



**pennsylvania**  
DEPARTMENT OF EDUCATION

# **The Pennsylvania System of School Assessment**

## **Mathematics Item and Scoring Sampler**



**2019–2020  
Grade 5**

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## INTRODUCTION

### General Introduction

The Pennsylvania Department of Education (PDE) 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.

This Item and Scoring Sampler is available in Braille format. For more information regarding Braille call (717) 901-2238.

### Pennsylvania Core Standards (PCS)

This sampler contains examples of test questions designed to assess the Pennsylvania Assessment Anchors and Eligible Content aligned to the Pennsylvania Core Standards. 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 2014 PCS-aligned Assessment Anchor and Eligible Content documents are posted on this portal:

- [www.education.pa.gov](http://www.education.pa.gov) [Roll over 'DATA AND REPORTING' in the dark blue bar across the top of the page. Select 'ASSESSMENT AND ACCOUNTABILITY.' Click on the link that reads 'Pennsylvania System of School Assessment (PSSA).' Then click on 'Assessment Anchors/Eligible Content!']

### 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.<sup>1</sup> 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. 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.<sup>1</sup>

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<sup>1</sup> The permission to copy and/or use these materials does not extend to commercial purposes.

## 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.

<b>Mathematics Item Type</b>	<b>MC</b>	<b>OE</b>
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	• C = Geometry
• B = Algebraic Concepts	• 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 5.

- 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 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.**

Response may show only information copied from the question.

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

## 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<sup>2</sup> 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
<i>p</i> -value A	Percentage of students who selected each option
<i>p</i> -value B	Percentage of students who selected each option
<i>p</i> -value C	Percentage of students who selected each option
<i>p</i> -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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<sup>2</sup> All *p*-value percentages listed in the item information tables have been rounded.

**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.

2019  
 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)

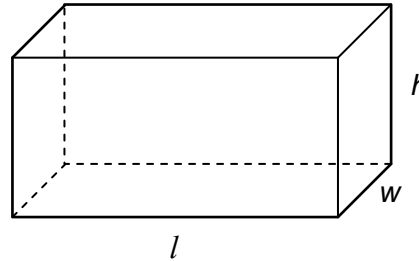
1 kilogram (kg) = 1,000 grams (g)

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  
 $V = B \times l$

**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.



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

### MULTIPLE-CHOICE ITEMS

1. Divide:  $18 \div \frac{1}{12}$

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

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

C. 30

D. 216

Item Information	
Alignment	A-F.2.1.4
Answer Key	D
Depth of Knowledge	1
p-value A	12%
p-value B	33%
p-value C	9%
p-value D	46% (correct answer)
Option Annotations	<p>A. inverts both 18 and <math>\frac{1}{12}</math> before multiplying (or divided 12 by 18)</p> <p>B. divides 18 by 12</p> <p>C. inverts <math>\frac{1}{12}</math> but then adds 12 to 18</p> <p>D. correct</p>

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

2. Joe writes a number with a 3 in the tenths place. Ellie also writes a number with a 3 as a digit. The value of the 3 in Ellie’s number is 10 times the value of the 3 in Joe’s number. Which number could be the one Ellie wrote?
- A. 324.67
  - B. 423.67
  - C. 426.37
  - D. 426.73

Item Information	
Alignment	A-T.1.1.1
Answer Key	B
Depth of Knowledge	1
p-value A	21%
p-value B	46% (correct answer)
p-value C	19%
p-value D	14%
Option Annotations	<p>A. uses the tens place instead of the tenths place for the 3 in Joe’s number</p> <p>B. correct</p> <p>C. identifies a number that could be Joe’s number</p> <p>D. identifies a number using a 3 that is <math>\frac{1}{10}</math> of the value of the 3 in Joe’s number instead of 10 times the value</p>

3. An inequality is shown below.

$$4.205 < \underline{\hspace{2cm}}$$

Which number could be placed into the blank to make the inequality true?

- A. four and twenty-four hundredths
- B. four and twenty-seven thousandths
- C. four and two hundred five thousandths
- D. four and two hundred four thousandths

Item Information	
Alignment	A-T.1.1.4 A-T.1.1.3
Answer Key	A
Depth of Knowledge	1
p-value A	48% (correct answer)
p-value B	26%
p-value C	17%
p-value D	9%
Option Annotations	A. correct B. compares 27 to 20 C. selects an equal amount D. compares the numbers in the wrong direction

4. A number is multiplied by 4, then divided by 2, and finally multiplied by 0.5. How does the result compare to the original number?
- A. The result is the same as the original number.
  - B. The result is four times the value of the original number.
  - C. The result is one-fourth the value of the original number.
  - D. The result cannot be compared to the original number without knowing the original number.

Item Information	
Alignment	A-T.2.1.1 A-T.2.1.2 A-T.2.1.3
Answer Key	A
Depth of Knowledge	2
p-value A	39% (correct answer)
p-value B	12%
p-value C	12%
p-value D	37%
Option Annotations	A. correct B. thinks the second and third operations “cancel” each other OR finds $n \times 4 \times 2 \times 0.5$ OR finds $n \times 4 \div 2 \div 0.5$ C. finds $n \div 4 \times 2 \times 0.5$ D. does not understand how the operations are related

5. The expression below shows two fractions being added.

$$\frac{7}{12} + \frac{1}{18}$$

Which expression could be used to find the sum of the two fractions?

- A.  $\frac{5}{6} + \frac{2}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$
- B.  $\frac{5}{30} + \frac{1}{30} + \frac{1}{30} + \frac{1}{30}$
- C.  $\frac{15}{36} + \frac{6}{36} + \frac{1}{36} + \frac{1}{36}$
- D.  $\frac{30}{72} + \frac{12}{72} + \frac{2}{72} + \frac{1}{72}$

Item Information	
Alignment	A-F.1
Answer Key	C
Depth of Knowledge	1
p-value A	17%
p-value B	16%
p-value C	59% (correct answer)
p-value D	8%
Option Annotations	<p>A. decomposes numerators and denominators in attempt to get a common denominator</p> <p>B. adds numerators and adds denominators in original fractions</p> <p>C. correct</p> <p>D. does not notice that <math>\frac{1}{72}</math> should be <math>\frac{2}{72}</math></p>

6. Priya has two pieces of fabric.
- One piece is  $\frac{8}{12}$  foot in length.
  - The other piece is  $\frac{3}{12}$  foot in length.

Priya uses  $\frac{9}{12}$  foot of the fabric to make a pillowcase. How many feet of fabric does Priya have remaining?

- A.  $\frac{1}{6}$
- B.  $\frac{1}{3}$
- C.  $\frac{11}{12}$
- D.  $1\frac{1}{6}$

Item Information	
Alignment	A-F.1.1
Answer Key	A
Depth of Knowledge	2
p-value A	70% (correct answer)
p-value B	9%
p-value C	14%
p-value D	7%
Option Annotations	<p>A. correct</p> <p>B. finds <math>\frac{9}{12} + \frac{3}{12} - \frac{8}{12}</math></p> <p>C. finds total length of fabric before making pillowcase</p> <p>D. finds <math>\frac{8}{12} + \frac{9}{12} - \frac{3}{12}</math></p>

7. Tanya makes a paper volcano in science class. She spends  $\frac{1}{3}$  hour building the base,  $\frac{1}{6}$  hour shaping the cone, and  $\frac{1}{8}$  hour painting the outside. How many hours does Tanya spend making the volcano?
- A.  $\frac{1}{8}$
  - B.  $\frac{3}{17}$
  - C.  $\frac{5}{8}$
  - D.  $\frac{15}{17}$

Item Information	
Alignment	A-F.1.1.1
Answer Key	C
Depth of Knowledge	1
p-value A	5%
p-value B	14%
p-value C	69% (correct answer)
p-value D	12%
Option Annotations	A. adds numerators (before conversion), but uses correct LCD and reduces B. adds numerators (before conversion), then denominators (before conversion) C. correct D. adds numerators correctly (following conversion); adds denominators (before conversion)

8. Cereal boxes are arranged on three different shelves in a grocery store.
- The top shelf is  $42\frac{1}{2}$  inches in length and  $14\frac{2}{5}$  inches in width.
  - The middle shelf is  $1\frac{2}{5}$  times the length of the top shelf and  $1\frac{1}{2}$  times the width of the top shelf.
  - The bottom shelf is  $\frac{4}{5}$  times the length of the middle shelf and  $\frac{3}{4}$  times the width of the middle shelf.

What are the length and the width of the bottom shelf?

A. length:  $47\frac{3}{5}$  inches

width:  $12\frac{3}{20}$  inches

B. length:  $47\frac{3}{5}$  inches

width:  $16\frac{1}{5}$  inches

C. length:  $58\frac{7}{10}$  inches

width:  $20\frac{17}{20}$  inches

D. length:  $59\frac{1}{2}$  inches

width:  $21\frac{3}{5}$  inches



Item Information	
Alignment	A-F.2.1
Answer Key	B
Depth of Knowledge	2
p-value A	17%
p-value B	58% (correct answer)
p-value C	13%
p-value D	12%
Option Annotations	<p>A. calculates the correct length but subtracts the sum of “times the width” fractions of the middle and bottom shelves from the width of the top shelf</p> <p>B. correct</p> <p>C. subtracts “times the length” <math>\left(\frac{4}{5}\right)</math> and “times the width” <math>\left(\frac{3}{4}\right)</math> fractions in the bottom shelf bullet point from the correct length and width measurements of the middle shelf</p> <p>D. uses the middle shelf length and width</p>

9. Two expressions are described below.

expression R: multiply 35 by  $\frac{6}{5}$

expression S: multiply 35 by  $\frac{3}{4}$

Based on the descriptions, which statement is true?

- A. The value of expression R is greater than 35 because  $\frac{6}{5} < 1$ .
- B. The value of expression R is greater than 35 because  $\frac{6}{5} > 1$ .
- C. The value of expression S is greater than 35 because  $\frac{3}{4} < 1$ .
- D. The value of expression S is greater than 35 because  $\frac{3}{4} > 1$ .

Item Information	
Alignment	A-F.2.1.3
Answer Key	B
Depth of Knowledge	2
p-value A	24%
p-value B	55% (correct answer)
p-value C	14%
p-value D	7%
Option Annotations	<p>A. uses the incorrect inequality</p> <p>B. correct</p> <p>C. uses the correct inequality for <math>\frac{3}{4}</math> but incorrectly states the effect of multiplying by a number less than 1</p> <p>D. does not use the correct inequality (although the statement matches the inequality used)</p>

10. The value of the expression shown below is 7.5.

$$0.75(2 + 6 \times 4 - 2 \times 7 - 2)$$

Each 2 in the expression is changed to a 3 to make a new expression. What is the difference in the values of the expressions?

- A. 1
- B. 5.25
- C. 8.5
- D. 22.5

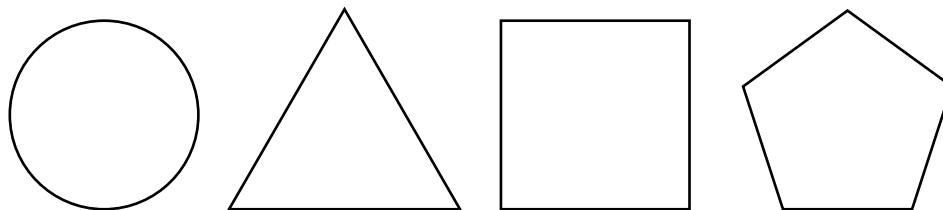
Item Information	
Alignment	B-O.1.1
Answer Key	B
Depth of Knowledge	2
p-value A	17%
p-value B	39% (correct answer)
p-value C	24%
p-value D	20%
Option Annotations	<ul style="list-style-type: none"> <li>A. assumes the change in the value of the expression will be 1 because 2 was increased by 1</li> <li>B. correct</li> <li>C. increases the original value of the expression by 1 because 2 was increased by 1</li> <li>D. multiplies 7.5 by 3</li> </ul>

11. Which calculation is represented by the expression  $(5 + 2) \div 9$ ?

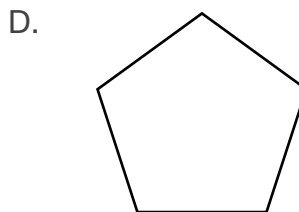
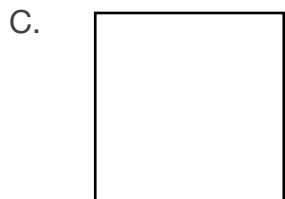
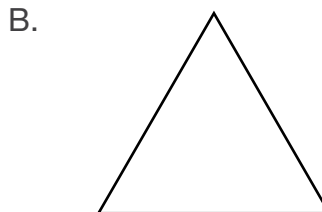
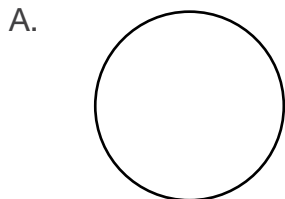
- A. divide five by nine, then add two
- B. divide two by nine, then add five
- C. divide the sum of five and two by nine
- D. divide nine by the sum of five and two

Item Information	
Alignment	B-O.1.1.2
Answer Key	C
Depth of Knowledge	1
p-value A	7%
p-value B	7%
p-value C	55% (correct answer)
p-value D	31%
Option Annotations	A. confuses order of operations B. confuses order of operations C. correct D. reverses division

12. The four shapes shown below repeat to form a pattern.

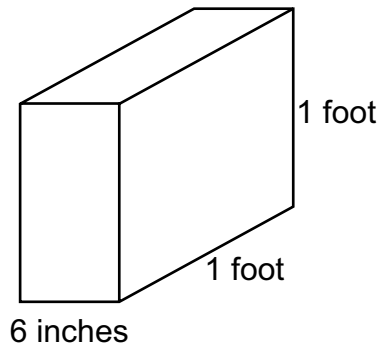


The pattern continues. What is the 67th shape in the pattern?



Item Information	
Alignment	B-O.2.1
Answer Key	C
Depth of Knowledge	2
p-value A	18%
p-value B	8%
p-value C	61% (correct answer)
p-value D	13%
Option Annotations	A. chooses 1 more instead of 1 less than a “complete” pattern (multiple of 4) B. selects the 66th shape C. correct D. selects the 68th shape (or 67 after the first)

13. A company uses boxes with the dimensions shown below. The width is in **inches**. The length and height are in **feet**.

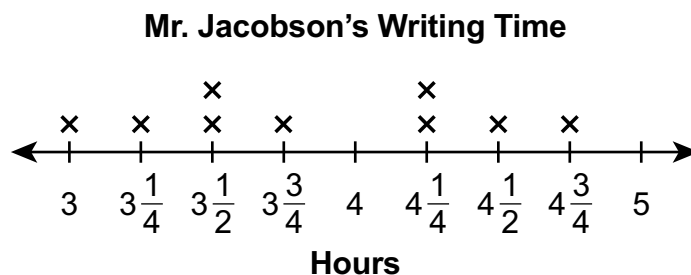


What is the volume, in **cubic inches**, of each box?

- A. 6 cubic inches
- B. 72 cubic inches
- C. 600 cubic inches
- D. 864 cubic inches

Item Information	
Alignment	D-M.1.1.1 D-M.3.1.1
Answer Key	D
Depth of Knowledge	2
p-value A	34%
p-value B	18%
p-value C	6%
p-value D	42% (correct answer)
Option Annotations	A. does not convert any of the measurements B. only converts one side to inches, and evaluates $12 \times 6 \times 1$ C. uses 10 inches to equal 1 foot D. correct

14. The line plot below shows the number of hours Mr. Jacobson spent writing for each of the last nine days.

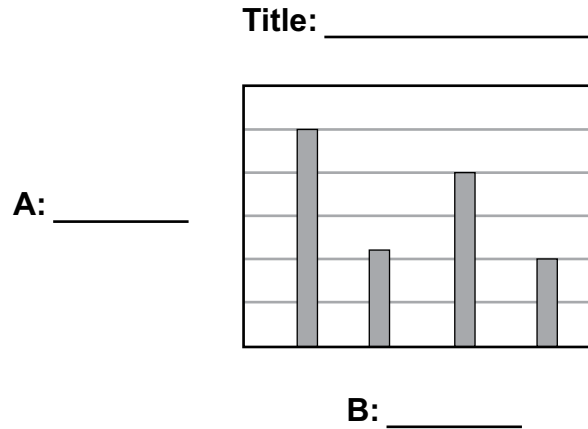


What is the total number of hours Mr. Jacobson spent writing over the last nine days?

- A. 31
- B.  $31\frac{6}{13}$
- C.  $34\frac{3}{4}$
- D. 35

Item Information	
Alignment	D-M.2.1.1
Answer Key	C
Depth of Knowledge	2
p-value A	11%
p-value B	11%
p-value C	63% (correct answer)
p-value D	15%
Option Annotations	<p>A. adds only the whole numbers</p> <p>B. adds the numerators and denominators in all the fractions</p> <p>C. correct</p> <p>D. incorrectly combines the fractional parts of the 4 greatest values to get 2 instead of <math>1 + \frac{3}{4}</math></p>

15. A bar graph is shown below, but some of the information is missing.



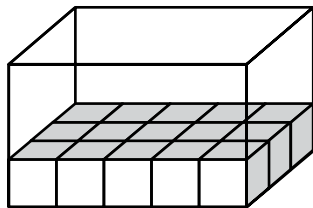
Which title and axis labels would be **most** appropriate for the graph?

- |   |   |
|---|---|
| <p>A. Title: Leo’s Plants<br/>A: Type of Plant<br/>B: Average Height (inches)</p> | <p>B. Title: Airplane Elevation<br/>A: Elevation (feet)<br/>B: Time since Start (minutes)</p> |
| <p>C. Title: Voting Results<br/>A: Number of Voters<br/>B: Candidate</p>          | <p>D. Title: Movie Tickets<br/>A: Number of Tickets<br/>B: Total Cost (\$)</p>                |

Item Information	
Alignment	D-M.2.1.2
Answer Key	C
Depth of Knowledge	2
p-value A	26%
p-value B	17%
p-value C	37% (correct answer)
p-value D	20%
Option Annotations	A. selects title and axis labels that would work if labels were switched B. does not recognize the non-continuous aspect of the x-axis C. correct D. does not recognize the non-continuous aspect of the x-axis



16. The bottom of the rectangular prism shown below is covered by 1-inch cubes.



The height of the prism is 3 inches. Which statement explains how to determine the volume, in cubic inches, of the rectangular prism?

- A. Add two more layers of the number of cubes in the bottom layer:  $15 + 15 + 15$ .
- B. Multiply the number of cubes in the bottom layer two more times:  $15 \times 15 \times 15$ .
- C. Add 3 to the number of cubes in the length and width of the bottom layer:  $3 + 5 + 3$ .
- D. Multiply the number of cubes in the bottom layer by the length and width of the bottom layer:  $15 \times 5 \times 3$ .

Item Information	
Alignment	D-M.3.1
Answer Key	A
Depth of Knowledge	2
p-value A	46% (correct answer)
p-value B	12%
p-value C	13%
p-value D	29%
Option Annotations	A. correct B. confuses multiplication with addition C. confuses adding layers with adding to the dimensions D. mixes adding layers with multiplying dimensions

## OPEN-ENDED QUESTION

17. Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

- A. Write the standard form for the number of minutes Derek rode his bike on Monday.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

- B. Write the word form for the number of minutes Derek rode his bike on Thursday.

Go to the next page to finish question 17.

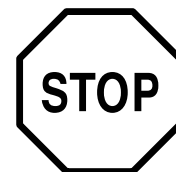


17. **Continued.** Please refer to the previous page for task explanation.

On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

- C. Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

**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

<b>Alignment</b>	A-T.1	<b>Depth of Knowledge</b>	2	<b>Mean Score</b>	1.45
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### Assessment Anchor this item will be reported under:

M05.A-T.1—Understand the place-value system.

### Specific Anchor Descriptor addressed by this item:

M05.A-T.1.1—Demonstrate understanding of place-value of whole numbers and decimals, and compare quantities or magnitudes of numbers.

### Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of the place-value system by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of the place-value system by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of the place-value system by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of the place-value system.
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 the place-value system.
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?
35.5 (minutes)	

Part B (1 point):

1 point for correct answer

What?	Why?
Forty-five and eighty-two thousandths (minutes)	

Part C (2 points):

1 point for correct answer

1 point for correct and complete explanation

What?	Why?
5.24 (miles)	<p><b>Sample Explanation:</b></p> <p>The 9 does not increase the 4 because it is in the ten thousandths place rather than the thousandths place.</p> <p><b>OR</b></p> <p>Derek should look only at the 0 after the 4 to determine whether to round up or down. Since 0 is less than 5, he should round down so the 4 stays the same.</p> <p><b>OR equivalent</b></p>

STUDENT RESPONSE

Response Score: 4 points



PARTS A AND B

Question 17  
Page 1 of 2

Item ID ?

Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

**A.** Write the standard form for the number of minutes Derek rode his bike on Monday.

35.5 minutes

The response provides a correct answer.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

**B.** Write the word form for the number of minutes Derek rode his bike on Thursday.

Forty-five and eighty-two thousandths.

The response provides a correct answer.

Next

Options

Flag







Pause

Review/End Test

PART C

Question 17  
Page 2 of 2

Item ID ?

Derek rode his bike several times last week.

On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

**C.** Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

The correct way to round 5.2409 to the nearest hundredth is by looking at the thousandths place, and rounding up if the number is 5 or above, or rounding down if the number is 4 or lower. For example, in 5.2409, I'd look at the zero because I'm rounding to the nearest hundredth. Since zero is below 4, I would round it down to 5.24. That is the correct way how to round 5.2409 to the nearest hundredth.

406 / 1000

Options

Flag

Pause

Review/End Test

Back

Next

The response provides a correct answer and a correct and complete explanation.

## STUDENT RESPONSE

Response Score: 3 points

17. Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

- A. Write the standard form for the number of minutes Derek rode his bike on Monday.

Derek rode his bike for.

35.5 minutes

The response provides a correct answer.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

- B. Write the word form for the number of minutes Derek rode his bike on Thursday.

forty-five and eighty-two  
thousandths.

The response provides a correct answer.

Go to the next page to finish question 17.





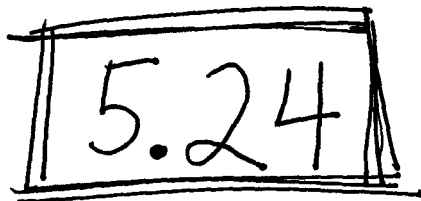
17. *Continued.* Please refer to the previous page for task explanation.

On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

- C. Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

We'll first go to the tenths place and see what the number next to it is. If it's more than five you round up. If it's less than five you are rounding down.

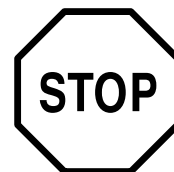
In this case the number is less than five so you do nothing with it.



5.24

The response provides a correct answer and an incorrect explanation.

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: 2 points



PARTS A AND B

Question 17  
Page 1 of 2

Item ID ?

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Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

**A.** Write the standard form for the number of minutes Derek rode his bike on Monday.

35 minutes and 50 seconds

The response provides an incorrect answer.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

**B.** Write the word form for the number of minutes Derek rode his bike on Thursday.

Forty-five minutes and 82 thousandths

The response provides an incorrect answer.

Review/End Test

Pause

Flag







Options

Next

PART C

Question 17  
Page 2 of 2

Item ID ?

Derek rode his bike several times last week.

On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

**C.** Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

The response provides a correct answer and a correct and complete explanation.

335 / 1000

Review/End Test

Pause

Flag

Options

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## STUDENT RESPONSE

Response Score: 1 point

17. Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

- A. Write the standard form for the number of minutes Derek rode his bike on Monday.

Derek rode his bike for 35.5 min.

The response provides a correct answer.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

- B. Write the word form for the number of minutes Derek rode his bike on Thursday.

fourty five eight hundred two thousand

The response provides an incorrect answer.

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

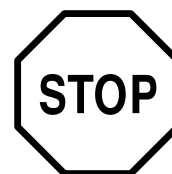
On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

- C. Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

To round 5.2409 to the nearest hundred go to the hundredths place and change the number to the closest hundred,

The response provides an incorrect explanation and no answer.

**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



PARTS A AND B

Question 17  
Page 1 of 2

Item ID

?

Derek rode his bike several times last week.

On Monday, Derek rode his bike for  $0.355 \times 10^2$  minutes.

**A.** Write the standard form for the number of minutes Derek rode his bike on Monday.

7.1 minutes

The response provides an incorrect answer.

On Thursday, the number of minutes Derek rode his bike is shown below.

$$(4 \times 10) + (5 \times 1) + \left(8 \times \frac{1}{100}\right) + \left(2 \times \frac{1}{1,000}\right)$$

**B.** Write the word form for the number of minutes Derek rode his bike on Thursday.

forty-five ten-thousandths

The response provides an incorrect answer.

Next

Review/End Test

Pause

Flag

Options

PART C

Question 17  
Page 2 of 2

Item ID ?

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Derek rode his bike several times last week.

On Saturday, Derek rode his bike 5.2409 miles. Derek rounds this distance to the nearest hundredth and gets 5.25 miles. Derek is incorrect.

**C.** Explain the correct way to round 5.2409 to the nearest hundredth using place value concepts. As part of your explanation, include the correctly rounded distance, to the nearest hundredth mile, Derek rode his bike.

It would be 5 miles because 2 is less than 5, so you would round down to 0, taking out the other numbers as well.

Review/End Test

Pause

Flag

Options

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The response provides an incorrect answer and an incorrect explanation.

**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.2.1.4	D	1	12%	33%	9%	46%
2	A-T.1.1.1	B	1	21%	46%	19%	14%
3	A-T.1.1.4 A-T.1.1.3	A	1	48%	26%	17%	9%
4	A-T.2.1.1 A-T.2.1.2 A-T.2.1.3	A	2	39%	12%	12%	37%
5	A-F.1	C	1	17%	16%	59%	8%
6	A-F.1.1	A	2	70%	9%	14%	7%
7	A-F.1.1.1	C	1	5%	14%	69%	12%
8	A-F.2.1	B	2	17%	58%	13%	12%
9	A-F.2.1.3	B	2	24%	55%	14%	7%
10	B-O.1.1	B	2	17%	39%	24%	20%
11	B-O.1.1.2	C	1	7%	7%	55%	31%
12	B-O.2.1	C	2	18%	8%	61%	13%
13	D-M.1.1.1 D-M.3.1.1	D	2	34%	18%	6%	42%
14	D-M.2.1.1	C	2	11%	11%	63%	15%
15	D-M.2.1.2	C	2	26%	17%	37%	20%
16	D-M.3.1	A	2	46%	12%	13%	29%

**OPEN-ENDED**

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	A-T.1	4	2	1.45





# **PSSA Grade 5 Mathematics Item and Scoring Sampler**

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