pennsylvania
DEPARTMENT OF EDUCATION

The Pennsylvania System of School Assessment

Mathematics
Item and Scoring Sampler

2019–2020
Grade 4

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* [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.[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. 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.[1]

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[1] 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.

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	• 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 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 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[2] 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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2 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.
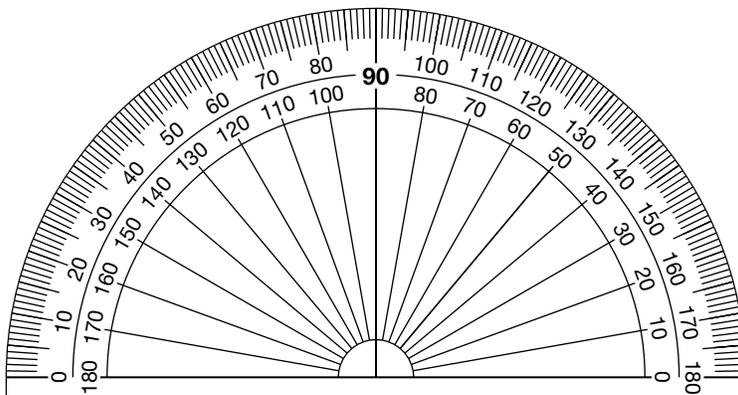
Grade 4 Formula Sheet

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 4

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)

Rectangle
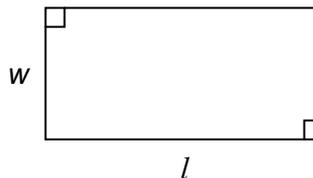
Area = length × width
$A = l \times w$

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.

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

MULTIPLE-CHOICE ITEMS

1. Which decimal number is equal to $\frac{79}{100}$?

   A. 0.079

   B. 0.709

   C. 0.79

   D. 7.9

Item Information	
Alignment	A-F.3.1.2
Answer Key	C
Depth of Knowledge	1
p-value A	15%
p-value B	5%
p-value C	75% (correct answer)
p-value D	5%
Option Annotations	A. misplaces decimal B. misplaces a 0 after the decimal C. correct D. misplaces decimal

A calculator is permitted for use in solving questions 2–16 in this sampler.

2. Greg buys 21 bags of nails. Each bag has 85 nails in it. Greg rounds both numbers to the nearest ten to find an estimate of the total number of nails. What is the difference between Greg's estimate of the total number of nails and the actual total number of nails?

   A. 4

   B. 6

   C. 15

   D. 185

Item Information	
Alignment	A-T.2 A-T.1.1.4
Answer Key	C
Depth of Knowledge	2
p-value A	18%
p-value B	12%
p-value C	37% (correct answer)
p-value D	33%
Option Annotations	A. compares the sum of 21 + 85 with the sum of 20 + 90 B. compares the sum of 21 + 85 with the sum of 20 + 80 C. correct D. rounds to 20 and 80

3. Amanda ate $\frac{5}{8}$ of her chocolate bar. Cody ate more of his chocolate bar than Amanda ate of hers. Which fraction could represent the amount of Cody's chocolate bar that he ate?

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

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

C. $\frac{5}{10}$

D. $\frac{7}{12}$

Item Information	
Alignment	A-F.1.1.2
Answer Key	A
Depth of Knowledge	2
p-value A	42% (correct answer)
p-value B	16%
p-value C	21%
p-value D	21%
Option Annotations	A. correct
	B. confuses the value of $\frac{3}{5}$ with the value of $\frac{3}{4}$
	C. thinks a larger denominator is a larger amount
	D. thinks a larger denominator is a larger amount

4. In Ms. Lassiter's class, $\frac{1}{8}$ of the students have blue eyes and $\frac{5}{8}$ of the students have brown eyes. What fraction of the students in Ms. Lassiter's class have neither blue eyes nor brown eyes?

A. $\frac{2}{8}$

B. $\frac{4}{8}$

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

D. $\frac{6}{8}$

Item Information	
Alignment	A-F.2.1.4
Answer Key	A
Depth of Knowledge	2
p-value A	50% (correct answer)
p-value B	18%
p-value C	7%
p-value D	25%
Option Annotations	A. correct B. subtracts the fraction of blue-eyed students from the fraction of brown-eyed students C. adds the numerators and denominators of the fractions before finding the difference from the whole and reducing D. finds the fraction of students with either blue or brown eyes

5. A store sold 6 sandwiches. Each sandwich contained between $\frac{1}{3}$ and $\frac{1}{2}$ pound of meat. How much meat did the 6 sandwiches contain?

    A.   between 2 and 3 pounds

    B.   between 3 and 4 pounds

    C.   between 5 and 6 pounds

    D.   between 6 and 7 pounds

Item Information	
Alignment	A-F.2.1.7
Answer Key	A
Depth of Knowledge	2
p-value A	52% (correct answer)
p-value B	15%
p-value C	22%
p-value D	11%
Option Annotations	A. correct B. calculates $6 \times \frac{1}{2}$ and thinks that $6 \times \frac{1}{3}$ is a little greater than $6 \times \frac{1}{2}$ C. calculates $6\left(\frac{1}{3} + \frac{1}{2}\right)$ D. calculates $6 + \frac{1}{3} + \frac{1}{2}$

6. In Chang's garden, $\frac{7}{10}$ of the plants are tomato plants and $\frac{12}{100}$ of the plants are cucumber plants. Which decimal is equal to the fraction of the plants in Chang's garden that are either tomato plants or cucumber plants?

   A.   0.19

   B.   0.50

   C.   0.58

   D.   0.82

Item Information	
Alignment	A-F.3.1.1 A-F.3.1.2
Answer Key	D
Depth of Knowledge	1
p-value A	29%
p-value B	10%
p-value C	9%
p-value D	52% (correct answer)
Option Annotations	A. adds 12 and 7 and then converts to decimal B. subtracts 7 from 12 and then converts to decimal form incorrectly C. converts $\frac{7}{10}$ to $\frac{70}{100}$ and then subtracts $\frac{12}{100}$ D. correct

7. In the equation below, each shape stands for a different whole number.

$$\triangle + \bigcirc = \square$$

Which expression has the same value as $\triangle$?

A. $\square - \bigcirc$

B. $\square + \bigcirc$

C. $\square \div \bigcirc$

D. $\square \times \bigcirc$

Item Information	
Alignment	B-O.1.1
Answer Key	A
Depth of Knowledge	1
p-value A	59% (correct answer)
p-value B	23%
p-value C	11%
p-value D	7%
Option Annotations	A. correct B. adds instead of subtracts C. divides instead of subtracts D. multiplies instead of subtracts

8. The bar graph below shows the numbers of four types of fish available at a pet store.

Pet Store Fish
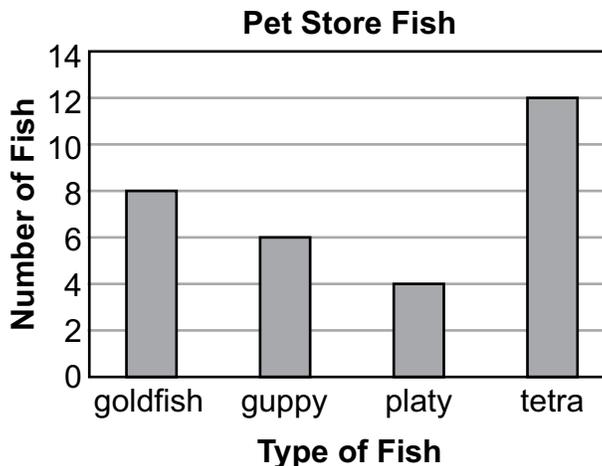
The store owner wants to place an equal number of each type of fish into 4 tanks. For which type of fish will the store owner **not** be able to place an equal number of fish into 4 tanks?

A. goldfish

B. guppy

C. platy

D. tetra

Item Information	
Alignment	B-O.2.1 D-M.2.1
Answer Key	B
Depth of Knowledge	2
p-value A	6%
p-value B	42% (correct answer)
p-value C	23%
p-value D	29%
Option Annotations	A. finds a factor of 4 B. correct C. finds a factor of 4 D. finds a factor of 4

9. Claire packages 42 T-shirts for an order. She puts the same number of T-shirts in each package. How many T-shirts could be in each package?

    A. 6

    B. 8

    C. 9

    D. 12

Item Information	
Alignment	B-O.2.1.1
Answer Key	A
Depth of Knowledge	2
p-value A	72% (correct answer)
p-value B	9%
p-value C	6%
p-value D	13%
Option Annotations	A. correct B. thinks 8 is a factor of 42 C. thinks 9 is a factor of 42 D. thinks 12 is a factor of 42

10. Emmett makes a shape pattern. He starts with shape 1. He turns the shape 90° clockwise to create the next shape in the pattern. The first five shapes of the pattern are shown below.

| shape 1 | shape 2 | shape 3 | shape 4 | shape 5 |
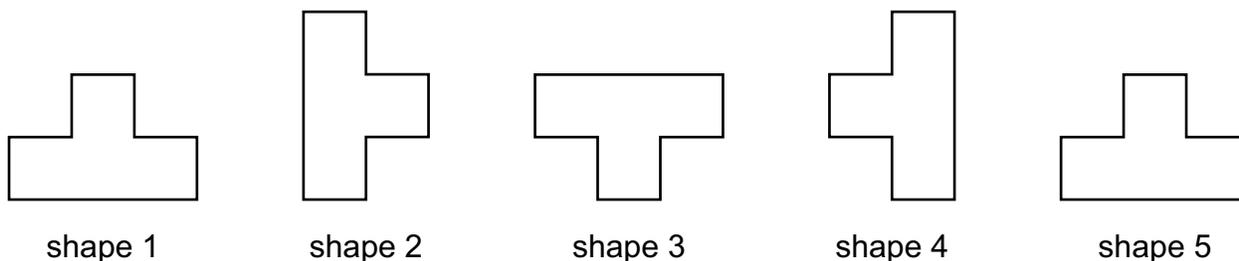
The pattern continues. Which list shows **only** the shape numbers that will be in the **same** position as shape 2 in Emmett's pattern?

A.   4, 6, 8, 10

B.   4, 8, 12, 16

C.   6, 8, 10, 12

D.   6, 10, 14, 18

Item Information	
Alignment	B-O.3
Answer Key	D
Depth of Knowledge	2
p-value A	28%
p-value B	21%
p-value C	16%
p-value D	35% (correct answer)
Option Annotations	A. counts by 2, not noticing that 1 and 3 are reflections B. correctly counts by 4 but starts at 4 C. starts counting at the right number, but counts by 2 and not 4 D. correct

11. Oscar runs the same number of miles each week. The table below shows the total number of miles he had run through the end of some of the weeks.

Oscar's Running

Weeks	Total Miles
2	26
4	52
5	?
7	91

The pattern continues. Which number sentence could be used to find the total number of miles Oscar had run through the end of week 5?

A. $52 + 5 = 57$

B. $5 \times 13 = 65$

C. $91 - 5 = 86$

D. $5 \times 26 = 130$

Item Information	
Alignment	B-O.3.1.2 B-O.3.1.3
Answer Key	B
Depth of Knowledge	2
p-value A	11%
p-value B	61% (correct answer)
p-value C	19%
p-value D	9%
Option Annotations	A. adds 5 to the previous total B. correct C. subtracts 5 from week 7 total D. multiplies 5 by the first total in the table

12. A wheel of cheddar cheese weighs 22 **pounds**. How many **ounces** does the cheese wheel weigh?

    A.   220 ounces

    B.   320 ounces

    C.   342 ounces

    D.   352 ounces

Item Information	
Alignment	D-M.1.1.1
Answer Key	D
Depth of Knowledge	1
p-value A	24%
p-value B	8%
p-value C	6%
p-value D	62% (correct answer)
Option Annotations	A. uses 10 ounces as a conversion factor B. finds the number of ounces for 20 pounds C. does not regroup when multiplying D. correct

13. Gertrude practices the piano on Monday from a quarter past 3:00 until 5 minutes before 4:00. On Tuesday, she practices the piano from 5 minutes after 3:00 until a quarter to 4:00. How many minutes does Gertrude practice the piano in all?

    A. 80

    B. 90

    C. 110

    D. 120

Item Information	
Alignment	D-M.1.1.4 D-M.1.1.2
Answer Key	A
Depth of Knowledge	1
p-value A	41% (correct answer)
p-value B	19%
p-value C	21%
p-value D	19%
Option Annotations	A. correct B. finds 50 + 40, thinking Gertrude stopped on Monday at 5 minutes after 4 C. finds 40 + 70, thinking Gertrude stopped on Tuesday at a quarter after 4 D. finds 50 + 70, thinking Gertrude stopped on Monday at 5 minutes after 4 and on Tuesday at a quarter after 4

14. Deb and Kendal each walked five times in a week. The line plots below show the distance of each of their walks.

Deb's Walks

Distance (miles)
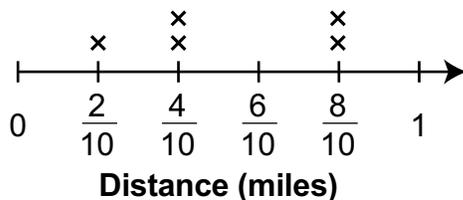
Kendal's Walks

Distance (miles)
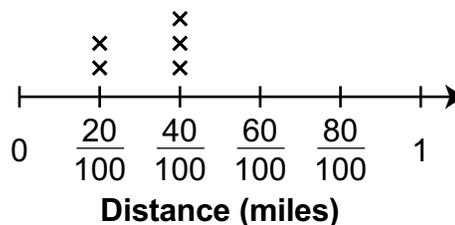
How many miles farther is Deb's longest walk than Kendal's longest walk?

A. $\dfrac{1}{40}$

B. $\dfrac{1}{4}$

C. $\dfrac{4}{10}$

D. $\dfrac{4}{100}$

Item Information	
Alignment	D-M.2.1.2
Answer Key	C
Depth of Knowledge	2
p-value A	10%
p-value B	11%
p-value C	55% (correct answer)
p-value D	24%
Option Annotations	A. creates a unit fraction with 80 – 40 B. creates a unit fraction with 8 – 4 C. correct D. combines both scales

15. The bottom of a clothes hanger and its side form an angle as shown below.
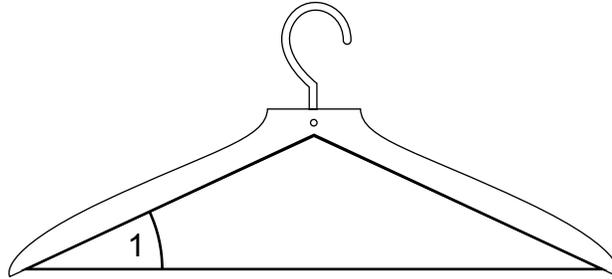
Using your protractor, what is the measure of angle 1 formed by the clothes hanger?

A. 25°

B. 35°

C. 155°

D. 165°

Item Information	
Alignment	D-M.3.1.1
Answer Key	A
Depth of Knowledge	1
p-value A	52% (correct answer)
p-value B	27%
p-value C	13%
p-value D	8%
Option Annotations	A. correct B. starts at 30° and counts "up" 5 degrees C. reads obtuse measure instead of acute D. starts at 160° and counts "up" 5 degrees

16. A picture of a right angle is shown below.
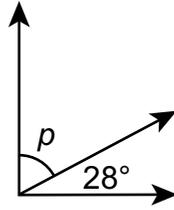
Which expression can be used to find the measure, in degrees, of angle p?

A. $80 + 28$

B. $80 - 28$

C. $90 + 28$

D. $90 - 28$

Item Information	
Alignment	D-M.3.1.2
Answer Key	D
Depth of Knowledge	1
p-value A	12%
p-value B	12%
p-value C	17%
p-value D	59% (correct answer)
Option Annotations	A. incorrectly identifies a right angle as 80 degrees, and then adds to the 28 B. incorrectly identifies a right angle as 80 degrees C. adds the measurements D. correct

OPEN-ENDED QUESTION

17. Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

Go to the next page to finish question 17.

GO ON

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

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

city C: _____ people

city D: _____ people

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

STOP

Item-Specific Scoring Guideline

#17 Item Information

Alignment	A-T.1	Depth of Knowledge	3	Mean Score	1.34

Assessment Anchor this item will be reported under:

M04.A-T.1—Generalize place-value understanding for multi-digit whole numbers.

Specific Anchor Descriptor addressed by this item:

M04.A-T.1.1—Apply place-value and numeration concepts to compare, find equivalencies, and round.

Scoring Guide

Score	In this item, the student . . .
4	Demonstrates a thorough understanding of how to generalize place-value understanding for multi-digit whole numbers by correctly solving problems and clearly explaining procedures.
3	Demonstrates a general understanding of how to generalize place-value understanding for multi-digit whole numbers by correctly solving problems and clearly explaining procedures with only minor errors or omissions.
2	Demonstrates a partial understanding of how to generalize place-value understanding for multi-digit whole numbers by correctly performing a significant portion of the required task.
1	Demonstrates minimal understanding of how to generalize place-value understanding for multi-digit whole numbers.
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 properties of how to generalize place-value understanding for multi-digit whole numbers.
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?
130,078	

Part B (1 point):

   1 point for correct answer

What?	Why?
100,000 + 4,000 + 700 + 10 + 2 **OR equivalent**	

Part C (2 points):

   1 point for correct answer
   1 point for correct and complete explanation

What?	Why?
Answers may vary. One answer should be in the interval 144,500 through 144,999. The other answer should be in the interval 145,000 through 145,499. **Sample Response:** city C: 144,750 city D: 145,263	**Sample Explanation:** When rounding 144,750 to the thousands place, it is closer to 145,000 because the 7 in the hundreds place is higher than 5. When rounding 145,263 to the thousands place, it rounds down to 145,000 also because the 2 in the hundreds place is 4 or less. When rounding to the ten thousands place, 144,750 rounds to 140,000 because the number in the thousands place is 4 or less so it rounds down. When rounding 145,263 to the ten thousands place it rounds up to 150,000 because the thousands place is a 5 or higher. Depending on the digit that is being rounded to, the numbers may be different. **OR Equivalent**

STUDENT RESPONSE

Response Score: 4 points

PARTS A AND B

Question 17
Page 1 of 2

Item ID

Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

130,078

The response provides a correct answer.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

$100,000 + 0 + 4,000 + 700 + 10 + 2 = 104,712$

The response provides a correct answer.

Next

Review/End Test   Pause   Flag   Options

PART C

Gary, Erin, and Brayden are studying populations of different cities.

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

It works because city C has 144,560 and when you round it to thousands it rounds to 145,000.

City D has 145,150, if you round it to thousands it also rounds to 145,000. City C hass 144,560 people if you round it to ten-thousands it rounds to 140,000.

If city D has 145,150 people and you round it to ten-thousands it would round to 150,000 which is different from city C.

city C: 144,560 people

city D: 145,150 people

The response provides a correct answer (two correct populations) and a correct and complete explanation.

376 / 1000

STUDENT RESPONSE

Response Score: 3 points

17. Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

$$130,078$$

The response provides a correct answer.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

one hundred thousand
four seven hundred twelve

The response provides an incorrect answer.

Go to the next page to finish question 17.

GO ON ⟩

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

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

I chose those numbers because if you round 144,960 to the nearest thousand you get 145,000 and if you round 145,370 to the nearest thousand you get 145,000 and it said that they have to have the same rounded number at the end. Then, if you round 144,960 to the nearest ten-thousand you would get 140,000 and if you rounded the number 145,370 to the nearest ten thousand you would get 150,000 and in the problem it says that you have to have have 2 diffrent rounded numbers in the end. That is how I know why this situation is able to fit into this problem.

city C: __144,960__ people

city D: __145,370__ people

> The response provides a correct answer (two correct populations) and a correct and complete explanation.

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

PARTS A AND B

Question 17
Page 1 of 2

Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

130,780

> The response provides an incorrect answer.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

100,000 + 4,000 + 700 + 10 + 2

> The response provides a correct answer.

PART C

Gary, Erin, and Brayden are studying populations of different cities.

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

I figerdd this out by gessing and checing and by checeing in rounding by thousand or ten thousand.

city C: 144,932 people

city D: 145,499 people

98 / 1000

The response provides a correct answer (two correct populations), and an incorrect explanation.

STUDENT RESPONSE

Response Score: 1 point

17. Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

130,780

The response provides an incorrect answer.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

$100,000 + 4000 + 700 + 10 + 2$

The response provides a correct answer.

Go to the next page to finish question 17.

GO ON

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

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

They fit this situation because they both round to 145000 when rounding by thousands and different #'s when rounded by the ten-thousand.

city C: 145,381 people

city D: 145,296 people

The response provides an incorrect answer (There is no credit for one correct population.) 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.

STOP

STUDENT RESPONSE

Response Score: 0 points

PARTS A AND B

Question 17
Page 1 of 2

Gary, Erin, and Brayden are studying populations of different cities.

Gary lives in a city that has a population of one hundred thirty thousand, seventy-eight people.

A. Write the number of people who live in Gary's city in standard form.

138,078

The response provides an incorrect answer.

Erin's city has a population of 104,712 people.

B. Write the population of Erin's city in expanded form.

104 + 712

The response provides an incorrect answer.

PART C

Gary, Erin, and Brayden are studying populations of different cities.

Brayden compares the population of city C to the population of city D. When rounded to the nearest thousand, the populations each round to 145,000 people. When rounded to the nearest ten-thousand, the populations round to two different numbers.

C. What could be the population of city C and the population of city D? Explain why the numbers you chose fit this situation.

290,00
If you add both it will only have to round up like that. Because the total of both would go up to that

110 / 1000

city C: 290,00 people

city D: 210,00 people

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.3.1.2	C	1	15%	5%	**75%**	5%
2	A-T.2 A-T.1.1.4	C	2	18%	12%	**37%**	33%
3	A-F.1.1.2	A	2	**42%**	16%	21%	21%
4	A-F.2.1.4	A	2	**50%**	18%	7%	25%
5	A-F.2.1.7	A	2	**52%**	15%	22%	11%
6	A-F.3.1.1 A-F.3.1.2	D	1	29%	10%	9%	**52%**
7	B-O.1.1	A	1	**59%**	23%	11%	7%
8	B-O.2.1 D-M.2.1	B	2	6%	**42%**	23%	29%
9	B-O.2.1.1	A	2	**72%**	9%	6%	13%
10	B-O.3	D	2	28%	21%	16%	**35%**
11	B-O.3.1.2 B-O.3.1.3	B	2	11%	**61%**	19%	9%
12	D-M.1.1.1	D	1	24%	8%	6%	**62%**
13	D-M.1.1.4 D-M.1.1.2	A	1	**41%**	19%	21%	19%
14	D-M.2.1.2	C	2	10%	11%	**55%**	24%
15	D-M.3.1.1	A	1	**52%**	27%	13%	8%
16	D-M.3.1.2	D	1	12%	12%	17%	**59%**

OPEN-ENDED

Sample Number	Alignment	Points	Depth of Knowledge	Mean Score
17	A-T.1	4	3	1.34

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PSSA Grade 4 Mathematics
Item and Scoring Sampler