What is the total height of the volcano? Show your work and write your answer in the space provided.

_____ feet

Item 10

A zoo wanted to know which animal exhibit is liked the most by children under 12 years of age. One day, zoo officials surveyed every 20th person leaving the zoo and asked them to name their favorite animal exhibit. Of the people surveyed, 73% reported that the elephant habitat was their favorite exhibit. The zoo officials concluded that children under 12 years of age like the elephant habitat the most.

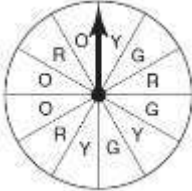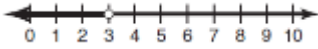**Part A: Describe the sample for this survey.**

_____

Part B: If 560 visitors were at the zoo on the day of the survey, what was the sample size for the survey?

_____

Part C: Was the survey random? Explain your answer.

_____

_____

Part D: Explain why the zoo's conclusion is invalid.

_____

_____

_____

Math Additional Sample Item Keys

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
1	MCC7EE3	2	D	The correct answer is choice (D) 28. Alicia hits the backboard with $\frac{2}{5}(100) = 40$ shots, hits the rim with $0.32(100) = 32$ shots, and makes $100 - 40 - 32 = 28$ shots. Choice (A) is incorrect because it does not subtract the number of shots that hit the backboard. Choice (B) is incorrect because it is the number of shots that hit the backboard. Choice (C) is incorrect because it is the number of shots that hit the rim.
2	MCC7RP3	2	D	The correct answer is choice (D) 25%. 40% of 60 is 24, and 6 out of 24 is 25%. Choice (A) is incorrect because it is the result of dividing 60 by 0.4 instead of multiplying, and then dividing 6 by that quotient. Choice (B) is incorrect because it is the result of dividing 6 by 60. Choice (C) is incorrect because it is the result of dividing 6 by 40.
3	MCC7G3	2	C	The correct answer is choice (C) The cross-section of Figure 1 is a triangle, and the cross-section of Figure 2 is a rectangle. The plane intersects Figure 1 perpendicular to its base and passing through its apex, so the cross-section is a triangle, and the plane intersects Figure 2 parallel to its rectangular faces. Choice (A) is incorrect because the plane does not intersect Figure 1 parallel to its base. Choice (B) is incorrect because the planes intersect the figures perpendicular to their bases. Choice (D) is incorrect because the plane passes through the apex of Figure 1.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
4	MCC7SP7a	2	D	The correct answer is choice (D) . The spinner is divided into 12 equal sections, three of which are marked "G." Since $\frac{3}{12} = \frac{1}{4}$, the probability of the arrow landing on G is $\frac{1}{4}$. Choice (A) is incorrect because three of the four sections are labeled "G," so the probability of landing on G is $\frac{3}{4}$. Choice (B) is incorrect because four of the eight sections are labeled "G," so the probability of landing on G is $\frac{1}{2}$. Choice (C) is incorrect because four out of the twelve sections are labeled "G," so the probability of landing on G is $\frac{1}{3}$.
5	MCC7NS3	2	A	The correct answer is choice (A) $\frac{1}{8}$. Tara ate $6 \times \frac{1}{4} = \frac{6}{4}$ pounds of nuts in 6 days, which is equivalent to $\frac{12}{8}$ pounds. So, she has $\frac{13}{8} - \frac{12}{8} = \frac{1}{2}$ pound left after 6 days. Choice (B) is incorrect because $\frac{6}{4}$ was incorrectly converted to $\frac{6}{8}$ and then subtracted from $1\frac{5}{8}$. Choice (C) is incorrect because it is the number of pounds of nuts that Tara ate, not the pounds left over. Choice (D) is incorrect because it is the result of subtracting $\frac{1}{4}$ from $1\frac{5}{8}$.
6	MCC7EE4b	2	B	The correct answer is choice (B) . Choice (A) is incorrect because the arrow is pointing in the wrong direction. Choice (C) is incorrect because the inequality was incorrectly solved by adding 5 to the right side instead of subtracting, and the arrow points in the wrong direction. Choice (D) is incorrect because the inequality was incorrectly solved by adding 5 to the right side instead of subtracting.

Item	Standard/ Element	DOK Level	Correct Answer	Explanation
7	MCC7RP1	2	D	The correct answer is choice (D) $4\frac{1}{3}$. Choice (A) is incorrect because it is the result of dividing the time by the weight instead of the weight by the time. Choice (B) is incorrect because it is the result of dividing the reciprocal of the time by the weight. Choice (C) is incorrect because it is the result of multiplying the weight by the time instead of dividing.
8	MCC7G4	2	B	The correct answer is choice (B) 45.53 inches. Choice (A) is incorrect because it is equal to $\frac{1}{2} \times \pi \times d$. Choice (B) is incorrect because it is equal to $2 \times \pi \times d$. Choice (C) is incorrect because it is the area of the circle.
9	MCC7NS1	2	N/A	See scoring rubric and exemplar responses on page 59.
10	MCC7SP1	3	N/A	See scoring rubric and exemplar responses beginning on page 60.

Math Example Scoring Rubrics and Exemplar Responses

Item 9

Scoring Rubric

Points	Description
2	The response achieves the following: • The response demonstrates a complete understanding of applying and extending previous understandings of addition and subtraction to add and subtract rational numbers. • Give 2 points for a correct response and a correct process shown. Response is correct and complete. • Response shows application of a reasonable and relevant strategy. • Mathematical ideas are expressed coherently through clear, complete, logical, and fully developed responses using words, calculations, and/or symbols as appropriate.
1	The response achieves the following: • The response demonstrates a minimal understanding of applying and extending previous understandings of addition and subtraction to add and subtract rational numbers. • Give 1 point for a correct response with no work shown. • Response shows application of a relevant strategy, though it may be only partially applied or remain unexplained. • Mathematical ideas are expressed only partially using words, calculations, and/or symbols as appropriate.
0	The response achieves the following: • The response demonstrates no understanding of applying and extending previous understandings of addition and subtraction to add and subtract rational numbers. • The student cannot determine the distance between the bird and the fish or add the positions together. • Response shows no application of a strategy or application of an irrelevant strategy. • Mathematical ideas cannot be interpreted or lack sufficient evidence to support even a limited understanding.

Exemplar Response

Points Awarded	Response
2	$12,000 + |{-}20,000| = 34,000$ *or other valid process* *AND* *34,000 feet*
1	*34,000 feet*
0	*Response is irrelevant, inappropriate, or not provided.*

Item 10

Scoring Rubric

Points	Description
4	The response achieves the following: • The response demonstrates that the student completely understands that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. • Response also demonstrates that the student completely understands that valid inferences must be supported by random sampling, which produces a representative sample. • Give 4 points if the student's response to all 4 parts is correct and complete. The response is correct and complete. • Mathematical ideas are expressed coherently through clear, complete, logical, and fully developed responses using words, calculations, and/or symbols as appropriate.
3	The response achieves the following: • The response demonstrates that the student mostly understands that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. • Response may also demonstrate that the student mostly understands that valid inferences must be supported by random sampling, which produces a representative sample. • Give 3 points if the student's response to 3 of the 4 parts is correct and complete. • Correct and complete responses express mathematical ideas using words, calculations, and/or symbols as appropriate.
2	The response achieves the following: • The response demonstrates that the student somewhat understands that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. • Response may also demonstrate that the student somewhat understands that valid inferences must be supported by random sampling which produces a representative sample. • Give 2 points if the student's response to 2 of the 4 parts is correct and complete. • Correct and complete responses express mathematical ideas using words, calculations, and/or symbols as appropriate.

Item 10

Scoring Rubric – continued

Points	Description
1	The response achieves the following: • The response demonstrates that the student has a limited understanding that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. • Response may also demonstrate that the student has a limited understanding that valid inferences must be supported by random sampling which produces a representative sample. • Give 1 point if the student's response to 1 of the 4 parts is correct and complete. • Correct and complete responses express mathematical ideas using words, calculations, and/or symbols as appropriate.
0	The response achieves the following: • The response demonstrates that the student has no understanding that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. • Give 0 points if the student's response to all of the 4 parts is incorrect, incomplete, or missing. • Response may also demonstrate that the student has no understanding that valid inferences must be supported by random sampling which produces a representative sample.

Exemplar Response

Points Awarded	Response
4	*Student's response contains all of the four key elements:* *Part A: Every 20th person leaving the zoo.* *Part B: 28* *Part C: Yes. By choosing systematically, the zoo officials ensured that each person had the same chance of being chosen.* *(or other valid explanation)* *Part D: The conclusion is not valid because the sample was not representative of the target population. The sample included people of all ages.* *(or other valid explanation)*

Item 10

Exemplar Response – continued

Points Awarded	Response
3	*Student's response contains three of the four key elements:* *Part A: Every 20th person leaving the zoo.* *Part B: 28* *Part C: Yes. By choosing systematically, the zoo officials ensured that each person had the same chance of being chosen.* *(or other valid explanation)* *Part D: The conclusion is not valid because the sample was not representative of the target population. The sample included people of all ages.* *(or other valid explanation)*
2	*Student's response contains two of the four key elements:* *Part A: Every 20th person leaving the zoo.* *Part B: 28* *Part C: Yes. By choosing systematically, the zoo officials ensured that each person had the same chance of being chosen.* *(or other valid explanation)* *Part D: The conclusion is not valid because the sample was not representative of the target population. The sample included people of all ages.* *(or other valid explanation)*
1	*Student's response contains one of the four key elements:* *Part A: Every 20th person leaving the zoo.* *Part B: 28* *Part C: Yes. By choosing systematically, the zoo officials ensured that each person had the same chance of being chosen.* *(or other valid explanation)* *Part D: The conclusion is not valid because the sample was not representative of the target population. The sample included people of all ages.* *(or other valid explanation)*
0	*Response is irrelevant, inappropriate, or not provided.*