# Pennsylvania PSSA 2018 Grade 5 Math

## Reference Materials
## Page 2

## Exam & Answer Key Materials
## Pages 3 - 37

# Grade 5 Formula Sheet

Formulas and conversions that you may need on this test are found below.
You may refer back to this page at any time during the mathematics test.

2018
Grade 5

### Standard Conversions

1 mile (mi) = 1,760 yards (yd)
1 mile = 5,280 feet (ft)
1 yard (yd) = 3 feet (ft)
1 foot = 12 inches (in.)

1 ton (T) = 2,000 pounds (lb)
1 pound = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)
1 quart = 2 pints (pt)
1 pint = 2 cups (c)
1 cup = 8 fluid ounces (fl oz.)

### Metric Conversions

1 kilometer (km) = 1,000 meters (m)
1 meter = 100 centimeters (cm)
1 centimeter = 10 millimeters (mm)

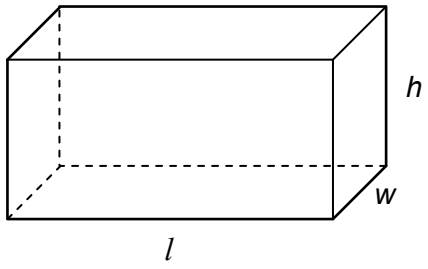
1 kilogram (kg) = 1,000 grams (g)

1 liter (L) = 1,000 milliliters (mL)

### Time Conversions

1 century = 10 decades
1 decade = 10 years (yr)
1 year (yr) = 12 months (mo)
1 year = 52 weeks (wk)
1 year = 365 days
1 week = 7 days
1 day = 24 hours (hr)
1 hour = 60 minutes (min)
1 minute = 60 seconds (sec)

### Rectangular Prism




Volume = length × width × height
$V = l \times w \times h$

Volume = area of the base × height
$V = B \times h$

Volume = area of the base × width
$V = B \times w$

Volume = area of the base × length
$V = B \times l$

pennsylvania
DEPARTMENT OF EDUCATION

# The Pennsylvania System of School Assessment

## Mathematics
## Item and Scoring Sampler

## 2018–2019
## Grade 5

Pennsylvania Department of Education Bureau of Curriculum, Assessment and Instruction—September 2018

## Mathematics Test Directions

On the following pages are the mathematics questions.

- You may not use a calculator for question 1. You may use a calculator for all other questions on this test.

**Directions for Multiple-Choice Questions:**

Some questions will ask you to select an answer from among four choices.

For the multiple-choice questions:

- First solve the problem on scratch paper.
- Choose the correct answer and record your choice in the answer booklet.
- If none of the choices matches your answer, go back and check your work for possible errors.
- Only one of the answers provided is the correct response.

**Directions for Open-Ended Questions:**

Some questions will require you to write your response.

For the open-ended questions:

- These questions have more than one part. Be sure to read the directions carefully.
- You cannot receive the highest score for an open-ended question without completing all tasks in the question. For example, if the question asks you to show your work or explain your reasoning, be sure to show your work or explain your reasoning in the space provided.
- If the question does **not** ask you to show your work or explain your reasoning, you may use the space provided, but only those parts of your response that the question specifically asks for will be scored.
- Write your response in the appropriate location within the response box in the answer booklet. Some answers may require graphing, plotting, labeling, drawing, or shading. If you use scratch paper, be sure to transfer your final response and any needed work or reasoning to the answer booklet.

## General Description of Scoring Guidelines for Mathematics Open-Ended Questions

**4— The response demonstrates a *thorough* understanding of the mathematical concepts and procedures required by the task.**

The response provides correct answer(s) with clear and complete mathematical procedures shown and a correct explanation, as required by the task. Response may contain a minor "blemish" or omission in work or explanation that does not detract from demonstrating a *thorough* understanding.

**3— The response demonstrates a *general* understanding of the mathematical concepts and procedures required by the task.**

The response and explanation (as required by the task) are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a *general* understanding.

**2— The response demonstrates a *partial* understanding of the mathematical concepts and procedures required by the task.**

The response is somewhat correct with *partial* understanding of the required mathematical concepts and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

**1— The response demonstrates a *minimal* understanding of the mathematical concepts and procedures required by the task.**

**0— The response has no correct answer and *insufficient* evidence to demonstrate any understanding of the mathematical concepts and procedures required by the task for that grade level.**

Special Categories within zero reported separately:

**Blank**.....Blank, entirely erased, entirely crossed out, or consists entirely of whitespace

**Refusal**.....Refusal to respond to the task

**Off Task**.....Makes no reference to the item but is not an intentional refusal

**Foreign Language**.....Written entirely in a language other than English

**Illegible** .....Illegible or incoherent

**Question 1 in this sampler is to be solved without the use of a calculator.**

## MULTIPLE-CHOICE ITEMS

**1.** Subtract: $7\frac{1}{2} - \frac{2}{3}$

A. $2\frac{1}{6}$

B. $3\frac{5}{6}$

C. $6\frac{5}{6}$

D. $7\frac{1}{6}$

| Item Information | |
|---|---|
| Alignment | A-F.1.1.1 |
| Answer Key | C |
| Depth of Knowledge | 1 |
| *p*-value A | 8% |
| *p*-value B | 7% |
| *p*-value C | 52% (correct answer) |
| *p*-value D | 33% |
| Option Annotations | A. solves $\frac{15}{2} - \frac{2}{3} = \frac{15}{6} - \frac{2}{6} = \frac{13}{6}$<br>B. solves $\frac{9}{2} - \frac{2}{3} = \frac{27}{6} - \frac{4}{6} = \frac{23}{6}$<br>C. correct<br>D. solves $\left(7 + \left(\frac{2}{3} - \frac{1}{2}\right)\right)$ |

**A calculator is permitted for use in solving questions 2–17 in this sampler.**

**2.** Jon rides his bike 0.23 mile. Angie rides her bike 100 times as far as Jon rides. How many miles does Angie ride her bike?

A. 2.3

B. 23

C. 230

D. 2,300

| Item Information | |
|---|---|
| Alignment | A-T.1.1 |
| Answer Key | B |
| Depth of Knowledge | 1 |
| *p*-value A | 9% |
| *p*-value B | 71% (correct answer) |
| *p*-value C | 11% |
| *p*-value D | 9% |
| Option Annotations | A. confuses 10 times and 100 times<br>B. correct<br>C. selects an answer that is in the hundreds<br>D. multiplies 23 and 100 |

**3.** The chart below shows the number of rocking chairs a factory made in the first three months of a year and the number of rocking chairs that the factory shipped for each of those months.

**Rocking Chair Factory**

| Month | Number of Rocking Chairs Made | Number of Rocking Chairs Shipped |
|---|---|---|
| January | 4,228 | 2,987 |
| February | 3,165 | 4,000 |
| March | 3,784 | 3,985 |

How many rocking chairs that were made in the first three months of the year remain to be shipped?

A. 201

B. 205

C. 1,241

D. 2,277

| Item Information | |
|---|---|
| Alignment | A-T.2<br>D-M.2.1 |
| Answer Key | B |
| Depth of Knowledge | 2 |
| *p*-value A | 7% |
| *p*-value B | 47% (correct answer) |
| *p*-value C | 23% |
| *p*-value D | 23% |
| Option Annotations | A. uses numbers for March only; 3,985 – 3,784<br>B. correct<br>C. uses only numbers for January since it is the only month in which the number made is greater than the number shipped; 4,228 – 2,987 = 1,241<br>D. solves (4,228 – 2,987) + (4,000 – 3,165) + (3,985 – 3,784) |

**4.** An expression is shown below.

$$5 \times 1\frac{1}{12}$$

Which has the same value as the expression?

A. $5 + \left(1 + \frac{1}{12}\right)$

B. $(1 + 1 + 1 + 1 + 1) + \left(\frac{1}{12}\right)$

C. $1 + \left(\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}\right)$

D. $(1 + 1 + 1 + 1 + 1) + \left(\frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12} + \frac{1}{12}\right)$

| **Item Information** | |
|---|---|
| Alignment | A-F.2 |
| Answer Key | D |
| Depth of Knowledge | 1 |
| *p*-value A | 31% |
| *p*-value B | 19% |
| *p*-value C | 10% |
| *p*-value D | 40% (correct answer) |
| Option Annotations | A. decomposes correctly $1\frac{1}{12}$ to $1 + \frac{1}{12}$, but changes to adding 5 instead of multiplying by 5<br>B. applies 5 to whole number portion only, not realizing $1\frac{1}{12}$ means $1 + \frac{1}{12}$ and requires 5 addends of $\frac{1}{12}$ also<br>C. applies 5 to fraction portion only, not realizing $1\frac{1}{12}$ means $1 + \frac{1}{12}$ and requires 5 addends of 1 also<br>D. correct |

**5.** Dai cooks 54 cups of soup at his restaurant. He serves an equal share of all 54 cups of soup to each of 24 customers. How many cups of soup is each customer served?

A. $\frac{3}{10}$

B. $\frac{4}{9}$

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

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

| **Item Information** | |
|---|---|
| Alignment | A-F.2.1.1 |
| Answer Key | D |
| Depth of Knowledge | 1 |
| *p*-value A | 11% |
| *p*-value B | 9% |
| *p*-value C | 11% |
| *p*-value D | 69% (correct answer) |
| Option Annotations | A. subtracts numbers in stem (30); creates fraction $\frac{30}{100}$ and simplifies<br>B. creates fraction of $\frac{24}{54}$ (numbers in stem) and simplifies<br>C. subtracts numbers in stem (30); divides 30 by 24 (number of customers)<br>D. correct |

**6.** What is the value of the expression $[(5 + 3) \times 6] \div 2$?

A. 11.5

B. 13

C. 14

D. 24

| Item Information | |
|---|---|
| Alignment | B-O.1.1.1 |
| Answer Key | D |
| Depth of Knowledge | 1 |
| *p*-value A | 4% |
| *p*-value B | 2% |
| *p*-value C | 10% |
| *p*-value D | 84% (correct answer) |
| Option Annotations | A. solves $[5 + (3 \times 6)] \div 2$<br>B. solves $[(5 + 3) + (3 \times 6)] \div 2$<br>C. solves $5 + [3 \times (6 \div 2)]$<br>D. correct |

**7.** The first four terms in a pattern are shown below.

$$\frac{3}{4}, \quad 1\frac{1}{4}, \quad 1\frac{3}{4}, \quad 2\frac{1}{4}$$

The pattern continues. What is the tenth term in the pattern?

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

B. $5\frac{3}{4}$

C. $10\frac{1}{4}$

D. $10\frac{3}{4}$

| **Item Information** | |
|---|---|
| Alignment | B-O.2.1 |
| Answer Key | A |
| Depth of Knowledge | 2 |
| *p*-value A | 62% (correct answer) |
| *p*-value B | 23% |
| *p*-value C | 9% |
| *p*-value D | 6% |
| Option Annotations | A. correct<br>B. understands correctly the $\frac{10}{2}$ part but confused about $\frac{1}{4}$ or $\frac{3}{4}$<br>C. uses 10 from tenth term with correct fractional part<br>D. uses 10 from tenth term but confused about $\frac{1}{4}$ or $\frac{3}{4}$ |

**8.** During his free time last week, Javon read a book and played outside. At the end of each day, Javon recorded the total number of hours he had spent so far that week doing each activity. The data Javon recorded for the last four days of the week are shown in the table below.

**Javon's Free Time**

| End of Day | Read a Book (hours) | Played Outside (hours) |
|---|---|---|
| Wednesday | 8 | 12 |
| Thursday | 10 | 15 |
| Friday | 12 | 18 |
| Saturday | 14 | 21 |

Based on the patterns in the table, which statement is true?

A. For every hour Javon read a book, he played outside for 1.5 hours.

B. For every hour Javon played outside, he read a book for 1.5 hours.

C. For every hour Javon read a book, he played outside for 3 hours.

D. For every hour Javon played outside, he read a book for 3 hours.

| Item Information | |
|---|---|
| Alignment | B-O.2.1.1 |
| Answer Key | A |
| Depth of Knowledge | 2 |
| *p*-value A | 46% (correct answer) |
| *p*-value B | 17% |
| *p*-value C | 27% |
| *p*-value D | 10% |
| Option Annotations | A. correct<br>B. reverses the relationship<br>C. uses the daily increase and not the rate<br>D. reverses the relationship and uses the daily increase of time spent playing outside |

**9.** The first six terms in pattern A and pattern B are shown below.

pattern A: 0, 2, 4, 6, 8, 10
pattern B: 0, 10, 20, 30, 40, 50

The patterns continue. Which statement about corresponding terms in the patterns is true?

A. Each term in pattern A is $\frac{1}{5}$ of the corresponding term in pattern B.

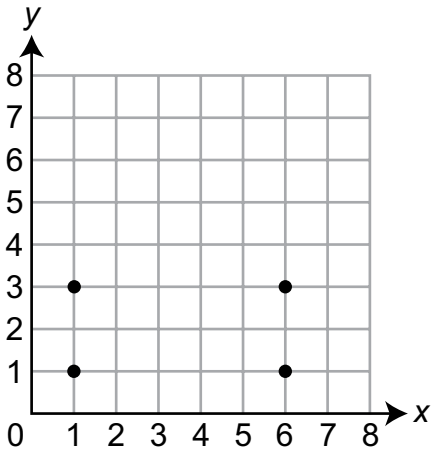
B. Each term in pattern A is $\frac{1}{2}$ of the corresponding term in pattern B.

C. Each term in pattern A is always less than the corresponding term in pattern B.

D. Each term in pattern A is equal to or 8 less than the corresponding term in pattern B.

| **Item Information** | |
|---|---|
| Alignment | B-O.2.1.2 |
| Answer Key | A |
| Depth of Knowledge | 2 |
| *p*-value A | 46% (correct answer) |
| *p*-value B | 11% |
| *p*-value C | 35% |
| *p*-value D | 8% |
| Option Annotations | A. correct<br>B. sees 2 to 4 in pattern A and 10 to 20 in pattern B, so thinks patterns have something to do with 2 times or $\frac{1}{2}$<br>C. disregards 0 in pattern, when pattern terms have same value<br>D. focuses on first two corresponding terms, but not true for all corresponding terms |

**10.** A scientist puts stakes into the ground at the locations of the plotted points shown on the coordinate grid below.




The scientist connects the stakes with string to form a rectangle before digging for objects in the ground. The scientist finds one object inside the rectangle and one object outside the rectangle. At which two locations could the objects have been found?

A. (2, 2) and (5, 2)

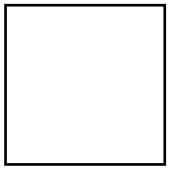
B. (4, 2) and the origin

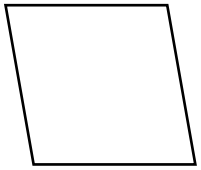
C. (3, 0) and the point with an *x*-coordinate of 1 and a *y*-coordinate of 5

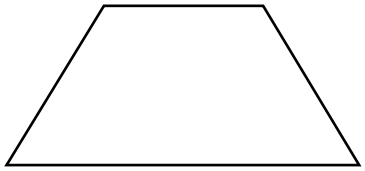
D. (3, 2) and the point with a *y*-coordinate of 2 and an *x*-coordinate of 5

| **Item Information** | |
|---|---|
| Alignment | C-G.1.1.1<br>C-G.1.1.2 |
| Answer Key | B |
| Depth of Knowledge | 2 |
| *p*-value A | 18% |
| *p*-value B | 50% (correct answer) |
| *p*-value C | 15% |
| *p*-value D | 17% |
| Option Annotations | A. chooses option with both locations inside rectangle<br>B. correct<br>C. chooses option with one location “below” rectangle; one location “above” rectangle<br>D. chooses option with both locations inside rectangle |

**11.** Jabari has a quilt made from pieces of fabric that are all parallelograms. Which shape would **not** be found on Jabari's quilt?

A. 

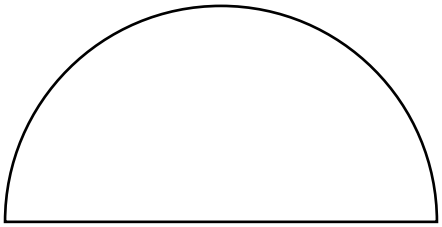
B. 

C. 

D. 

| **Item Information** | |
|---|---|
| Alignment | C-G.2.1 |
| Answer Key | C |
| Depth of Knowledge | 1 |
| *p*-value A | 11% |
| *p*-value B | 6% |
| *p*-value C | 76% (correct answer) |
| *p*-value D | 7% |
| Option Annotations | A. does not think a square is a parallelogram<br>B. does not think a rhombus is a parallelogram<br>C. correct<br>D. does not think a parallelogram is a parallelogram |

**12.** A shape is shown below.



Which statement about the shape is true?

A. The shape is a polygon because it is closed.

B. The shape is a polygon because it has one straight side.

C. The shape is **not** a polygon, because it is closed.

D. The shape is **not** a polygon, because it has one curved side.

| **Item Information** | |
|---|---|
| Alignment | C-G.2.1.1 |
| Answer Key | D |
| Depth of Knowledge | 1 |
| *p*-value A | 18% |
| *p*-value B | 12% |
| *p*-value C | 7% |
| *p*-value D | 63% (correct answer) |
| Option Annotations | A. misinterprets a polygon as being any closed figure<br>B. misinterprets a polygon as being any figure with at least one straight side<br>C. correctly identifies the shape is not a polygon, but gives a reason that contradicts the definition of a polygon<br>D. correct |

**13.** Sonja rakes leaves for $3\frac{1}{4}$ **hours**. For how many **minutes** does Sonja rake leaves?

A. $63\frac{1}{4}$ minutes

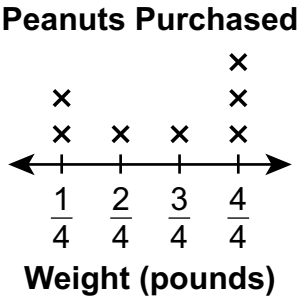
B. $180\frac{1}{4}$ minutes

C. 195 minutes

D. 225 minutes

| **Item Information** | |
|---|---|
| Alignment | D-M.1.1.1 |
| Answer Key | C |
| Depth of Knowledge | 1 |
| *p*-value A | 11% |
| *p*-value B | 27% |
| *p*-value C | 57% (correct answer) |
| *p*-value D | 5% |
| Option Annotations | A. adds instead of multiplies and appends $\frac{1}{4}$<br>B. appends $\frac{1}{4}$ instead of calculating how many minutes are in $\frac{1}{4}$ hour<br>C. correct<br>D. solves $(4 \times 60) - 15$ |

**14.** The line plot below shows the weights, in pounds, of peanuts purchased by 7 customers at a grocery store.




What is the combined weight, in pounds, of the peanuts purchased by the 7 customers?

A. $\frac{5}{8}$

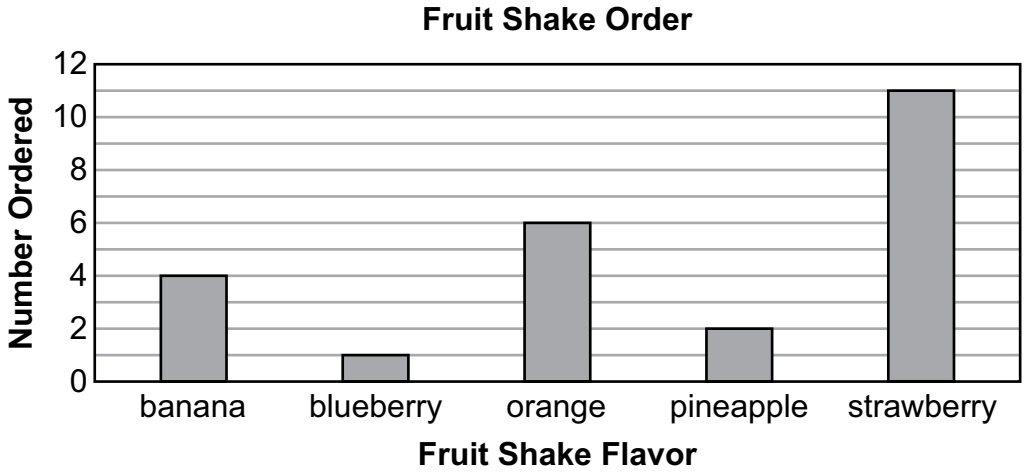
B. $1\frac{3}{4}$

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

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

| Item Information | |
|---|---|
| Alignment | D-M.2.1.1 |
| Answer Key | D |
| Depth of Knowledge | 1 |
| *p*-value A | 5% |
| *p*-value B | 10% |
| *p*-value C | 21% |
| *p*-value D | 64% (correct answer) |
| Option Annotations | A. adds numerators and denominators across, then simplifies<br>B. divides 7 entries by 4, writes $\frac{7}{4}$ as $1\frac{3}{4}$<br>C. uses only 1 entry for each weight<br>D. correct |

**15.** Each of the students in Ms. Steven's class orders a fruit shake. The bar graph below shows the number of fruit shakes of each flavor the students order.




Which two fruit shake flavors are ordered by exactly half of the students in Ms. Steven's class?

A. banana and orange

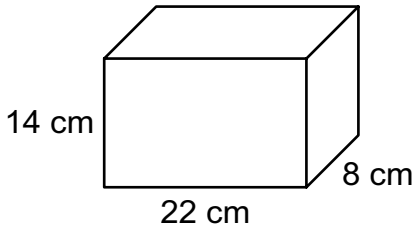
B. banana and pineapple

C. blueberry and strawberry

D. orange and strawberry

| Item Information | |
|---|---|
| Alignment | D-M.2.1.2 |
| Answer Key | C |
| Depth of Knowledge | 2 |
| *p*-value A | 20% |
| *p*-value B | 16% |
| *p*-value C | 39% (correct answer) |
| *p*-value D | 25% |
| Option Annotations | A. counts a total number of 20 students in the class<br>B. chooses a total of 6 which is half of greatest number shown on vertical axis<br>C. correct<br>D. uses two tallest bars |

**16.** A metal container is shaped like a rectangular prism. The dimensions of the container are shown below.




The container is completely filled with a liquid mixture. There is an equal amount of each of the 3 liquids in the mixture. What is the volume of each liquid in the container?

A. $14\frac{2}{3}$ cm$^3$

B. $91\frac{7}{27}$ cm$^3$

C. $273\frac{7}{9}$ cm$^3$

D. $821\frac{1}{3}$ cm$^3$

| **Item Information** | |
|---|---|
| Alignment | D-M.3.1.1<br>A-F.2.1.1 |
| Answer Key | D |
| Depth of Knowledge | 2 |
| *p*-value A | 20% |
| *p*-value B | 18% |
| *p*-value C | 16% |
| *p*-value D | 46% (correct answer) |
| Option Annotations | A. adds dimensions and divides by 3<br>B. divides each dimension by 3 first; $\left(\frac{14}{3}\right)\left(\frac{22}{3}\right)\left(\frac{8}{3}\right)$<br>C. adds 3 + 3 + 3 to get 9; divides volume by 9<br>D. correct |

## OPEN-ENDED QUESTION

**17.** Mitch is making some bread dough.

To make the bread dough, Mitch uses $5\frac{1}{2}$ cups of wheat flour, $1\frac{3}{4}$ cups of rice flour, and $\frac{2}{3}$ cup of white flour.

**A.** How many cups of flour, in total, does Mitch use? Show or explain all your work.

**Go to the next page to finish question 17.**

GO ON

**17.** ***Continued.*** Please refer to the previous page for task explanation.

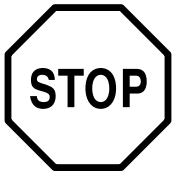
Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

rice flour: _____

white flour: _____

**After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.**



## Item-Specific Scoring Guideline

### #17 Item Information

| | | | | | |
|---|---|---|---|---|---|
| **Alignment** | A-F.1 | **Depth of Knowledge** | 2 | **Mean Score** | 1.75 |

**Assessment Anchor this item will be reported under:**

M05.A-F.1—Use equivalent fractions as a strategy to add and subtract fractions.

**Specific Assessment Anchor Descriptor addressed by this item:**

M05.A-F.1.1—Solve addition and subtraction problems involving fractions (straight computation or word problems).

**Scoring Guide**

| Score | In this item, the student . . . |
|---|---|
| **4** | Demonstrates a thorough understanding of how to use equivalent fractions as a strategy to add and subtract fractions by correctly solving problems and clearly explaining procedures. |
| **3** | Demonstrates a general understanding of how to use equivalent fractions as a strategy to add and subtract fractions by correctly solving problems and clearly explaining procedures with only minor errors or omissions. |
| **2** | Demonstrates a partial understanding of how to use equivalent fractions as a strategy to add and subtract fractions by correctly performing a significant portion of the required task. |
| **1** | Demonstrates minimal understanding of how to use equivalent fractions as a strategy to add and subtract fractions. |
| **0** | The response has no correct answer and insufficient evidence to demonstrate any understanding of the mathematical concepts and procedures as required by the task. Response may show only information copied from the question. |

### Top-Scoring Student Response and Training Notes

| Score | Description |
|---|---|
| **4** | Student earns 4 points. |
| **3** | Student earns 3.0–3.5 points. |
| **2** | Student earns 2.0–2.5 points. |
| **1** | Student earns 0.5–1.5 points.<br>OR<br>Student demonstrates minimal understanding of how to use equivalent fractions as a strategy to add and subtract fractions. |
| **0** | Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured. |

**Top-Scoring Response**

**Part A (2 points):**

1 point for correct answer
1 point for complete support

OR $\frac{1}{2}$ point for correct but incomplete support

| What? | Why? |
|---|---|
| $7\frac{11}{12}$ (cups) | **Sample Work:**<br>$5\frac{1}{2} + 1\frac{3}{4} + \frac{2}{3} = 5\frac{6}{12} + 1\frac{9}{12} + \frac{8}{12} = 6\frac{23}{12} = 7\frac{11}{12}$<br>**OR**<br>**Sample Explanation:**<br>To find the total amount of flour Mitch uses, I added the three fractions together. To do this, I first found a common denominator (12). Next I changed all the fractions using the common denominator. Then I added the whole numbers together, followed by the numerators. Since the numerator total is bigger than the denominator, I subtracted 12 from the numerator and added 1 to the whole number to get $7\frac{11}{12}$ cups. |

**Part B (2 points):**

$\frac{1}{2}$ point for <u>each</u> correct answer

1 point for complete explanation

OR $\frac{1}{2}$ point for correct but incomplete explanation

| What? | Why? |
|---|---|
| rice flour: $2\frac{1}{4}$ (cups)<br><br>white flour: $1\frac{1}{6}$ (cups) | **Sample Work:**<br>$7\frac{11}{12} - 4\frac{1}{2} = 7\frac{11}{12} - 4\frac{6}{12} = 3\frac{5}{12}$<br>$1\frac{3}{4} + \frac{2}{3} = 1\frac{9}{12} + \frac{8}{12} = 1\frac{17}{12} = 2\frac{5}{12}$<br>$3\frac{5}{12} - 2\frac{5}{12} = 1 \rightarrow 1 \div 2 = \frac{1}{2}$<br>Rice Flour: $1\frac{3}{4} + \frac{1}{2} = 1\frac{3}{4} + \frac{2}{4} = 1\frac{5}{4} = 2\frac{1}{4}$<br>White Flour: $\frac{2}{3} + \frac{1}{2} = \frac{4}{6} + \frac{3}{6} = \frac{7}{6} = 1\frac{1}{6}$<br>**OR**<br>**Sample Explanation:**<br>Since $5\frac{1}{2} - 4\frac{1}{2} = 1$, Mitch needs to make up the "missing" 1 cup of flour by adding  cup to each of the other two types of flour.<br>[Note: Carry over any error from Part A] |

## STUDENT RESPONSE

**Response Score: 4 points**

**PART A**

Question 17
Page 1 of 2

Line Guide | Item ID | ?

Mitch is making some bread dough.

To make the bread dough, Mitch uses $5\frac{1}{2}$ cups of wheat flour, $1\frac{3}{4}$ cups of rice flour, and $\frac{2}{3}$ cup of white flour.

**A.** How many cups of flour, in total, does Mitch use? Show or explain all your work.

EQ

$5\frac{1}{2} = 5\frac{6}{12}$

$1\frac{3}{4} = 1\frac{9}{12}$

$\frac{2}{3} = \frac{8}{12}$

$5\frac{6}{12} + 1\frac{9}{12} + \frac{8}{12} = 6\frac{23}{12} = 7\frac{11}{12}$

Mitch uses $7\frac{11}{12}$ cups of flour.

66 / 1000

The response provides a correct answer and complete support.

Review/End Test | Pause | Flag | Options | Next

Question 17
Page 2 of 2

Line Guide

Item ID

Mitch is making some bread dough.

Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

EQ

$5\frac{1}{2} - 4\frac{1}{2} = 1$

$1 \div 2 = \frac{1}{2}$

$\frac{1}{2} = \frac{2}{4}$

rice flour: $1\frac{3}{4} + \frac{2}{4} = 1\frac{5}{4} = 2\frac{1}{4}$

$\frac{1}{2} = \frac{3}{6}$

white flour: $\frac{4}{6} + \frac{3}{6} = \frac{7}{6} = 1\frac{1}{6}$

66 / 1000

rice flour: EQ $2\frac{1}{4}$ cups

white flour: EQ $1\frac{1}{6}$ cups

The response provides both correct answers and complete support.

Review/End Test | Pause | Flag | Options | Back | Next

## STUDENT RESPONSE

**Response Score: 3 points**

**17.** Mitch is making some bread dough.

To make the bread dough, Mitch uses $5\frac{1}{2}$ cups of wheat flour, $1\frac{3}{4}$ cups of rice flour, and $\frac{2}{3}$ cup of white flour.

**A.** How many cups of flour, in total, does Mitch use? Show or explain all your work.

| Work | Explain |
|---|---|
| ① ~~$5\frac{6}{12}$~~ $\frac{8}{12}$ $\frac{9}{12}$ | First, I found equivalent denomonators |
| ② $5\frac{6}{12}$ wheat flower<br>$1\frac{9}{12}$ rice flower<br>$6\frac{15}{12}$ $1\frac{2}{12}$<br>$7\frac{2}{12}$ wheat & rice flower<br>$7\frac{2}{12}$ wheat & rice flower<br>$\frac{8}{12}$ white flower<br>$7\frac{10}{12}$ $\frac{5}{6}$<br>$7\frac{5}{6}$ flower in all | Next, I add all of my fractions up.<br>Finally, I add up all my fractions and Mitch used $7\frac{5}{6}$ cups of flower. |

The response provides an incorrect answer due to an error in calculation. The support is complete.

**Go to the next page to finish question 17.**

GO ON

**17.** ***Continued.*** Please refer to the previous page for task explanation.

Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

**Work**

① 7

$5\frac{1}{2}$ wheat flower last time

$4\frac{1}{2}$ wheat flower this time

① how much flower I split in half

② $1 \div 2 = 0.5 = \frac{1}{2}$

③ $1\frac{9}{12}$ rice flower + $\frac{6}{12}$ white flower

$\frac{6}{12}$ $\frac{1}{2}$ more flower $\frac{6}{12}$ $\frac{1}{2}$ more flower

$\frac{14}{12}$ $1\frac{2}{12}$

$1\boxed{\frac{15}{12}}$ $1\frac{2}{12}$

$2\frac{2}{12}$

**Explain**

First, I subtracted the amount of wheat flower Mitch used before to see how much flower I had to divide by 2 to increase the rice and white flower. Next I divide my answer (1) by 2. I got $\frac{1}{2}$ as my answer to 1 divided by 2. Finally I added $\frac{1}{2}$ to the amount of white and rice flower Mitch used last time.

rice flour: $2\frac{2}{12}$

white flour: $1\frac{2}{12}$

The response provides both correct answers and complete support.

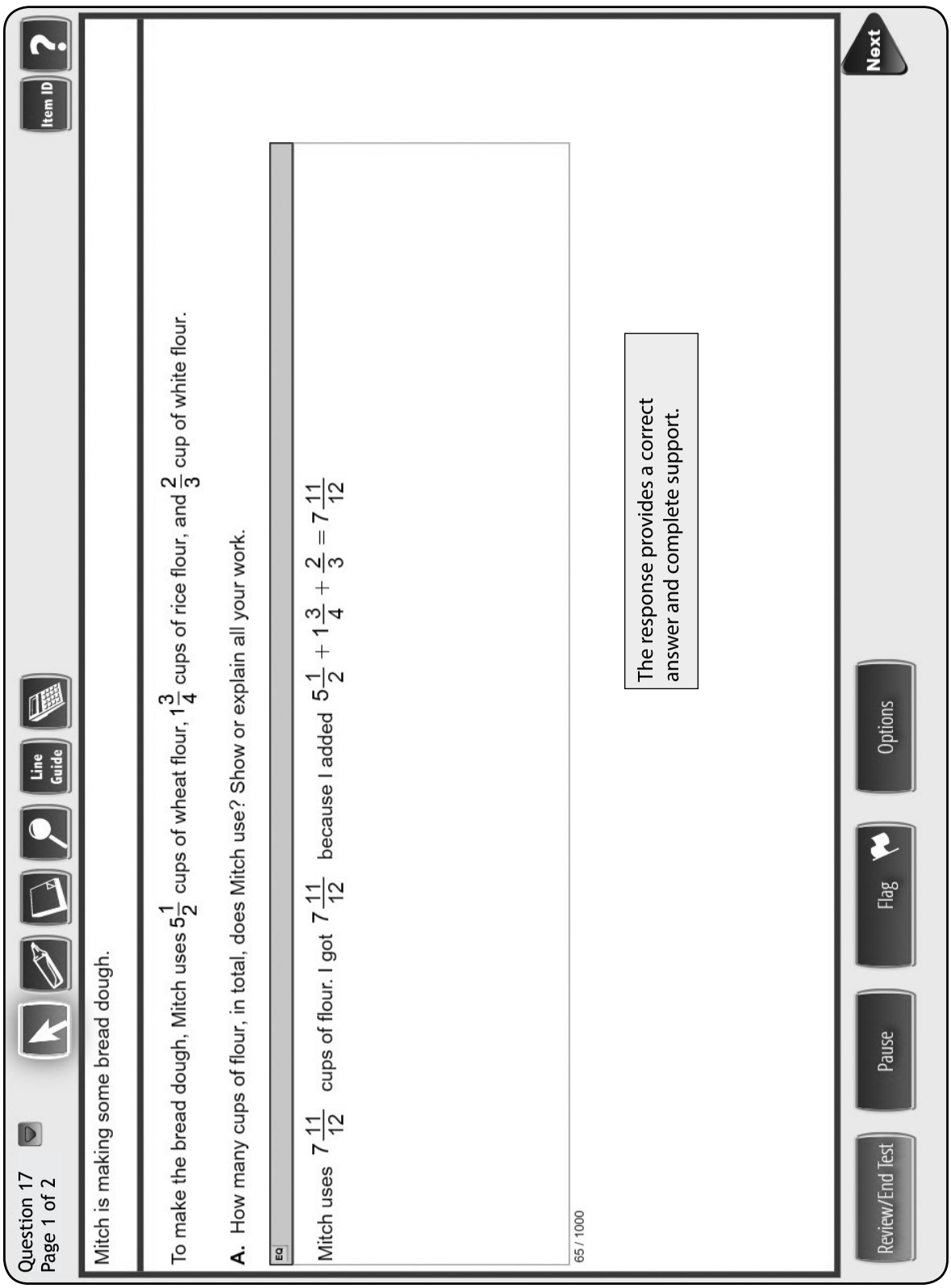
**After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.**

STOP

## STUDENT RESPONSE

**Response Score: 2 points**

**PART A**



Question 17
Page 2 of 2

Line Guide

Item ID

Mitch is making some bread dough.

Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

EQ

Since $5\frac{1}{2}$ was changed to $4\frac{1}{2}$ I made $1\frac{3}{4}$ , $2\frac{3}{4}$ , and kept $\frac{2}{3}$ the same, and I got $7\frac{11}{12}$

73 / 1000

rice flour: EQ $2\frac{3}{4}$

white flour: EQ $\frac{2}{3}$

Both answers provided are incorrect and the support is incorrect.

Review/End Test | Pause | Flag | Options | Back | Next

## STUDENT RESPONSE

**Response Score: 1 point**

**17.** Mitch is making some bread dough.

To make the bread dough, Mitch uses $5\frac{1}{2}$ cups of wheat flour, $1\frac{3}{4}$ cups of rice flour, and $\frac{2}{3}$ cup of white flour.

**A.** How many cups of flour, in total, does Mitch use? Show or explain all your work.

The total cups of flour is $6\frac{13}{20}$ because I add $\frac{1}{2}, \frac{3}{4}, \frac{2}{3}$ and then I add 5 and 1.

The response provides an incorrect answer. The support is complete.

**Go to the next page to finish question 17.**

GO ON

**17.** ***Continued.*** Please refer to the previous page for task explanation.

Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

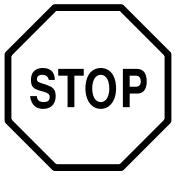
The next time when mitch makes bread dough he will put $\frac{1}{3}$ because that is just right to make bread dough.

rice flour: $\frac{2}{3}$

white flour: $\frac{3}{4}$

Both answers provided are incorrect and the support is incorrect.

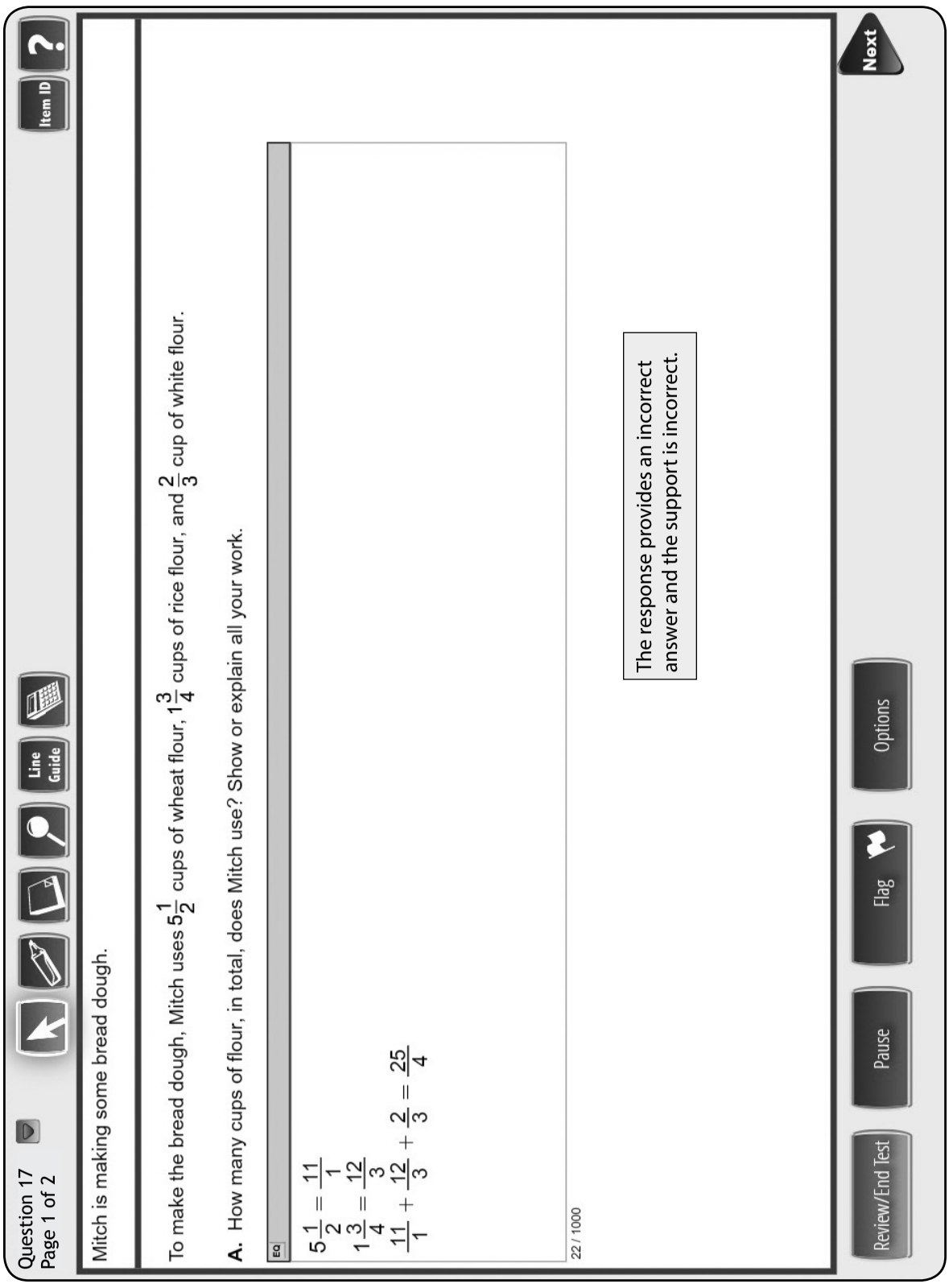
**After you have checked your work, close your answer booklet and test booklet so your teacher will know you are finished.**



## STUDENT RESPONSE

**Response Score: 0 points**

**PART A**



Question 17
Page 2 of 2

Line Guide | Item ID | ?

Mitch is making some bread dough.

Mitch decides that the next time he makes the bread dough he would use only $4\frac{1}{2}$ cups of wheat flour. He would also increase the amounts of rice flour and white flour so that the total amount of flour he used stayed the same. He plans to increase the rice flour and the white flour by the same amount.

**B.** How many cups of rice flour and white flour will Mitch use the next time he makes the bread dough? Show or explain all your work.

EQ

$4\frac{1}{2} = \frac{9}{1}$

$\frac{6}{1} + \frac{3}{1} = \frac{9}{1}$

10 / 1000

rice flour: EQ $\frac{6}{1}$

white flour: EQ $\frac{3}{1}$

Both answers provided are incorrect and the support is incorrect.

Review/End Test | Pause | Flag | Options | Back | Next

## MATHEMATICS—SUMMARY DATA

## MULTIPLE-CHOICE

| Sample Number | Alignment | Answer Key | Depth of Knowledge | *p*-values A | *p*-values B | *p*-values C | *p*-values D |
|---|---|---|---|---|---|---|---|
| 1 | A-F.1.1.1 | C | 1 | 8% | 7% | 52% | 33% |
| 2 | A-T.1.1 | B | 1 | 9% | 71% | 11% | 9% |
| 3 | A-T.2<br>D-M.2.1 | B | 2 | 7% | 47% | 23% | 23% |
| 4 | A-F.2 | D | 2 | 31% | 19% | 10% | 40% |
| 5 | A-F.2.1.1 | D | 1 | 11% | 9% | 11% | 69% |
| 6 | B-O.1.1.1 | D | 1 | 4% | 2% | 10% | 84% |
| 7 | B-O.2.1 | A | 2 | 62% | 23% | 9% | 6% |
| 8 | B-O.2.1.1 | A | 2 | 46% | 17% | 27% | 10% |
| 9 | B-O.2.1.2 | A | 2 | 46% | 11% | 35% | 8% |
| 10 | C-G.1.1.1<br>C-G.1.1.2 | B | 2 | 18% | 50% | 15% | 17% |
| 11 | C-G.2.1 | C | 1 | 11% | 6% | 76% | 7% |
| 12 | C-G.2.1.1 | D | 1 | 18% | 12% | 7% | 63% |
| 13 | D-M.1.1.1 | C | 1 | 11% | 27% | 57% | 5% |
| 14 | D-M.2.1.1 | D | 2 | 5% | 10% | 21% | 64% |
| 15 | D-M.2.1.2 | C | 2 | 20% | 16% | 39% | 25% |
| 16 | D-M.3.1.1<br>A-F.2.1.1 | D | 2 | 20% | 18% | 16% | 46% |

## OPEN-ENDED

| Sample Number | Alignment | Points | Depth of Knowledge | Mean Score |
|---|---|---|---|---|
| 17 | A-F.1 | 4 | 2 | 1.75 |