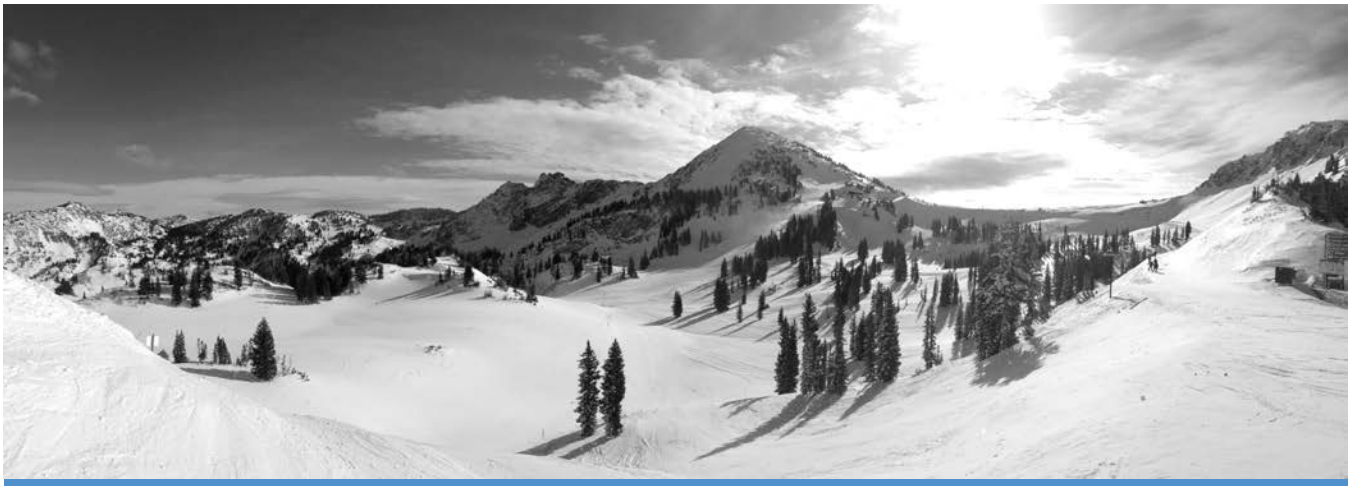
Colorado Measures of Academic Success



Grade 5 Mathematics

Answer Key with Scoring Rubrics

Practice Resource for Students

1123285 1 2 3 4 5 A B C D E Printed in the USA ISD33083

ANSWER KEY: ITEM SET 1

Item Set 1 - Question 1 (Fill in the Blank, Fill in the Blank)

A farmer has two different-sized rectangular gardens.

Part A

The smaller garden has a length of 24 feet and a width of 9 feet.

What is the area, in square feet, of the smaller garden?

Enter your answer in the box.

216

Part B

The larger garden has a length of 132 feet and a width of 24 feet.

What is the area, in square feet, of the larger garden?

Enter your answer in the box.

3168

Item Information		
Answer:	See Image	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
Evidence Statement:	5.Int.1	Solve one-step word problems involving multiplying multi-digit whole numbers. i) The given factors are such as to require an efficient/standard algorithm (e.g., 726 x 4,871). Factors in the task do not suggest any obvious ad hoc or mental strategy (as would be present for example in a case such as 7250 x 400). ii) The possibilities are 1-digit x 2-digit, 1-digit x 3-digit, 2-digit x 3-digit, 2-digit x 4-digit or 3-digit x 3-digit. iii) Word problems shall include a variety of grade-level appropriate applications and contexts.
Subclaim:	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.453	

Item Set 1 - Question 2 (Fill in the Blank, Selected Response)

Part A

Which amount is greater than four hundred forty-five and fifty-seven hundredths?

- A. Four hundred forty-five and five tenths
- B. Four hundred forty-five and seven tenths
- C. Four hundred forty-five and five thousandths
- D. Four hundred forty-five and fifty-seven thousandths

Part B

What is four hundred forty-five and fifty-seven hundredths rounded to the nearest tenth?

Enter your answer in the box.

445.6

Item Information		
Answer:	Part A = B, Part B = See Image	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NBT.A.3.a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).
	5.NBT.A.4	Use place value understanding to round decimals to any place.
Evidence Statement:	5.NBT.A.Int.1	Demonstrate understanding of the place value system by combining or synthesizing knowledge and skills articulated in 5.NBT.A. i) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.
Subclaim:	A - Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.292	

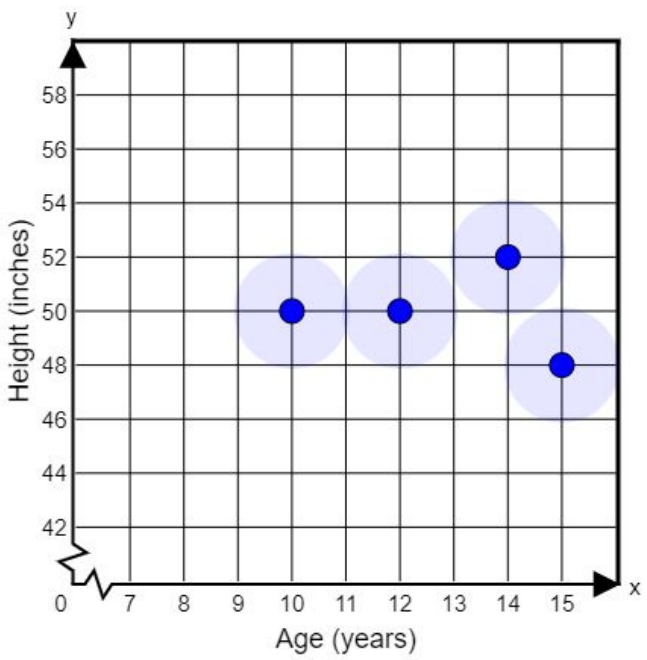
Item Set 1 - Question 3 (TEI Line Graph, Selected Response)

Four children are in line. Their age and height are shown in the table.

Child	Martha	Jason	Angie	Alex
Age (years)	12	15	10	14
Height (inches)	50	48	50	52

Part A

Graph the points for the age, x, in years, and height, y, in inches, of the four children.



Part B

The park rules allow children who are 12 years or older and at least 50 inches tall to go on the water ride.

Which coordinate pair could represent the age and height of a child that can go on the ride?

- A. $(11, 54)$
- B. $(12, 44)$
- C. $(13, 51)$
- D. $(14, 49)$

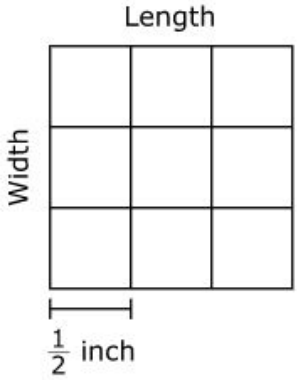
Item Information		
Answer:	Part A = See Image, Part B = C	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.G.A.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Evidence Statement:	5.G.2	Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.
Subclaim:	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.793	

Item Set 1 - Question 4 (TEI Slider, Constructed Response)

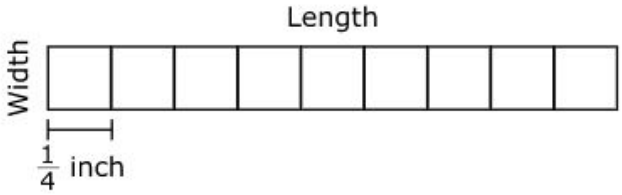
Student A and Student B created patterns using square tiles.

- The pattern created by each student is made up of 9 square tiles.
- Each tile in the pattern for Student A has a side length of $\frac{1}{2}$ inch.
- Each tile in the pattern for Student B has a side length of $\frac{1}{4}$ inch.

Student A Pattern



Student B Pattern

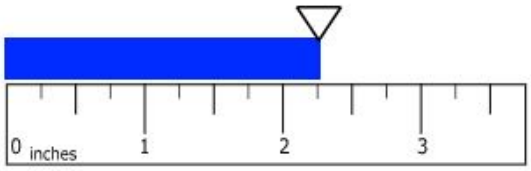


not to scale

Part A

What is the length, in inches, of the pattern for Student B?

Adjust the slider by dragging the end of the slider to the correct length.



Part B

- Find the area, in square inches, of the pattern for Student A.
- Explain how to find the area of the pattern for Student B using a different method than the one used to find the area of the pattern for Student A.

Enter your answer and your explanation in the space provided.

Item Information		
Answer:	See Scoring Rubric and Sample Student Responses	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NF.B.4.b	Find the area of a rectangle with fractional side lengths by tiling it with unit squares of the appropriate unit fraction side lengths, and show that the area is the same as would be found by multiplying the side lengths. Multiply fractional side lengths to find areas of rectangles, and represent fraction products as rectangular areas.
Evidence Statement:	5.C.4-2	Base arithmetic explanations/reasoning on concrete referents such as diagrams (whether provided in the prompt or constructed by the student in her response), connecting the diagrams to a written (symbolic) method. Content Scope: Knowledge and skills articulated in 5.NF.4b.
Subclaim:	C - Expressing Mathematical Reasoning	The student expresses grade/course-level appropriate mathematical reasoning by constructing viable arguments, critiquing the reasoning of others, and/or attending to precision when making mathematical statements.
Score Point Distribution:	1.8% of students earned 3 points. 6.8% of students earned 2 points. 32.5% of students earned 1 point. 58.9% of students earned 0 points.	

Scoring Rubric – Part A (Machine Scored)	
Points	**Attributes**
1	**Computation Component:** Correct length, in inches, of the pattern for Student B: Slider points to $2\frac{1}{4}$
0	Student response is incorrect or irrelevant.

Scoring Rubric – Part B	
Points	**Attributes**
2	Student response includes each of the following 2 elements. • **Computation component**: Correct area, in square inches, of the pattern for Student A. • **Reasoning component**: Valid work or explanation of a different way to find the area of the pattern for Student B using a different method then the one used to find the area of the pattern for Student A.
1	Student response includes 1 of the 2 elements.
0	Student response is incorrect or irrelevant.
Sample Student Response	For Pattern A to find the area I will just do the area of the tiny square first. It is $\frac{1}{4}$ sq. in. for each square since $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. Since there are 9 tiny squares that make up the 1 big square I am going to multiply $\frac{1}{4}$ by 9. $\frac{1}{4} \times 9 = 2\frac{1}{4}$. The area for pattern A is $2\frac{1}{4}$. For pattern B there are 9 squares that make a rectangle. The length and width are $\frac{1}{4}$ in. Since there are 9 squares and each have $\frac{1}{4}$ in. for length I will do $\frac{1}{4}$ times 9. This is $2\frac{1}{4}$. The width only has 1 square so it will stay as $\frac{1}{4}$ so to find the area you have to multiply $\frac{1}{4} \times 2\frac{1}{4}$. The area is $\frac{9}{16}$.

Annotation for Sample Student Response	**Score Point 2** The response receives full credit. It includes each of the 2 required elements. **Computation Component:** • **Student Response:** The area for pattern A is $2\frac{1}{4}$. ○ **Rationale for Score:** The student finds the correct area of the pattern for Student A ($2\frac{1}{4}$). **Reasoning Component:** • **Student Response:** For Pattern A . . . It is $\frac{1}{4}$ sq. in. for each square since $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$. Since there are 9 tiny squares that make up the 1 big square I am going to multiply $\frac{1}{4}$ by 9. $\frac{1}{4} \times 9 = 2\frac{1}{4}$. . . For pattern B . . . there are 9 squares and each have $\frac{1}{4}$ in. for length I will do $\frac{1}{4}$ times 9. This is $2\frac{1}{4}$. The width only has 1 square so it will stay as $\frac{1}{4}$ so to find the area you have to multiply $\frac{1}{4} \times 2\frac{1}{4}$. The area is $\frac{9}{16}$. ○ **Rationale for score:** The student explains a different way to find the area of the pattern for Student B using a different method than the one used to find the area of the pattern for Student A. The area of pattern A is determined by finding the area of each square in the pattern ($\frac{1}{4}$ sq. in. for each square since $\frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$), then multiplying the total number of squares by the individual area of each square to find the total area of the pattern ($\frac{1}{4} \times 9 = 2\frac{1}{4}$). A different method to find the area of Pattern B is used. The student multiplies the length of the pattern by the width of the pattern to find the total area of pattern B (multiply $\frac{1}{4} \times 2\frac{1}{4}$. The area is $\frac{9}{16}$). **Note:** Sample student responses are not representative of all correct answers for an item and are only provided as a guide to assist teachers with scoring.

Item Set 1 - Question 5 (Selected Response)

What is the value of the expression $\frac{11}{8} + \frac{1}{5}$?

- A. $\frac{3}{10}$
- B. $\frac{12}{13}$
- C. $\frac{63}{40}$
- D. $\frac{15}{8}$

Item Information		
Answer:	C	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NF.A.1	Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad + bc)/bd.)
Evidence Statement:	5.NF.1-1	Add two fractions with unlike denominators, or subtract two fractions with unlike denominators, by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. For example, 2/3 + 5/4 = 8/12 + 15/12 = 23/12. (In general, a/b + c/d = (ad+bc)/bd.) i) Tasks do not have a context. ii) Tasks ask for the answer or ask for an intermediate step that shows evidence of using equivalent fractions as a strategy. iii) Tasks do not include mixed numbers. iv) Tasks may involve fractions greater than 1 (including fractions equal to whole numbers). v) Prompts do not provide visual fraction models; students may at their discretion draw visual fraction models as a strategy.
Subclaim:	A - Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.503	

Item Set 1 - Question 6 (Selected Response; Selected Response)

Part A

A frog wants to reach a pond that is 10 feet away. The frog hops 5 times. Each hop is 18 inches.

How many more inches does the frog need to travel to reach the pond?

- (●) A. 30
- ( ) B. 90
- ( ) C. 102
- ( ) D. 138

Part B

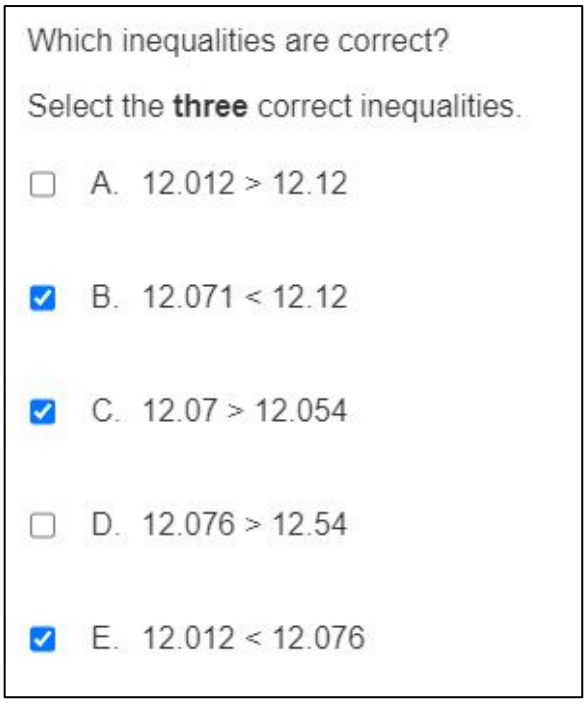
The frog has two ways to reach the pond. The frog could hop on grass for 10 feet or hop on the sidewalk for 4 yards and 1 foot to reach the pond.

Which statement is true?

- ( ) A. The grass route is 72 inches shorter than the sidewalk route.
- ( ) B. The sidewalk route is 5 feet shorter than the grass route.
- (●) C. The sidewalk route is 1 yard longer than the grass route.
- ( ) D. The sidewalk route is 2 feet longer than the grass route.

Item Information		
Answer:	Part A = A, Part B = C	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.MD.A.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.
Evidence Statement:	5.MD.1-2	Solve multi-step, real world problems requiring conversion among different-sized standard measurement units within a given measurement system. i) Multi-step problems must have at least 3 steps.
Subclaim:	B - Supporting Content	The student solves problems involving the Additional and Supporting Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.376	

Item Set 1 - Question 7 (Multiple Select)

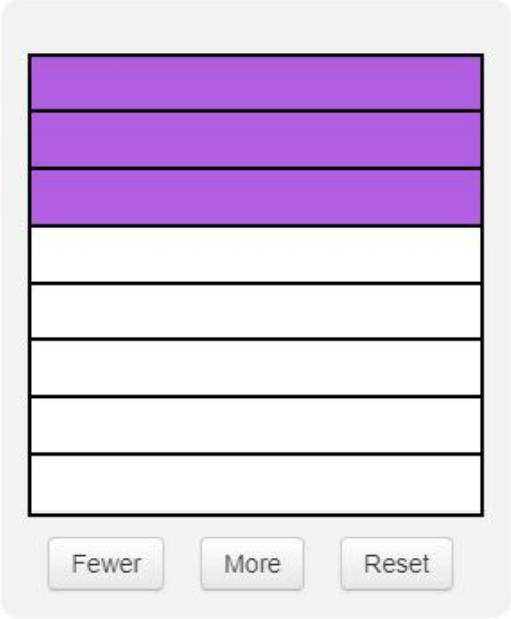


Item Information		
Answer:	B, C, E	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NBT.A.3.b	Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
Evidence Statement:	5.NBT.3b	Read, write, and compare decimals to the thousandths. b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons. i) Tasks assess conceptual understanding, e.g., by including a mixture (both within and between items) of expanded form, number names, and base ten numerals. ii) Tasks have "thin context" or no context.
Subclaim:	A - Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	0.49	

Item Set 1 - Question 8 (TEI Fraction Model)

Create a fraction model to show the answer to $\frac{1}{2} \times \frac{3}{4}$.

Divide the figure into the correct number of equal parts by using the More and Fewer buttons. Then shade by selecting the part or parts.



Item Information		
Answer:	See Image	
Colorado Academic Standards (CAS) Evidence Outcomes:	5.NF.B.4.a	Interpret the product (a/b) × q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a × q ÷ b. For example, use a visual fraction model to show (2/3) × 4 = 8/3, and create a story context for this equation. Do the same with (2/3) × (4/5) = 8/15. (In general, (a/b) × (c/d) = ac/bd.)
Evidence Statement:	5.NF.4a-2	Apply and extend previous understandings of multiplication to multiply a fraction or whole number by a fraction. a. For a fraction q, interpret the product (a/b) x q as a parts of a partition of q into b equal parts; equivalently, as the result of a sequence of operations a x q ÷ b. For example, use a visual fraction model to show (2/3) x 4 = 8/3, and create a story context for this equation. Do the same with (2/3) x (4/5) = 8/15. (In general, (a/b) x (c/d) = ac/bd.) i) Tasks require finding a product of two fractions (neither of the factors equal to a whole number). ii) The result is equal to a whole number in 20% of tasks; these are practice-forward for MP.7. iii) Tasks have "thin context" or no context.
Subclaim:	A - Major Content	The student solves problems involving the Major Content for her grade/course with connections to the Standards for Mathematical Practice.
P Value:	Not Available	