The Pennsylvania System of School Assessment
Mathematics
Item and Scoring Sampler
2016–2017
Grade 4

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INTRODUCTION

General Introduction

The Pennsylvania Department of Education provides districts and schools with tools to assist in delivering focused instructional programs aligned with the Pennsylvania Core Standards (PCS). These tools include Academic Standards, Assessment Anchor documents, assessment handbooks, and content-based item and scoring samplers. This Item and Scoring Sampler is a useful tool for Pennsylvania educators in preparing local instructional programs. It can also be useful in preparing students for the statewide assessment.

Pennsylvania Core Standards (PCS)

This sampler contains examples of test questions that are aligned to the new Pennsylvania Core Standards-based 2013 PSSA Assessment Anchors and Eligible Content. The Mathematics, Reading, and Writing PSSA transitioned to PCS-based operational Mathematics and English Language Arts assessments starting with the spring 2015 PSSA administration.

The 2013 PCS-aligned Assessment Anchor and Eligible Content documents are posted on this portal:

> ➤ *www.education.pa.gov* [Hover over "K–12," select "Assessment and Accountability," and select "Pennsylvania System of School Assessment (PSSA)." Then select "Assessment Anchors" from the "Other Materials" list on the right side of the screen.]

What Is Included

This sampler contains test questions (items) that have been written to align to the Assessment Anchors that are based on the Pennsylvania Core Standards (PCS). The test questions provide an idea of the types of items that will appear on an operational, PCS-based PSSA. Each sample test question has been through a rigorous review process to ensure alignment with the Assessment Anchors.

Purpose and Uses

The items in this sampler may be used as examples for creating assessment items at the classroom level, and they may also be copied and used as part of a local instructional program.[1] Classroom teachers may find it beneficial to have students respond to the open-ended item in this sampler. Educators can then use the sampler as a guide to score the responses either independently or together with colleagues within a school or district.

Item Format and Scoring Guidelines

The multiple-choice (MC) items have four answer choices. Each correct response to an MC item is worth one point.

Each open-ended (OE) item is designed to take approximately ten to fifteen minutes to complete.

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During the administration of the PSSA, students are given additional time as necessary to complete the test items. Each OE item in mathematics is scored using an item-specific scoring guideline based on a 0–4-point scale. In this sampler, every item-specific scoring guideline is combined with examples of student responses that represent each score point to form a practical, item-specific scoring guide.

This sampler also includes the *General Description of Scoring Guidelines for Mathematics Open-Ended Questions* that students will have access to during a PSSA mathematics administration. The general description of scoring guidelines can be distributed to students for use during local assessments and can also be used by educators when scoring local assessments.[2]

Item Alignment

All PSSA items are aligned to statements and specifications included in the *Assessment Anchors and Eligible Content Aligned to the Pennsylvania Core Standards.* The mathematics content, process skills, directives, and action statements included in the PSSA mathematics questions align with the Assessment Anchor Content Standards. The Eligible Content statements represent the limits of the content of the mathematics questions.

Testing Time and Mode of Testing Delivery for the PSSA

The PSSA is delivered in traditional paper-and-pencil format as well as in an online format. The estimated time to respond to a test question is the same for both methods of test delivery. During an official testing administration, students are given additional time as necessary to complete the test questions. The following table shows the estimated response time for each item type.

Mathematics Item Type	MC	OE
Estimated Response Time (minutes)	2	10 to 15

Mathematics Reporting Categories

The Assessment Anchors are organized into four classifications as listed below.

A = Numbers and Operations

B = Algebraic Concepts

C = Geometry

D = Data Analysis and Probability

These four classifications are used throughout the grade levels. In addition to these classifications, there are five Reporting Categories for each grade level. The first letter of each Reporting Category represents the classification; the second letter represents the Domain as stated in the Common Core State Standards for Mathematics. Listed below are the Reporting Categories for Grade 4.

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These four classifications are used throughout the grade levels. In addition to these classifications, there are five Reporting Categories for each grade level. The first letter of each Reporting Category represents the classification; the second letter represents the Domain as stated in the Common Core State Standards for Mathematics. Listed below are the Reporting Categories for Grade 4.

A-T = Numbers and Operations in Base Ten

A-F = Numbers and Operations—Fractions

B-O = Operations and Algebraic Thinking

C-G = Geometry

D-M = Measurement and Data

Examples of multiple-choice and open-ended items assessing these categories are included in this booklet.

General Description of Scoring Guidelines for Mathematics Open-Ended Questions

4: The response demonstrates a *thorough* understanding of mathmatial 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.

Reponse may show only information copied from the question.

Special Categories within zero reported separately:

BLK (blank)   Blank, entirely erased, or written refusal to respond

OT   Off task

LOE   Response in a language other than English

IL   Illegible

Item and Scoring Sampler Format

This sampler includes the test directions and scoring guidelines that appear in the PSSA Mathematics assessments. Each multiple-choice item is followed by a table that includes the alignment, the answer key, the depth of knowledge (DOK) level, the percentage[3] of students who chose each answer option, and a brief answer option analysis or rationale. The open-ended item is followed by a table that includes the item alignment, DOK level, and mean student score. Additionally, each of the included item-specific scoring guidelines is combined with sample student responses representing each score point to form a practical, item-specific scoring guide. The *General Description of Scoring Guidelines for Mathematics Open-Ended Questions* used to develop the item-specific scoring guidelines should be used if any additional item-specific scoring guidelines are created for use within local instructional programs.

Example Multiple-Choice Item Information Table

Item Information	
Alignment	Assigned AAEC
Answer Key	Correct Answer
Depth of Knowledge	Assigned DOK
p-value A	Percentage of students who selected each option
p-value B	Percentage of students who selected each option
p-value C	Percentage of students who selected each option
p-value D	Percentage of students who selected each option
Option Annotations	Brief answer option analysis or rationale

Example Open-Ended Item Information Table

Alignment: Assigned AAEC

Depth of Knowledge: Assigned DOK

Mean Score

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[3] All *p*-value percentages listed in the item information tables have been rounded.

Grade 4 Protractor

The protractor shown below is not intended to be used to measure. It has been included as a representation of the protractors that will be provided for students when they take the test. Due to differences in printers, the protractor may not accurately reproduce to scale.
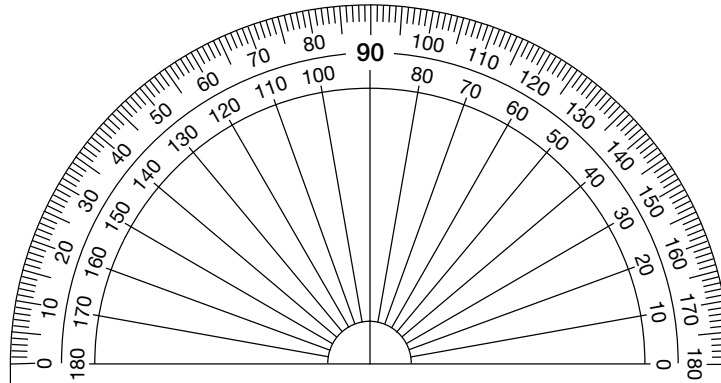
Grade 4 Formula Sheet

2016

Grade 4

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

Standard Conversions

1 yard (yd) = 3 feet (ft)

1 foot = 12 inches (in.)

1 pound (lb) = 16 ounces (oz.)

1 gallon (gal) = 4 quarts (qt)

1 quart = 2 pints (pt)

1 pint = 2 cups (c)

Metric Conversions

1 kilometer (km) = 1,000 meters (m)

1 meter = 100 centimeters (cm)

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

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

Time Conversions

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)

Graphic of a Rectangle with w representing width and l representing length.

Area = length × width

A = l × w

Perimeter = length + length + width + width

P = l + l + w + w

MATHEMATICS TEST DIRECTIONS

On the following pages are the Mathematics questions.

You may <u>not</u> use a calculator for question 1. You may use a calculator for all other questions on this test.

You may need a protractor for 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.

MULTIPLE-CHOICE ITEMS

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

1. Which value is **closest** to 79 × 4?

    A.   280

    B.   320

    C.   350

    D.   400

Item Information	
Alignment	A-T.2.1.4
Answer Key	B
Depth of Knowledge	1
p-value A	13%
p-value B	73% (correct answer)
p-value C	7%
p-value D	7%
Option Annotations	A. rounds 79 down to 70 B. correct C. rounds 79 down to 70 and 4 up to 5 D. rounds both multiplicands up 1

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

2. Asia covers about 3/10 of the land on Earth. South America covers about 12/100 of the land on Earth. Which statement correctly compares the land sizes of Asia and South America?

   A.   Since 12/100 is equivalent to 12/10 and 3/10 < 12/10 , Asia covers less land than South America.

   B.   Since 3/10 is equivalent to 3/100 and 3/100 < 12/100 , Asia covers less land than South America.

   C.   Since 3/10 is equivalent to 30/100 and 30/100 > 12/100 , Asia covers more land than South America.

   D.   Since 3/10 is equivalent to 93/100 and 93/100 > 12/100 , Asia covers more land than South America.

Item Information	
Alignment	A-F.1.1.2 A-F.1.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	21%
p-value B	19%
p-value C	52% (correct answer)
p-value D	8%
Option Annotations	A. does not convert denominator B. does not convert denominator C. correct D. converts 3/10 to hundredths by adding 90 to both numerator and denominator

3. In a box of 24 chocolate pieces, 2/3 of the pieces have peanuts in them. How many of the chocolate pieces have peanuts in them?

    A.   8

    B.   12

    C.   16

    D.   19

Item Information	
Alignment	A-F.2.1.6
Answer Key	C
Depth of Knowledge	1
p-value A	24%
p-value B	22%
p-value C	42% (correct answer)
p-value D	12%
Option Annotations	A. 24/3 B. 24/2 C. correct D. 24 – 2 – 3

4. Miguel went to a baseball stadium and a football stadium.

The baseball stadium has thirty-seven thousand, four hundred ninety-five seats.

The football stadium has sixty-nine thousand, one hundred forty-three seats.

How many times greater is the value of the digit 3 in the number of seats at the baseball stadium than the value of the digit 3 in the number of seats at the football stadium?

A. 10 times

B. 100 times

C. 1,000 times

D. 10,000 times

Item Information	
Alignment	A-T.1.1.2 A-T.1.1.1
Answer Key	D
Depth of Knowledge	2
p-value A	13%
p-value B	13%
p-value C	17%
p-value D	57% (correct answer)
Option Annotations	A. states mathematical rule rather than applying it (each place to the left is 10 times greater) B. incorrectly counts number of places C. counts 3 places between the ones and tens thousands place, thus 10 × 10 × 10 D. correct

5. Rounded to the nearest ten, 8,300 books were read by the students at Matilda's school during a read-a-thon. Which value could be the actual total number of books read?

A. 8,289

B. 8,296

C. 8,307

D. 8,312

Item Information	
Alignment	A-T.1.1.4
Answer Key	B
Depth of Knowledge	1
p-value A	11%
p-value B	53% (correct answer)
p-value C	20%
p-value D	16%
Option Annotations	A. rounds to nearest hundred B. correct C. rounds down to the nearest ten D. rounds to nearest hundred

6. Each team in a football league has 53 players on it. There are 32 teams in the league. How many total players are in the league?

    A.   256

    B.   265

    C.   1,506

    D.   1,696

Item Information	
Alignment	A-T.2.1.2
Answer Key	D
Depth of Knowledge	1
p-value A	5%
p-value B	5%
p-value C	5%
p-value D	85% (correct answer)
Option Annotations	A. does 32 × 53 and when multiplying 2 × 5 does not put down the 0 since there is already a (placeholder) 0 there B. does 53 × 32 and when multiplying 3 × 3 does not put in a placeholder 0 C. multiplies 5 × 3 and 2 × 3 D. correct

7. Albert has been a chef for *y* years. Maria has been a chef for 3 years more than 2 times as many years as Albert. Which expression shows how many years Maria has been a chef?

    A. $3 + 2 + y$

    B. $3 + 2 \times y$

    C. $3 \times v + 2$

    D. $3 \times y \times 2$

Item Information	
Alignment	B-O.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	14%
p-value B	31% (correct answer)
p-value C	27%
p-value D	28%
Option Annotations	A. adds all the values B. correct C. does 3 times as many plus 2 D. multiplies all the values

8. Kara, Lynn, and Molly each play on a basketball team. The points scored in their last game are listed below.

Kara scored 3 points.

Lynn scored 5 times as many points as Kara.

Molly scored 7 times as many points as Kara.

How many more points did Molly score than Lynn in their last game?

A. 2

B. 6

C. 8

D. 16

Item Information	
Alignment	B-O.1.1.1 B-O.1.1.3
Answer Key	B
Depth of Knowledge	2
p-value A	24%
p-value B	49% (correct answer)
p-value C	10%
p-value D	17%
Option Annotations	A. 7 – 5 B. correct C. (3 × 5) – 7 D. (3 × 7) – 5

9. Rosie, Stella, and Tiffany are all on a bowling team. In a recent game, Stella scored twice as many points as Rosie. Tiffany scored 2 more points than Rosie. Rosie scored 70 points. What is the total number of points scored by all three women?

    A.   177

    B.   216

    C.   282

    D.   350

Item Information	
Alignment	B-O.1.1.2 B-O.1.1.3
Answer Key	C
Depth of Knowledge	2
p-value A	14%
p-value B	16%
p-value C	64% (correct answer)
p-value D	6%
Option Annotations	A. thinks Stella scored half as many points (35) not twice as many B. thinks Tiffany, Stella, and Rosie all scored 72 C. correct D. thinks Tiffany and Stella both scored 140

10. Frank made a pattern starting with the number 7. He used the rule "add 7." What is true about every number in Frank's pattern?

    A.   Every number is a multiple of 7.

    B.   The last digit of every number is a 7.

    C.   The first digit of every number is a 7.

    D.   The digits in every number add up to 7.

Item Information	
Alignment	B-O.2.1.1 B-O.3.1.1
Answer Key	A
Depth of Knowledge	1
p-value A	70% (correct answer)
p-value B	4%
p-value C	6%
p-value D	20%
Option Annotations	A. correct B. only true of the 1st term, 11th term, 21st term, 31st term, etc. C. is true for some but not all D. only true for some of the terms but not all the terms

11. Starting with an octagon, Hillary used the rule "Replace one side with two new sides" to create the pattern shown below.

Four shapes are shown. The first shape has 8 sides. The second shape has 9 sides. The third shape has 10 sides. The fourth shape has 11 sides.

How many sides will the next shape in Hillary's pattern have?

A.   8

B.   11

C.   12

D.   16

Item Information	
Alignment	B-O.3.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	21%
p-value B	13%
p-value C	58% (correct answer)
p-value D	8%
Option Annotations	A. assumes each shape has 8 sides because it starts with an octagon B. gives the number of sides of the last shape given C. correct D. thinks the number of sides is increasing by 2 with each iteration and not 1

12. In a video game, players can collect a special item that is worth different points based on what level of the game they are on, as shown in the table below.

Special Item Points

Level	Number of Points
1	10
2	20
3	40
4	80

The pattern for the number of points for collecting the special item continues. Which statement explains how to find the correct number of points for collecting the special item while on level 5?

A.   Add 10 to 80 to get 90 points.

B.   Add 40 to 80 to get 120 points.

C.   Multiply 80 by 2 to get 160 points.

D.   Multiply 80 by 5 to get 400 points.

Item Information	
Alignment	B-O.3.1.3 B-O.3.1.2
Answer Key	C
Depth of Knowledge	2
p-value A	22%
p-value B	18%
p-value C	53% (correct answer)
p-value D	7%
Option Annotations	A. returns to idea of adding 10, which only works going from level 1 to 2 B. adds the previous value C. correct D. multiplies by the new level

13. As part of a map, Lewis drew a ray with three points labeled A, B, and C on it. The ray Lewis drew started at point A. Which could be the part of the map Lewis drew?

    A.   A line that passes through the points A, B, and C.

    B.   A ray that starts at point A and passes through the points B and C.

    C.   A line segment that starts at point A, passes through point C, and ends at point B.

    D.   A line segment that starts at point B, passes through point A, and ends at point C.

Item Information	
Alignment	C-G.1.1.1
Answer Key	B
Depth of Knowledge	1
p-value A	16%
p-value B	75% (correct answer)
p-value C	6%
p-value D	3%
Option Annotations	A. confuses a ray and a line B. correct C. confuses a ray with a line segment D. confuses a ray with a line segment and chooses a starting point that is neither at the left-most nor right-most point

14. Eric is making a design for a school flag. He draws the pentagon shown below

Graphic of a Pentagon

Eric will cut the figure along a line of symmetry of the shape. What are the two shapes Eric will make?

A.   two trapezoids

B.   two parallelograms

C.   a rectangle and a triangle

D.   a rectangle and a pentagon

Item Information	
Alignment	C-G.1.1.2 C-G.1.1.3
Answer Key	A
Depth of Knowledge	2
p-value A	51% (correct answer)
p-value B	20%
p-value C	19%
p-value D	10%
Option Annotations	A. correct B. sees a set of parallel lines C. draws a horizontal line through 2 vertices D. draws a horizontal line halfway through the shape

15. A designer drew a line of symmetry in an angle to create two acute angles. Which figure could the designer have drawn?

A.   The figure shows two rays that form a right angle. One ray is pointing up and the other ray is pointing right. A dashed line passes through the ray that is pointing up.

B.   The figure shows a horizontal line. A vertical dashed line passes through the horizontal line.

C.   The figure shows two rays that form an obtuse angle. One ray is pointing up and to the left, and the other ray is pointing right. A dashed line passes through the center of the angle.

D.   The figure shows two rays that form an obtuse angle. One ray is pointing to the left, and the other ray is point up and to the right. A vertical dashed line passes through the point where the rays intersect.

Item Information	
Alignment	C-G.1.1.3 C-G.1.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	6%
p-value B	12%
p-value C	69% (correct answer)
p-value D	13%
Option Annotations	A. does not create a line of symmetry B. creates two right angles, not acute angles C. correct D. does not create a line of symmetry

16. A 90° angle is divided into three smaller angles, as shown below.

The figure shows four rays that all start at point X. Ray X R and ray X U form a right angle. Ray X S and ray X T are both inside the right angle. Angle S X T (the middle angle) is labeled 20 degrees.

The middle angle is 20°. The other two angles have the same measure. What is the measure of one of the other two angles?

A.   35°

B.   45°

C.   30°

D.   70°

Item Information	
Alignment	D-M.3.1.2
Answer Key	A
Depth of Knowledge	2
p-value A	47% (correct answer)
p-value B	20%
p-value C	14%
p-value D	19%
Option Annotations	A. correct B. 90 divided by 2 (does not subtract the 20) C. 90 divided by 3 (thinks all three angles are equal) D. 90 minus 20 (does not divide the difference)

OPEN-ENDED QUESTION

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

Item-Specific Scoring Guideline

#17 Item Information

Alignment   A-F.3

Depth of Knowledge   3

Mean Score   1.75

Assessment Anchor this item will be reported under:

M04.A-F.3—Understand decimal notation for fractions, and compare decimal fractions.

Specific Anchor Descriptor addressed by this item:

M04.A-F.3.1—Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems).

Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of decimal notation for fractions and comparing decimal fractions by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of decimal notation for fractions and comparing decimal fractions by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of decimal notation for fractions and comparing decimal fractions by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of decimal notation for fractions and comparing decimal 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. OR Student demonstrates minimal understanding of decimal notation for fractions and comparing decimal 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 (1 point):

　　1 point for correct answer

What?	Why?
0.4 (meter)	

Part B (2 points):

　　1 point for correct answer
　　1 point for complete support

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

What?	Why?
$\frac{82}{100}$ (meter) **OR equivalent**	**Sample Work:** $\frac{4}{10} = \frac{40}{100}$ $\frac{40}{100} + \frac{42}{100} = \frac{82}{100}$ **OR** **Sample Explanation:** First, I changed $\frac{4}{10}$ to $\frac{40}{100}$ by multiplying the numerator and denominator by 10. Then I added $\frac{40}{100} + \frac{42}{100}$ to get $\frac{82}{100}$. **OR equivalent**

Part C (1 point):

1 point for complete explanation

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

What?	Why?
	Sample Explanation: The first piece of rope is equal to $\frac{40}{100}$ meter and the second piece of rope is $\frac{42}{100}$ meter. There is only one possible length between these two lengths since 41 is the only whole number between 40 and 42. So the length of the third piece of rope must be $\frac{41}{100}$ meter, which can also be written as 0.41 meter. **OR equivalent**

STUDENT RESPONSE

Handwritten Response Score: 4 points

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

        Student Response: 0.4 meters long

        Annotation: The student has given a correct answer.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

        Student Response: LCM: 100

                4/10 + 42/100 =

                40/100 + 42/100 = 82/100

                82/100 meters

        Annotation: The student has given a correct answer and complete support.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

        Student Response: 0.41

                The one possible length is 0.41. It is because in hundredths of 0.4 is also 0.40. Then the other one is 0.42. Then I thought it was 0.41. Thats how I got my answer.

        Annotation: Student has given a complete explanation.

STUDENT RESPONSE

Online Response Score: 3 points

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

        Student Response: 0.4

        Annotation: The student has given a correct answer.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

        Student Response: 82/100

                                  $0.42 + 0.4 = 0.82$

        Annotation: The student has given a correct answer and complete support.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

        Student Response: Because it's between the first and second rope, and there could only be one answer for the length of the third rope the length is 0.20.

        Annotation: The student has given an incorrect explanation ("between the first and second rope" is given information and is insufficient for any credit).

STUDENT RESPONSE

Handwritten Response Score: 2 points

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

        Student Response: 0.41

        Annotation: The student has given an incorrect answer.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

        Student Response: 42/100 + (4/10) / (10 x 10)

                               40/100 + 42/100 =

                               82/100 meters

        Annotation: The student has given a correct answer and complete support.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

        Student Response: there is only one possible length For the rope to Be Because I changed 4/10 to an equivelent Fraction so I could add them. I multiplied By 10 to get 40/100. I also Have 42/100. therefore the only possible answer could Be 41/100.

        Annotation: The student has given a correct but incomplete explanation (has not expressed the length as a decimal).

STUDENT RESPONSE

Online Response Score: 1 point

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

        Student Response: 0.4

        Annotation: The student has given a correct answer.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

        Student Response: 42/100 4/10

                          I made 42 hundrths into fourdundrths so it would look more like a fraction not a decimal

        Annotation: The student has given an incorrect answer and incorrect support.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

        Student Response: if the length is between the first and second piece of rope then it could be 32/100 because I picked a number that is close to 42 and not super far away from four.

                          this is the number and what it would like in a decimal.

                          00.32

        Annotation: The student has given an incorrect explanation.

STUDENT RESPONSE

Handwritten Response Score: 0 points

17. Curt has two pieces of rope. The first piece of rope is 4/10 meter long. The second piece of rope is 42/100 meter long.

    A.   Write the length, in meters as a decimal, of the first piece of rope.

        Student Response: 4, 1

        Annotation: The student has given an incorrect answer.

    B.   Write the total length, in meters as a fraction, of both pieces of rope. Show or explain all your work.

        Student Response: 46/100

                        I put the answer because I added the 4 to 42 and got 46 then I added 10 to 100 and got 110.

        Annotation: The student has given an incorrect answer and incorrect support.

The length of a third piece of rope is between the lengths of the first and second pieces of rope. The length of the third piece is expressed as a decimal to the hundredths place.

    C.   Explain why there is only one possible length for the third piece of rope. As part of the explanation, find the length, in meters, of the third piece of rope and express it as a decimal to the hundredths place.

        Student Response: 4/10 28/10 42/100 28.0

                        I put 26.0 because I cut the 42 in half and got 26 then I cut 4 in half and got 2 so I added the 26 and the 2 together and got 28 then I put the 28 in meters like this 28/100 because it said hundreds.

                        When I put the 28 in decimal form to the hundreth's it looks lik this.

        Annotation: The student has given an incorrect explanation.

MATHEMATICS—SUMMARY DATA

MULTIPLE-CHOICE

Sample Number	Alignment	Answer Key	Depth of Knowledge	*p*-value A	*p*-value B	*p*-value C	*p*-value D
1	A-T.2.1.4	B	1	13%	73% (correct answer)	7%	7%
2	A-F.1.1.2 A-F.1.1.1	C	2	21%	19%	52% (correct answer)	8%
3	A-F.2.1.6	C	1	24%	22%	42% (correct answer)	12%
4	A-T.1.1.2 A-T.1.1.1	D	2	13%	13%	17%	57% (correct answer)
5	A-T.1.1.4	B	1	11%	53% (correct answer)	20%	16%
6	A-T.2.1.2	D	1	5%	5%	5%	85% (correct answer)
7	B-O.1.1	B	2	14%	31% (correct answer)	27%	28%
8	B-O.1.1.1 B-O.1.1.3	B	2	24%	49% (correct answer)	10%	17%
9	B-O.1.1.2 B-O.1.1.3	C	2	14%	16%	64% (correct answer)	6%
10	B-O.2.1.1 B-O.3.1.1	A	1	70% (correct answer)	4%	6%	20%
11	B-O.3.1.1	C	1	21%	13%	58% (correct answer)	8%
12	B-O.3.1.3 B-O.3.1.2	C	2	22%	18%	53% (correct answer)	7%
13	C-G.1.1.1	B	1	16%	75% (correct answer)	6%	3%

Sample Number	Alignment	Answer Key	Depth of Knowledge	p-value A	p-value B	p-value C	p-value D
14	C-G.1.1.2 C-G.1.1.3	A	2	51% (correct answer)	20%	19%	10%
15	C-G.1.1.3 C-G.1.1.1	C	2	6%	12%	69% (correct answer)	13%
16	D-M.3.1.2	A	2	47% (correct answer)	20%	14%	19%

OPEN-ENDED

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	A-F.3	4	3	1.75

PSSA Grade 4 Mathematics Item and Scoring Sampler