

# **WASL - Washington Assessment of Student Learning**

A Component of the Washington State  
Assessment Program

## **Using Results to Improve Student Learning**

### **Mathematics Grade 10 2003 Released Items**



***Dr. Terry Bergeson***  
State Superintendent of  
Public Instruction

Office of Superintendent of Public Instruction  
Old Capitol Building  
P.O. Box 47200  
Olympia, Washington 98504-7200

To order more copies of this document,  
please call 1-888-59-LEARN (1-888-595-3276)  
or visit our Web site at [www.12.wa.us/publications/](http://www.12.wa.us/publications/)

Please refer to the document number below for quicker service:  
03-0030

This material is available in alternative format upon request.  
Contact the Publications Center at 1-888-59-LEARN or TTY 360-664-3631.

The Office of Superintendent of Public Instruction complies with all federal and state rules and regulations and does not discriminate on the basis of race, color, national origin, sex, disability, age or marital status.

Using Results to Improve Student Learning  
Mathematics  
Grade 10  
Released Items 2003

Dr. Terry Bergeson  
State Superintendent of Public Instruction

Mary Alice Heuschel  
Deputy Superintendent, Learning and Teaching

Greg Hall  
Assistant Superintendent, Assessment and Research

Bev Neitzel  
Mathematics Assessment Specialist

**August 2003**

Copyright © 2003 by Washington Office of the Superintendent of Public Instruction.  
Educational institutions within the State of Washington have permission to reproduce this document. All other individuals wishing to reproduce this document must contact OSPI.

## **Table of Contents**

|  |   |
|--|---|
| A Letter from the Superintendent . . . . .                                   | 2 |
| How to Use this Released Item Booklet and the Item Analysis Report . . . . . | 3 |
| Ideas for Using Released Items as Professional Development Opportunities .   | 4 |
| Introduction to 10th Grade Mathematics Released Items . . . . .              | 5 |
| 2003 Released Items . . . . .  | 6 |

August 1, 2003

Dear Washington State Educators:

I am delighted to offer this third annual released test item publication from the 2003 Washington Assessment of Student Learning (WASL). My staff worked hard to be able to release this material in time for your use in administration workshops and summer staff development activities. This publication is designed to assist teachers and administrators in the analysis of the results of specific test items in order to identify strengths, weaknesses, patterns, and trends of student performance on the Essential Academic Learning Requirements (EALRs).

The writing prompts and annotations from the Spring 2003 WASL will be available electronically on the Office of Superintendent of Public Instruction (OSPI) website, as will released science pilot items for grade 5.

As a teacher, or as a district or building administrator, you will be able to analyze the actual test items and the data that accompany them to learn more about students in your school and district. You will be able to compare the performance of your school to your district or the state. By analyzing the differences in the data and the relationship that each question has with the EALRs, you will be able to identify areas where performance is strong and areas for improvement in your school and district. I sincerely hope that you can provide opportunities prior to the start of the school year for principals and teachers to work with the item-specific scoring guides in listening, reading, mathematics, and science and the annotated student responses that illustrate each score point. This experience will help schools work more effectively with students and parents this fall and throughout the school year. We have gotten great feedback from schools that have had the time to analyze and use this information.

I hope that you will use the information to begin a thoughtful, impassioned dialogue about what we expect our students to know and be able to do and how well they need to do it. We expect that this material will initiate conversations among administrators, faculty, students, and parents as to how this information can impact our teaching, our learning, and our communication. Plans to improve student learning should not be made based on these results alone. It is important to also include the results from other assessments used by the teacher, school, and/or district.

In November, OSPI assessment staff will again conduct regional training on the effective use of these materials.

Have a wonderful and successful school year as we continue our work toward improving student achievement in the 21st century. I encourage you to search our newly updated website, [www.k12.wa.us](http://www.k12.wa.us), for further resources to guide your instructional practices.

Sincerely,



Dr. Terry Bergeson  
State Superintendent of Public Instruction

## How to Use this Released Item Booklet and the Item Analysis Report

### Introduction

You should have two documents: one, this Released Item Booklet and two, the Item Analysis Report. These two documents should be used together to help administrators and teachers understand released WASL items that reflect content-specific learning strands and targets that are derived from the Essential Academic Learning Requirements.

This **Released Item Booklet** includes the following information:

- WASL mathematics items from the 2003 operational test
- A table for each item where you can transfer the school-level, district-level, and state-level data information
- A tools designation that shows whether the item was placed on the test in a location on a day when tools were permitted (Yes) or on a day when tools were not permitted (No)
- Information to indicate the strand and/or learning target and information for each item
- Item-specific scoring guides, student work at representative score points, and annotations for scores.

The **Item Analysis Report** includes the following information:

- A list of all released items referenced to strands and/or learning targets
- Multiple-choice items include the percentage of students who responded to each possible answer. Correct answers have asterisks. Information is presented by the percentage of students responding to each possible answer by school, by district, and by state
- For constructed-response items, including short answer, enhanced multiple-choice, and extended response, information is presented by the percentage of students who scored at each score point by school, by district, and by state
- Each item also includes the percentage of students who made no attempt at this item leaving it blank.

### How to Understand Your Data:

- First, transfer your data from the Item Analysis Report to the Released Item Booklet. Transfer all the information for each item into each table. By transferring the data, you will have all the information in one place.
- Second, examine the item types that represent the school's or the district's strengths or weaknesses. Does the school or district perform well on multiple-choice items? Constructed-response items? What percentage of students in a school or district left constructed-response items blank or earned a zero?
- Third, examine the learning strands and/or targets represented by each item. Group together targets that represent strengths or weaknesses for a school or a district. Do the targets all fit underneath one particular strand or do they belong to several strands? Compare the 2003 data to the previous year's results.
- Fourth, look for trends. Does a school perform markedly lower on a particular item in comparison to the district or the state? Does a school or a district perform markedly higher on a particular item in comparison to the state?

## **Ideas for Using Released Items as Professional Development Opportunities**

### **Half-Day Professional Development**

- Follow guidelines for “How to Use this Released Item Booklet and the Item Analysis Report.” Depending on configuration of the participating group, complete data for grades 4, 7, and 10 or just do grade specific data
- Provide data analysis from 2001 and 2002 released items and ask, “Where have we seen areas of growth?” “In what areas do we believe instructional practices made an impact on student learning?” “Where do we see areas that need further improvement?” Formulate questions based on the work you have done in school and/or district
- Compare WASL assessment results with other school and/or district assessments to further define areas in which to focus instruction.

### **Full-Day Professional Development**

- Complete the suggestions for Half-Day Professional Development
- Contact your district assessment coordinator, ESD, 2003 Summer Washington Teacher Scorers, or Mathematics Assessment Leadership Team Members to receive more in depth training on the full set of anchor papers, practice sets, and qualifying sets for mathematics released items 10, 13, and 15. To receive specific contact information, please email Beverly Neitzel, OSPI Mathematics Assessment Specialist, at [bneitzel@ospi.wednet.edu](mailto:bneitzel@ospi.wednet.edu).

### **Follow-Up Professional Development and Involving Students in Assessment**

- Have students complete the items
- Bring student work to a two or three hour workshop to score student papers and ask yourselves, “What do the results tell us?”

AND/OR

- Train students on the sample student responses in the Released Item Booklet and have students score their own responses using the scoring guides
- Train students on how to use Sample Mathematics WASL Questions to write questions based on scenarios, informational text, etc.



## Introduction to 10th Grade Mathematics Released Items

Welcome to the Released Item Booklet for the WASL 2003 mathematics items. In this booklet you will find 15 items that were part of the spring 2003 WASL assessment for mathematics.

There are four types of assessment items:

- multiple-choice questions where students earn one point by selecting the right answer from four options
- extended multiple-choice items where students can earn up to two points by first selecting the right answer from options and then explaining something about their choice
- short-answer items where students earn up to two points by writing an answer, explaining their thinking, drawing a picture or diagram, or showing steps used to solve a problem
- extended-response items where students can earn up to four points by constructing a response that asks for more details (graphs, tables, written summaries) or more thinking.

Please note that in releasing 15 items from the 2003 WASL assessment for mathematics, OSPI is releasing approximately 36% of the mathematics WASL. The items that were not released this year will be used on future WASLs. However, these released items also provide invaluable opportunities for teachers and administrators to become familiar with the types of mathematics items derived from the mathematics EALRs while also becoming experienced with the item-specific scoring guides and annotated samples of student responses.

You may want to become familiar with the WASL test and item specifications (located on our website—[www.k12.wa.us](http://www.k12.wa.us)) as you study the items, your school or district's data, and the annotated student responses contained in this Released Item Booklet. Each item in this booklet represents a “learning target,” which is a mathematics skill derived from the EALRs that can be captured in a paper and pencil assessment. These targets are subsets of the nine content and process mathematics strands.

As you begin to analyze your data, think about what would account for the performance of students on particular items. Although many of the items can represent strengths and weaknesses across schools, districts, and the state, attempt to maintain the whole picture in your analysis. Staff at OSPI recommends that you examine the items closely and ask yourselves, “What do we expect our students to know and be able to do in order to be successful on this item?”

In order to assist you in your efforts in understanding and using the Released Item Booklet, please do not hesitate to search our website for further resources or call our offices in Olympia for further information.

Sincerely,

Beverly Neitzel  
Mathematics Assessment Specialist

# Mathematics

1 Look at the chart below.

| Planet  | Mass                     |
|---------|--------------------------|
| Mercury | $3.30 \times 10^{23}$ kg |
| Venus   | $4.87 \times 10^{24}$ kg |
| Earth   | $5.97 \times 10^{24}$ kg |
| Mars    | $6.42 \times 10^{23}$ kg |

Which planet has the largest mass?

- A. Mercury
- B. Venus
- C. Earth
- D. Mars

Item Information:

Correct Response: C

Tools: No

Strand: Number Sense

Learning Target: NS01: (Number and Numeration) Demonstrate an understanding of and use the symbolic representations of rational numbers, percents, powers, and roots; compare and order rational numbers, percents, powers, and roots (Mathematics EALR 1.1.1, 1.1.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| Percent Distribution |          |       |                                  |
|----------------------|----------|-------|----------------------------------|
| School               | District | State | Responses (* = correct response) |
|                      |          |       | A                                |
|                      |          |       | B                                |
|                      |          |       | C*                               |
|                      |          |       | D                                |
|                      |          |       | NR                               |

**2** Which of the following statements **always** describes a trapezoid?

- A.** A trapezoid has one pair of parallel sides.
- B.** A trapezoid has one pair of congruent angles.
- C.** A trapezoid has two pairs of congruent angles.
- D.** A trapezoid has two pairs of perpendicular sides.

Item Information:

Correct Response: A

Tools: Yes

Strand: Geometric Sense

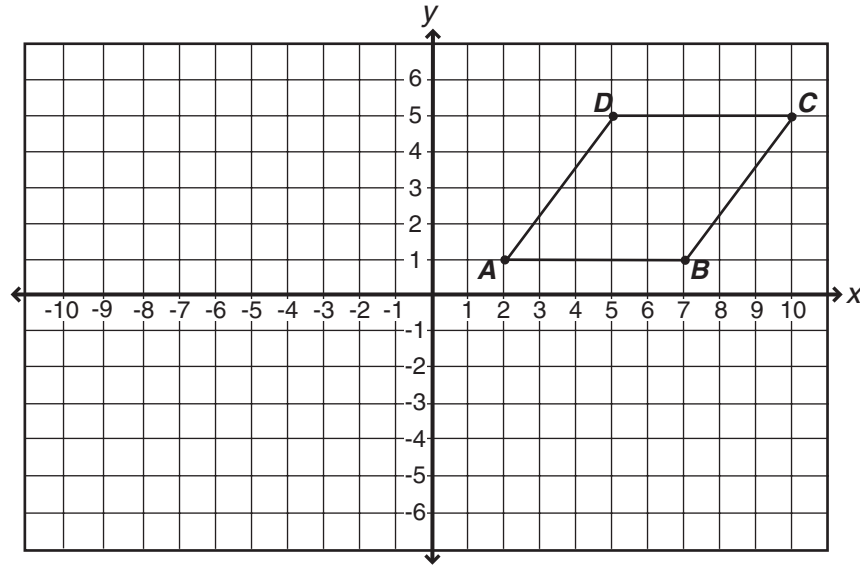
Learning Target: GS01: (Properties and Relationships) Use geometric properties and relationships to describe, compare, contrast, and classify 2- and 3-dimensional geometric figures; draw geometric models and scale drawings using tools as appropriate (Mathematics EALR 1.3.1, 1.3.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |                                  |
|-----------------------------|----------|-------|----------------------------------|
| School                      | District | State | Responses (* = correct response) |
|                             |          |       | A*                               |
|                             |          |       | B                                |
|                             |          |       | C                                |
|                             |          |       | D                                |
|                             |          |       | NR                               |

## Mathematics

- 3 Look at the figure on the grid below.



If the figure were translated so that point  $C$  moved to the origin, and point  $D$  moved to the  $x$ -axis, what would be the coordinates of point  $A$ ?

- A.  $(-9, -6)$
- B.  $(-4, -8)$
- C.  $(-3, -9)$
- D.  $(-8, -4)$

**3** (continued)

Item Information:

Correct Response: D

Tools: No

Strand: Geometric Sense

Learning Target: GS04: (Transformations) Demonstrate an understanding of and apply multiple geometric transformations using combinations of translations, reflections, and/or rotations (Mathematics EALR 1.3.6)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |                                  |
|-----------------------------|----------|-------|----------------------------------|
| School                      | District | State | Responses (* = correct response) |
|                             |          |       | A                                |
|                             |          |       | B                                |
|                             |          |       | C                                |
|                             |          |       | D*                               |
|                             |          |       | NR                               |

## Mathematics

- 4 Anita and Ajay play a game of chess. The probability that Anita will win is 48%, and the probability that Ajay will win is 42%. What is the probability that this game will end in a stalemate (tie)?
- A. 6%
- B. 10%
- C. 52%
- D. 58%

### Item Information:

Correct Response: B

Tools: No

Strand: Probability and Statistics

Learning Target: PS01: (Probability) Demonstrate an understanding of and use the properties of dependent and independent events; demonstrate an understanding of and use appropriate counting procedures and calculations to determine probabilities; use both experimental and theoretical methods to determine probabilities and compare results (Mathematics EALR 1.4.1, 1.4.2, 1.4.3)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| Percent Distribution |          |       |                                  |
|----------------------|----------|-------|----------------------------------|
| School               | District | State | Responses (* = correct response) |
|                      |          |       | A                                |
|                      |          |       | B*                               |
|                      |          |       | C                                |
|                      |          |       | D                                |
|                      |          |       | NR                               |

- 5** Jeremiah is doing an experiment in his math class. He flips four pennies in the air. What is most likely to happen?
- A.** Two of the pennies will be heads and two will be tails.
  - B.** Three of the pennies will be heads and one will be tails.
  - C.** All four pennies will be heads.
  - D.** None of the pennies will be heads.

Item Information:

Correct Response: A

Tools: No

Strand: Probability and Statistics

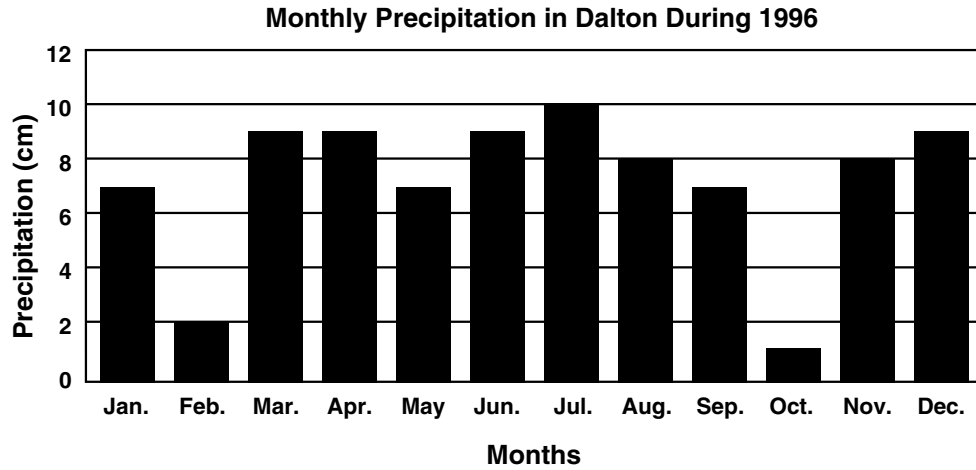
Learning Target: PS01: (Probability) Demonstrate an understanding of and use the properties of dependent and independent events; demonstrate an understanding of and use appropriate counting procedures and calculations to determine probabilities; use both experimental and theoretical methods to determine probabilities and compare results (Mathematics EALR 1.4.1, 1.4.2, 1.4.3)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |                                  |
|-----------------------------|----------|-------|----------------------------------|
| School                      | District | State | Responses (* = correct response) |
|                             |          |       | A*                               |
|                             |          |       | B                                |
|                             |          |       | C                                |
|                             |          |       | D                                |
|                             |          |       | NR                               |

## Mathematics

- 6 The graph shows the approximate amount of precipitation that fell in Dalton each month during 1996.



What was the **median** amount of monthly precipitation in Dalton during 1996?

- A. 7 cm
- B. 8 cm
- C. 9 cm
- D. 10 cm



**6** (continued)

Item Information:

Correct Response: B

Tools: No

Strand: Probability and Statistics

Learning Target: PS03: (Data Organization and Analysis) Organize and display data in appropriate forms; calculate and use different measures of central tendency, range, and average deviation as appropriate to describe a set of data (Mathematics EALR 1.4.5, 1.4.6)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |                                  |
|-----------------------------|----------|-------|----------------------------------|
| School                      | District | State | Responses (* = correct response) |
|                             |          |       | A                                |
|                             |          |       | B*                               |
|                             |          |       | C                                |
|                             |          |       | D                                |
|                             |          |       | NR                               |

## Mathematics

- 7 Thomas received  $m$  dollars for his allowance. He spent  $\frac{1}{3}$  of his allowance on a CD and  $\frac{1}{2}$  of his allowance on movies and snacks. Which expression represents the number of dollars he had left?
- A.  $1 - \frac{1}{3}m - \frac{1}{2}m$
- B.  $m - \frac{1}{3}m - \frac{1}{2}m$
- C.  $1 - \frac{1}{3}m + 1\frac{1}{2}m$
- D.  $m - \frac{1}{3}m + 1\frac{1}{2}m$

Item Information:

Correct Response: B

Tools: Yes

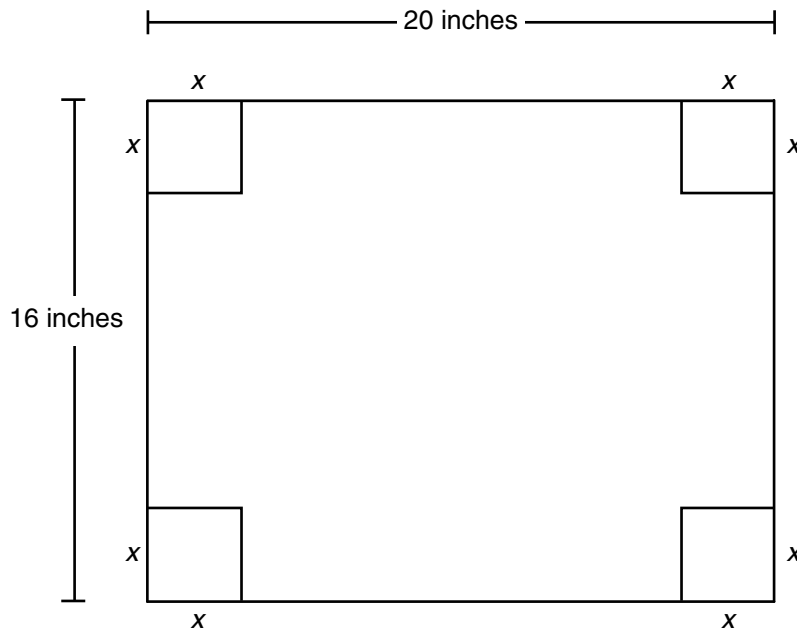
Strand: Algebraic Sense

Learning Target: AS02: (Symbols and Notations) Translate among tabular, symbolic, and graphical representations of relations using both equality and inequality; write expressions, equations, and inequalities to represent situations that involve variable quantities (Mathematics EALR 1.5.3, 1.5.4)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| Percent Distribution |          |       |                                  |
|----------------------|----------|-------|----------------------------------|
| School               | District | State | Responses (* = correct response) |
|                      |          |       | A                                |
|                      |          |       | B*                               |
|                      |          |       | C                                |
|                      |          |       | D                                |
|                      |          |       | NR                               |

- 8 A company is making shoe boxes from cardboard. The cardboard is 20 inches in length and 16 inches in width. The company is going to cut square pieces off each corner as shown in the diagram below and fold the sides up.



What would be the formula for the **volume** of the box in terms of  $x$ ?

- A.  $V = 4x^3 - 72x^2 + 320x$
- B.  $V = x^3 - 36x^2 + 320x$
- C.  $V = 4x^2 - 72x + 320$
- D.  $V = 320x$

# Mathematics

8 (continued)

Item Information:

Correct Response: A

Tools: Yes

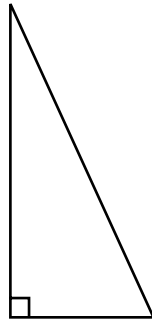
Strand: Making Connections

Learning Target: MC01: (Connections within Mathematics) Use concepts and procedures from multiple mathematics content strands in a given problem or situation; relate and use multiple equivalent mathematical models and representations (Mathematics EALR 5.1.1, 5.1.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| Percent Distribution |          |       |                                  |
|----------------------|----------|-------|----------------------------------|
| School               | District | State | Responses (* = correct response) |
|                      |          |       | A*                               |
|                      |          |       | B                                |
|                      |          |       | C                                |
|                      |          |       | D                                |
|                      |          |       | NR                               |

- 9 Luis wants to put carpet in the triangular showroom shown below. He knows the width of the room is 3 feet more than  $\frac{1}{3}$  the length of the room. If the length of the room is 21 feet, how many square feet of carpet does he need?



- A. 84 square feet
- B. 105 square feet
- C. 168 square feet
- D. 210 square feet

# Mathematics

9 (continued)

Item Information:

Correct Response: B

Tools: No

Strand: Making Connections

Learning Target: MC01: (Connections within Mathematics) Use concepts and procedures from multiple mathematics content strands in a given problem or situation; relate and use multiple equivalent mathematical models and representations (Mathematics EALR 5.1.1, 5.1.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |                                  |
|-----------------------------|----------|-------|----------------------------------|
| School                      | District | State | Responses (* = correct response) |
|                             |          |       | A                                |
|                             |          |       | B*                               |
|                             |          |       | C                                |
|                             |          |       | D                                |
|                             |          |       | NR                               |

The following pages include short-answer and extended-response items with rubrics and annotated example responses.





**10** (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Number Sense

Learning Target: NS03: (Conceptual Understanding of Operations)  
Demonstrate an understanding of operations  
on rational numbers, powers, and roots  
(Mathematics EALR 1.1.5)

Performance Data (Use this space to fill in student performance  
information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

## Mathematics

*Scoring Guide for question number 10:*

A **2-point** response: The student demonstrates an understanding of order of operations by doing one of the following:

- indicates that Naomi got the correct answer of 55 and explains that Dana multiplied 3 by 4 first, then squared the number 12
- gives a full explanation of why Dana's answer is incorrect
- indicates that Naomi got the correct answer with a full explanation of how she got 55 and gives a partial explanation of why Dana's answer is incorrect.

A **1-point** response: The student does one of the following:

- indicates that Naomi got the correct answer with a full or partial explanation of how she got 55
- indicates that Naomi is correct and gives a partial explanation of why Dana's answer is incorrect.

A **0-point** response: The student shows very little or no understanding of the order of operations.

**Annotated Example of a 2-point response for question number 10:**

**10** Naomi and Dana did the following computation.

$$3 \times 4^2 + 7$$

Naomi's answer was 55. Dana's answer was 151.

Which student's answer was correct? Describe the other student's error.

|   |
|---|
| $Naomi > 55 = 3 \cdot 4^2 + 7$                                      |
| $= 3 \cdot 16 + 7$  |
| $= 48 + 7$  |
| $= 55$  |
| $Dana > 151 = 3 \cdot 4^2 + 7$                                      |
| $-7 \quad -7$   |
| $144 \neq 3 \cdot 4^2$  |
| $144 = 3^2 \cdot 4^2$   |
| <i>Naomi was correct. Dana squared the 3</i>                        |
| <i>and the 4 before multiplying them together.</i>                  |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
| Which student's answer was correct? <u>      <i>naomi</i>      </u> |

## Mathematics

### **Annotated Example of a 2-point response for question number 10 (continued):**

Annotations:

This response shows thorough understanding of order of operations by indicating that Naomi got the correct answer of 55 and clearly explains why Dana was incorrect by explaining, “*Dana squared the 3 and the 4 before multiplying them together.*” This response earns two points.

Annotated Example of a 1-point response for question number 10:

10 Naomi and Dana did the following computation.

$$\begin{array}{l} 3 \times 16 + 7 \\ 3 \times 4^2 + 7 \end{array} \qquad \begin{array}{r} 4 \\ \times 4 \\ \hline 16 \end{array}$$

Naomi's answer was 55. Dana's answer was 151.

Which student's answer was correct? Describe the other student's error.

|  |   |
|--|---|
|  | $4$   |
|  | $\times 4$  |
|  | <hr style="width: 50%; margin-left: auto; margin-right: 0;"/> |
|  | $16$  |
| $3 \times 4^2 + 7$   |   |
| ✓  |   |
| $3 \times 16 + 7$  |   |
| ✓  |   |
| $\begin{array}{r} 16 \\ \times 3 \\ \hline 48 \end{array}$ |   |
| ✓  |   |
| $48 + 7$   | $\begin{array}{r} 148 + 7 \\ + 7 \\ \hline 55 \end{array}$    |
| ✓  |   |
| (55)   |   |
| ✓  |   |
| <i>Naomis correct.</i>                                     |   |
|  |   |
|  |   |
|  |   |
| Which student's answer was correct? <u>Naomi's answer</u>  |   |

## Mathematics

### **Annotated Example of a 1-point response for question number 10 (continued):**

Annotations:

This response shows partial understanding of order of operations by indicating that Naomi got the correct answer and provides supporting work that shows how she got 55. There is no reference to Dana's answer or why her answer is incorrect. This response earns one point.

**Annotated Example of a 0-point response for question number 10:**

**10** Naomi and Dana did the following computation.

$$3 \times 4^2 + 7$$

Naomi's answer was 55. Dana's answer was 151.

Which student's answer was correct? Describe the other student's error.

|   |
|---|
| <i>Naomi's was correct. When theres a problem like</i>  |
| <i>this you do the math left to right. Dana did the</i> |
| <i>math right to left.</i>                              |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
| <b>Which student's answer was correct? <u>Naomi</u></b> |

## Mathematics

### **Annotated Example of a 0-point response for question number 10 (continued):**

Annotations:

This response shows very little or no understanding of order of operations. Both statements in the student's response are not true. The student's statement "*When theres a problem like this you do the math left to right*" is not a completely true statement for using order of operations to solve an expression. When the student states, "*Dana did the math right to left,*" he or she is also not identifying the actual error that Dana made. This response earns zero points.



- 11** Caprice drives to work 5 days a week. In the morning, she takes a 10-mile route. In the afternoon, she takes a 12-mile route home to avoid traffic. Caprice's car gets 20 miles to the gallon.

How many gallons of gasoline will Caprice use each week driving to and from work?

Explain or show how you found your answer.

|   |
|---|
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
| <p><b>How many gallons of gasoline will Caprice use each week driving to and from work? _____</b></p> |

# Mathematics

**11** (continued)

Item Information:

Score Points: 2

Tools: Yes

Strand: Measurement

Learning Target: ME02: (Measuring and Calculating) Measure directly and indirectly and use measurements to describe and compare objects and events; calculate rate and other derived and indirect measurements and determine units (Mathematics EALR 1.2.2, 1.2.3)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

*Scoring Guide for question number 11:*

A **2-point** response: The student shows understanding of rates by doing the following:

- writes two complete expressions or equations for the division and multiplication procedures OR writes one complete expression or equation for division or multiplication and uses complete labels for the division or multiplication procedure where the operator is not shown or implied
  - possible division equations:  
( $50/20=2.5$  and  $60/20=3$  or  $110/20=5.5$ )  
OR ( $10/20=0.5$  and  $12/20=0.6$  or  $22/20=1.1$ )
  - possible multiplication equations:  
( $10\cdot5=50$  and  $12\cdot5=60$  or  $22\cdot5=110$ )  
OR ( $0.5\cdot5=2.5$  and  $0.6\cdot5=3$  or  $1.1\cdot5=5.5$ )
- provides the correct answer of 5.5, 5.5 gal, 5.5 gal/week, or 6 if 10 miles remaining is indicated

OR

- shows the entire process but makes one computation or one transcription error or uses 7 days in a week instead of 5 resulting in an answer that is consistent with that error.

A **1-point** response: The student does one of the following:

- provides the correct answer of 5.5, 5.5 gal, 5.5 gal/week, or 6 if 10 miles remaining is indicated, but the work shown is incorrect, incomplete, or missing
- shows an understanding of the outline of the procedure, however, due to computational errors or a labeling error, the answer is incorrect
- shows a sum or product from the context of the problem and divides by 20 with missing or correct labels
- shows  $10\cdot5$  (per week) and  $12\cdot5$  OR shows  $22\cdot5$  with missing or correct labels or are labeled with per day correctly and per week correctly
- shows  $10\cdot5=50$  and  $50/20$  OR  $12\cdot5=60$  and  $60/20$  with missing or correct labels.

A **0-point** response: The student shows very little or no understanding of how to use or calculate rate.

## Mathematics

### Annotated Example of a 2-point response for question number 11:

- 11** Caprice drives to work 5 days a week. In the morning, she takes a 10-mile route. In the afternoon, she takes a 12-mile route home to avoid traffic. Caprice's car gets 20 miles to the gallon.

How many gallons of gasoline will Caprice use each week driving to and from work?

Explain or show how you found your answer.

*Week = 7 days*

$$10(7) + 12(7) = 154 \text{ miles}$$

$$154 \text{ mi.} / 20 \text{ mi./gal.} = 7.7 \text{ gal.}$$

*Caprice will drive a total of 154 miles in a week. She will need 7.7 gallons per week that she drives.*

**How many gallons of gasoline will Caprice use each week driving to and from work? \_\_\_\_\_**

**Annotated Example of a 2-point response for question number 11 (continued):**

Annotations:

This response shows thorough understanding of rates by showing the entire process for determining how many gallons of gasoline Caprice will use each week for driving to and from work. The only error in this response is that 7 days are used for the number of days worked in a week instead of 5 days, as indicated in the prompt. The answer is a result of using this alternative value. This response earns two points.

## Mathematics

### Annotated Example of a 1-point response for question number 11:

- 11** Caprice drives to work 5 days a week. In the morning, she takes a 10-mile route. In the afternoon, she takes a 12-mile route home to avoid traffic. Caprice's car gets 20 miles to the gallon.

How many gallons of gasoline will Caprice use each week driving to and from work?

Explain or show how you found your answer.

$$\begin{aligned} 10+12 &= 22 \\ &\text{miles each day} \\ 22 \cdot 5 &= 110 \\ &\text{miles each week} \\ 110 \cdot 20 &= 2200 \\ &\text{gallons each week} \end{aligned}$$

Caprice will use 2200 gallons of gasoline each week. I found my answer; first, by finding the total mileage each day (22) and from that the total mileage for the week. Since there are 20 miles to the gallon, you multiply the week's mileage by 20.

How many gallons of gasoline will Caprice use each week driving to and from work? 2200

**Annotated Example of a 1-point response for question number 11 (continued):**

Annotations:

This response shows partial understanding of rates by correctly showing work that includes “ $22 \cdot 5 = 110$  miles each week.” However, full credit is not earned because the “110” is multiplied by “20” instead of divided by “20.” This response does not determine the number of gallons of gasoline Caprice will need each week to drive to and from work. This response earns one point.

## Mathematics

### Annotated Example of a 0-point response for question number 11:

- 11** Caprice drives to work 5 days a week. In the morning, she takes a 10-mile route. In the afternoon, she takes a 12-mile route home to avoid traffic. Caprice's car gets 20 miles to the gallon.

How many gallons of gasoline will Caprice use each week driving to and from work?

Explain or show how you found your answer.

The diagram shows a triangle with a horizontal base. The left side is labeled '10 mile' and the right side is labeled '12 mile'. Below the left side, there is a handwritten 'x' and the equation '= 200'. Below the right side, there is a handwritten '20 gal'. A diagonal line crosses the triangle, with '12x' written above it and '12' written below it. Below this, there is a horizontal line with '200' written above it and '12 = 16.6 gallons' written below it.

How I found my answer was, one side put how many miles she takes in the morning 10mi. Then under it I put x because I don't know how many gallons she used. Then on the other side I put how many miles she used in afternoon 12mil. Then under it I put how many gal. 20. Then I crossed multiplied  $20 \cdot 10 = 200$ .  $12x \div 12$  canceled then  $200 \div 12 = 16.6$  gallons. This is my answer.

How many gallons of gasoline will Caprice use each week driving to and from work? 16.6



**Annotated Example of a 0-point response for question number 11 (continued):**

Annotations:

This response shows very little or no understanding of rates by not showing any correct steps to solve the problem and providing an incorrect answer. This response earns zero points.

## Mathematics

- 12** The Acme Recycling Company has three salary options for its part-time summer employees. The total money earned is related to the amount of cans recycled and an optional hourly wage.

**Option 1: 25¢ a can plus \$1.00 an hour**

**Option 2: 5¢ a can plus \$5.00 an hour**

**Option 3: 40¢ a can and no hourly wage**

Jamal sits down and writes an equation for each salary option to see what he could make per hour.

**Option 1:  $y = 0.25x + 1.00$**

**Option 2:  $y = 0.05x + 5.00$**

**Option 3:  $y = 0.40x$**

Jamal estimates that he can recycle a minimum of 20 cans per hour. Based on these equations and Jamal's estimate, which option will allow Jamal to make the most money?

Clearly show your work to support your answer.

|   |
|---|
|   |
|   |
|   |
|   |
|   |
|   |
|   |
|   |
| <b>Option that allows Jamal to make the most money? _____</b> |

**12** (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Algebraic Sense

Learning Target: AS03: (Evaluating and Solving) Simplify and evaluate expressions and formulas; solve equations, inequalities, and systems of equations (Mathematics EALR 1.5.5, 1.5.6)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

## Mathematics

*Scoring Guide for question number 12:*

A **2-point** response: The student shows understanding of evaluating expressions in a context by doing one of the following:

- selects Option 3 and shows supporting work. Allow for one error.
- selects Option 1, Option 2, or all three as a direct result of one computation or notation error in the supporting work.

Example:

Option 1:  $0.25(20) + 1.00 = \$6.00$

Option 2:  $0.05(20) + 5.00 = \$6.00$

Option 3:  $0.40(20) = \$8.00$

Option 3 will allow Jamal to make the most money.

A **1-point** response: The student does one of the following:

- selects Option 3, but supporting work is incomplete or flawed
- fails to select Option 3, but shows correct computations for all three options
- selects Option 1 or Option 2 as a direct result of two computation and/or notation errors in the supporting work
- selects no option and has one computation error.

A **0-point** response: The student shows very little or no understanding of evaluating expressions in a context.

NOTE: Work must show substitution or show the 20 cans in the computation.

**Annotated Example of a 2-point response for question number 12:**

**12** The Acme Recycling Company has three salary options for its part-time summer employees. The total money earned is related to the amount of cans recycled and an optional hourly wage.

**Option 1: 25¢ a can plus \$1.00 an hour**

**Option 2: 5¢ a can plus \$5.00 an hour**

**Option 3: 40¢ a can and no hourly wage**

Jamal sits down and writes an equation for each salary option to see what he could make per hour.

**Option 1:  $y = 0.25x + 1.00$**

**Option 2:  $y = 0.05x + 5.00$**

**Option 3:  $y = 0.40x$**

Jamal estimates that he can recycle a minimum of 20 cans per hour. Based on these equations and Jamal’s estimate, which option will allow Jamal to make the most money?

Clearly show your work to support your answer.

|   |                       |
|---|-----------------------|
| 1: $y = 0.25(20) + 1$   | $5 + 1 = 6$ dollars   |
| 2: $y = 0.05(20) + 5$   | $10 + 5 = 15$ dollars |
| 3: $y = 0.40(20)$   | $= 8$ dollars         |
| option two will allow jamal to make                           |                       |
| the most money  |                       |
| Option that allows Jamal to make the most money? <u>  2  </u> |                       |

## Mathematics

### **Annotated Example of a 2-point response for question number 12 (continued):**

Annotations:

This response shows thorough understanding of evaluating expressions in a context by selecting Option 2, which is the correct answer for this response due to one computation error in the supporting work. Option 2 has a solution of \$15 rather than \$6. This response earns two points.

**Annotated Example of a 1-point response for question number 12:**

**12** The Acme Recycling Company has three salary options for its part-time summer employees. The total money earned is related to the amount of cans recycled and an optional hourly wage.

- Option 1: 25¢ a can plus \$1.00 an hour**
- Option 2: 5¢ a can plus \$5.00 an hour**
- Option 3: 40¢ a can and no hourly wage**

Jamal sits down and writes an equation for each salary option to see what he could make per hour.

- Option 1:  $y = 0.25x + 1.00$**
- Option 2:  $y = 0.05x + 5.00$**
- Option 3:  $y = 0.40x$**

Jamal estimates that he can recycle a minimum of 20 cans per hour. Based on these equations and Jamal’s estimate, which option will allow Jamal to make the most money?

Clearly show your work to support your answer.

|  |                        |
|--|------------------------|
| $y = .25(20) + 1.00$   | $y = \overset{20}{40}$ |
| $6 = 6:00\#$   | $8.00$                 |
| $y = y = .5(20) + 5.00$  | $\overset{100}{40}$    |
| $y = 6.00$   |                        |
| <p>To figure out how he would make</p>                               |                        |
| <p>the most money I would need to know</p>                           |                        |
| <p>how many hours he's working.</p>                                  |                        |
| <p><b>Option that allows Jamal to make the most money? _____</b></p> |                        |

## Mathematics

### **Annotated Example of a 1-point response for question number 12 (continued):**

Annotations:

This response shows partial understanding of evaluating expressions in a context by showing correct computations for all three options but fails to select Option 3. This response earns one point.



**Annotated Example of a 0-point response for question number 12:**

**12** The Acme Recycling Company has three salary options for its part-time summer employees. The total money earned is related to the amount of cans recycled and an optional hourly wage.

- Option 1: 25¢ a can plus \$1.00 an hour**
- Option 2: 5¢ a can plus \$5.00 an hour**
- Option 3: 40¢ a can and no hourly wage**

Jamal sits down and writes an equation for each salary option to see what he could make per hour.

- Option 1:  $y = 0.25x + 1.00$**
- Option 2:  $y = 0.05x + 5.00$**
- Option 3:  $y = 0.40x$**

Jamal estimates that he can recycle a minimum of 20 cans per hour. Based on these equations and Jamal’s estimate, which option will allow Jamal to make the most money?

Clearly show your work to support your answer.

|   |
|---|
|   |
| 5¢ can + 5.00 an hour would                                   |
| make him more money because                                   |
| the wage is higher and the cost                               |
| of a can is 5¢  |
|   |
|   |
| Option that allows Jamal to make the most money? <u>  2  </u> |

## Mathematics

### **Annotated Example of a 0-point response for question number 12 (continued):**

Annotations:

This response shows very little or no understanding of evaluating expressions in a context by selecting Option 2, not showing any supporting work, and giving a flawed explanation. This response earns zero points.



# Mathematics

**13** (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Solves Problems and Reasons Logically

Learning Target: SR03: (Construct Solutions) Organize and synthesize information from multiple sources, use viable strategies, and appropriate concepts, procedures, and tools to construct solutions (Mathematics EALR 2.3.1, 2.3.2, 2.3.3)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

*Scoring Guide for question number 13:*

A **2-point** response: The student shows understanding of organizing relevant information and applying procedures to construct a solution by providing the following:

Relevant Information:

Games played to date = 15

60% of total games is goal for winning percentage

Games won = 10

Games left to play = 25

Procedures:

$25 + 15 = 40$  to find total games in the season

$40 \times 60\% = 24$  to determine number of needed wins for percentage

$24 - 10 = 14$  to determine number of remaining games that must be won

Solution:

14 more wins are needed

Note: The student may omit showing one procedure, but must include  
 $40 \times 60\% = 24$ .

Note: The student may show all procedures with one computation error, and their final answer is consistent with the error made.

A **1-point** response: The student does one of the following:

- omits showing two procedures but does include  $40 \times 60\% = 24$
- omits showing one piece of relevant information but must include 60% of total games and games to play = 25
- indicates that 14 more wins are needed, all relevant information is shown and used appropriately, and all procedures are implied but not shown.

A **0-point** response: The student shows very little or no understanding of organizing relevant information and applying procedures to construct a solution.

## Mathematics

### Annotated Example of a 2-point response for question number 13:

- 13** A team has won 10 of the 15 games it has played. The team has 25 games left to play. The players figure they will make the playoffs if their winning percentage for the season is 60%.

How many of the **remaining** games must the team win to have a winning percentage of 60% for the season?

Clearly show how you arrived at your answer.

$$\text{Total games} = 15 + 25 = 40$$

$$60\% \text{ of total games} = 24 \text{ games } (40 \cdot .6)$$

$$\text{games left to win} = 14 (24 - 10)$$

To have a winning percentage of 60 percent the  
basketball team must win 14 of their remaining 25  
games

How many more wins are needed? 14

**Annotated Example of a 2-point response for question number 13 (continued):**

Annotations:

This response shows thorough understanding of organizing relevant information and applying procedures to construct a solution by providing 1) all relevant information: 15 games played to date, 25 games left to play, 60% is the goal, and 10 games already won; 2) all procedures:  $15 + 25 = 40$ ,  $40 \times .60 = 24$ , and  $24 - 10 = 14$ ; and 3) a solution of 14. This response earns two points.

## Mathematics

### Annotated Example of a 1-point response for question number 13:

- 13** A team has won 10 of the 15 games it has played. The team has 25 games left to play. The players figure they will make the playoffs if their winning percentage for the season is 60%.

How many of the **remaining** games must the team win to have a winning percentage of 60% for the season?

Clearly show how you arrived at your answer.

|  |
|--|
| <p><math>25/40 = .625 = 62\%</math><br/><math>24/40 = .6 = 60\%</math><br/>fourteen more wins are<br/>needed to make the<br/>playoffs!</p> |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
| How many <u>more</u> wins are needed? <u>14</u>  |



**Annotated Example of a 1-point response for question number 13 (continued):**

Annotations:

This response shows partial understanding of organizing relevant information and applying procedures to construct a solution by 1) providing all relevant information; 2) omitting two procedures:  $15 + 25 = 40$ , and  $24 - 10 = 14$ ; and 3) providing a solution of 14. This response earns one point.

## Mathematics

### Annotated Example of a 0-point response for question number 13:

- 13** A team has won 10 of the 15 games it has played. The team has 25 games left to play. The players figure they will make the playoffs if their winning percentage for the season is 60%.

How many of the **remaining** games must the team win to have a winning percentage of 60% for the season?

Clearly show how you arrived at your answer.

*10 of 15 games won.*

*18 of 25 games won.*

*they have to win 18*

*of the games.*

How many more wins are needed? 18

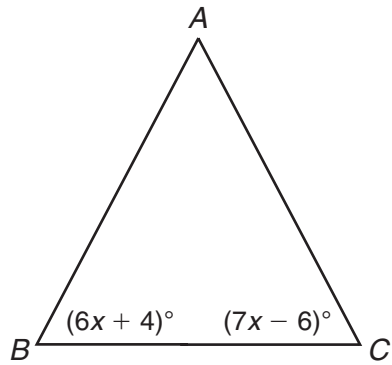
**Annotated Example of a 0-point response for question number 13 (continued):**

Annotations:

This response shows very little or no understanding of organizing relevant information and applying procedures to construct a solution by 1) omitting two pieces of relevant information: 60% is the goal and 25 games left to play; 2) omitting all procedures; and 3) providing an incorrect solution of “18.” This response earns zero points.

## Mathematics

- 14 In the isosceles triangle shown below,  $AB = AC$ .



What is the value of  $x$ ?

Clearly show your work.

$x = \underline{\hspace{2cm}}$

**14** (continued)

Item Information:

Score Points: 2

Tools: Yes

Strand: Making Connections

Learning Target: MC01: (Connections within Mathematics) Use concepts and procedures from multiple mathematics content strands in a given problem or situation; relate and use multiple equivalent mathematical models and representations (Mathematics EALR 5.1.1, 5.1.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

## Mathematics

*Scoring Guide for question number 14:*

A **2-point** response: The student applies conceptual and procedural understanding between the geometric sense and algebraic sense content strands by relating the equal sides of the triangle to their corresponding equal angles and writing and solving an equation or showing another valid method to find the value of  $x$ , which is 10.

Allow for one notation error.

Example:

$$6x + 4 = 7x - 6$$

$$6x + 10 = 7x$$

$$10 = x$$

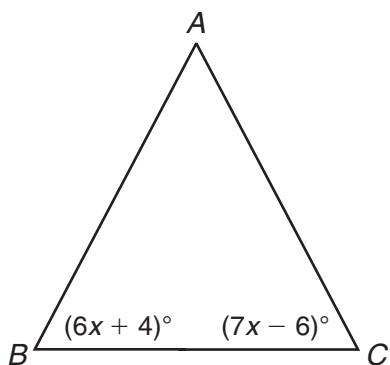
A **1-point** response: The student does one of the following:

- shows algebraic work but never writes an equation, and the solution is correct
- writes a correct or mostly correct equation, but the solution is incorrect or missing
- implies a correct equation, but the solution is incorrect
- gives a correct answer with no work or incorrect work shown.

A **0-point** response: The student shows very little or no conceptual or procedural understanding between the geometric sense and algebraic sense content strands.

Annotated Example of a 2-point response for question number 14:

14 In the isosceles triangle shown below,  $AB = AC$ .



What is the value of  $x$ ?

Clearly show your work.

$$\begin{array}{r}
 6x + 4 = 7x - 6 \\
 + 6 \qquad - 6 \\
 \hline
 6x + 10 = 7x \\
 - 6x \qquad - 6x \\
 \hline
 10 = x
 \end{array}$$

$$x = \underline{10}$$

## Mathematics

### **Annotated Example of a 2-point response for question number 14 (continued):**

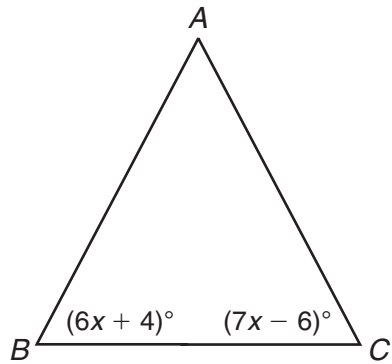
Annotations:

This response correctly applies conceptual and procedural understanding between geometric sense and algebraic sense by relating the equal sides of the triangle to their corresponding equal angles and writing and solving an equation to find the value of  $x$ , which is 10. This response earns two points.



Annotated Example of a 1-point response for question number 14:

14 In the isosceles triangle shown below,  $AB = AC$ .



What is the value of  $x$ ?

Clearly show your work.

$$\begin{aligned}
 &(6x + 4) = (7x - 6) \\
 &-6x - 4 = -7x + 6 \\
 &+ 7x \quad \quad \quad \\
 &\hline
 &1x = 10 \\
 &y = \frac{10}{1} \quad x = 5
 \end{aligned}$$

$$x = \underline{5}$$

## Mathematics

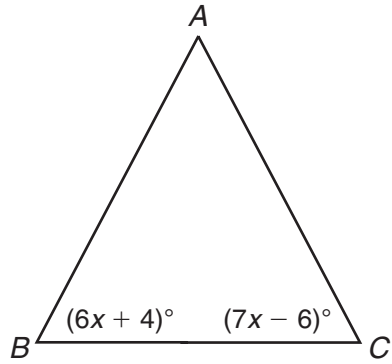
### **Annotated Example of a 1-point response for question number 14 (continued):**

Annotations:

This response is partially correct in using conceptual and procedural understanding from geometric sense and algebraic sense by writing a mostly correct equation where the first version of the equation does not include an equal sign and giving an incorrect solution. This response earns one point.

Annotated Example of a 0-point response for question number 14:

14 In the isosceles triangle shown below,  $AB = AC$ .



What is the value of  $x$ ?

Clearly show your work.

$$(6x + 4)^\circ = (7x - 6)^\circ$$

$$42x - 2$$

$$x = \underline{48^\circ}$$

## Mathematics

### **Annotated Example of a 0-point response for question number 14 (continued):**

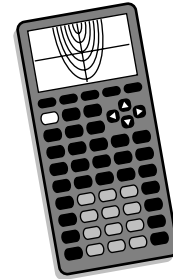
Annotations:

This response makes very little or no connection between geometric sense and algebraic sense content strands by writing an inappropriate expression and giving an incorrect solution. This response earns zero points.

- 15** Barbara invited five friends over to her home. All her friends liked her new calculator and wanted to borrow it.

After everyone left, Barbara realized she needed the calculator to finish her homework. She could not remember to whom she had loaned it. She remembered the following:

She last saw the calculator at 6:40 P.M.  
 Miguel left 15 minutes after Tom.  
 Tom left 30 minutes before Kendra.  
 Kendra left 5 minutes after Srey.  
 Dan left 25 minutes before Miguel.  
 The last person left at 7:00 P.M.



- List the order and times in which people left.
- Whom should Barbara call, based on your analysis of the information?


Explain your reasoning using words, numbers, and/or diagrams.

| <b>Person</b>                          | <b>Time Left</b> |
|--|------------------|
| 1st to leave:                          |                  |
| 2nd to leave:                          |                  |
| 3rd to leave:                          |                  |
| 4th to leave:                          |                  |
| Last to leave:                         |                  |
|  |                  |
|  |                  |
|  |                  |
|  |                  |
|  |                  |
| <b>Whom should Barbara call? _____</b> |                  |

## Mathematics

15 (continued)

Additional work space.

A large, empty rectangular box with a thin black border, intended for providing additional work space for the student.

**15** (continued)

Item Information:

Score Points: 4

Tools: No

Strand: Solves Problems and Reasons Logically

Learning Target: SR02: (Analyze) Compare, contrast, interpret, and integrate information from multiple sources (Mathematics EALR 3.1.1, 3.1.2)

Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

| <b>Percent Distribution</b> |          |       |        |
|-----------------------------|----------|-------|--------|
| School                      | District | State | Points |
|                             |          |       | 0      |
|                             |          |       | 1      |
|                             |          |       | 2      |
|                             |          |       | 3      |
|                             |          |       | 4      |
|                             |          |       | NR     |
|                             |          |       | Mean   |

## Mathematics

*Scoring Guide for question number 15:*

A **4-point** response: The student shows effective reasoning by doing all of the following:

- lists the order in which people left: 1st Dan, 2nd Tom, 3rd Miguel, 4th Srey, 5th Kendra
- shows at least partial justification for the order
- indicates the correct time that each person left: Dan at 6:20, Tom at 6:30, Miguel at 6:45, Srey at 6:55, and Kendra at 7:00 (with one minor time error as long as it does not affect the order or outcome)
- indicates that Barbara should call Kendra, Srey, and/or Miguel
- explains why Barbara should call the people/person who left after 6:40.

A **3-point** response: The student shows partial effective reasoning. The student lists the correct order in which people left and includes three (3) of the remaining four (4) components above. The response indicates the correct time that each person left for at least 4 of the friends. The explanation of reasoning may be incomplete or just the times that each person left. The response also concludes that Kendra, Srey, or Miguel could have borrowed the calculator. This final conclusion should be consistent with the times given and since one time may be incorrect, it is possible that only two people could have borrowed the calculator.

A **2-point** response: The student shows some reasoning by doing one of the following:

- provides a correct list for the order in which the friends left and one or two (2) of the remaining four (4) components listed above
- provides an incorrect list for the order in which the friends left but has three (3) of the following five (5) components:
  - the last three (3) people are in order and in place
  - times for at least three (3) people are correct
  - indicates the correct person to call
  - gives a reasonable justification for the order of people
  - gives a reasonable justification for whom to call.



*Scoring Guide for question number 15 (continued):*

A **1-point** response: The student lists all of the names in order OR does two of the following:

- has either the last three (3) names or the first three (3) names in order and place
- indicates the correct person(s) to call based on the times/place calculated
- gives a partial justification for whom to call.

A **0-point** response: The student shows very little or no evidence of reasoning.

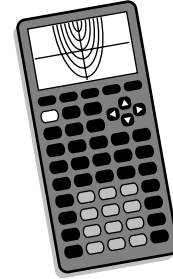
## Mathematics

### Annotated Example of a 4-point response for question number 15:

- 15** Barbara invited five friends over to her home. All her friends liked her new calculator and wanted to borrow it.

After everyone left, Barbara realized she needed the calculator to finish her homework. She could not remember to whom she had loaned it. She remembered the following:

She last saw the calculator at 6:40 P.M.  
 Miguel left 15 minutes after Tom.  
 Tom left 30 minutes before Kendra.  
 Kendra left 5 minutes after Srey.  
 Dan left 25 minutes before Miguel.  
 The last person left at 7:00 P.M.



- List the order and times in which people left.
- Whom should Barbara call, based on your analysis of the information?

Explain your reasoning using words, numbers, and/or diagrams.

|                | Person | Time Left |
|----------------|--------|-----------|
| 1st to leave:  | Dan    | 6:20      |
| 2nd to leave:  | Tom    | 6:30      |
| 3rd to leave:  | Miguel | 6:45      |
| 4th to leave:  | Srey   | 6:55      |
| Last to leave: | Kendra | 7:00      |

Neither Tom nor Dan could have taken the calculator because they bot left before 6:40. So, Since Kendra left Last, one can safely assume that she borrowed the calculator

Whom should Barbara call?     Kendra

15 (continued)

Additional work space.

$$\text{Tom} + 15 = \text{Miguel}$$

$$\text{Kendra} - 30 = \text{Tom}$$

$$\text{Srey} + 5 = \text{Kendra}$$

$$\text{Miguel} - 25 = \text{Dan}$$

|   | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| T | X | O | X | X | X |
| K | X | X | X | X | O |
| S | X | X | X | O | X |
| M | X | X | O | X | X |
| D | O | X | X | X | X |

$$\text{Dan} - \text{Tom} - \text{Miguel} - \text{Srey} - \text{Kendra}$$

## Mathematics

### **Annotated Example of a 4-point response for question number 15 (continued):**

Annotations:

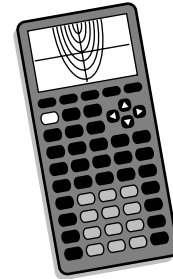
This response shows thorough understanding of comparing, contrasting, and interpreting information or results in order to answer a question in a given situation by correctly listing the order in which people left, showing justification for the order, indicating that Kendra should be called “*since Kendra left Last.*” This response earns four points.

**Annotated Example of a 3-point response for question number 15:**

**15** Barbara invited five friends over to her home. All her friends liked her new calculator and wanted to borrow it.

After everyone left, Barbara realized she needed the calculator to finish her homework. She could not remember to whom she had loaned it. She remembered the following:

She last saw the calculator at 6:40 P.M.  
 Miguel left 15 minutes after Tom.  
 Tom left 30 minutes before Kendra.  
 Kendra left 5 minutes after Srey.  
 Dan left 25 minutes before Miguel.  
 The last person left at 7:00 P.M.



- List the order and times in which people left.
- Whom should Barbara call, based on your analysis of the information?

Explain your reasoning using words, numbers, and/or diagrams.

|   | <b>Person</b> | <b>Time Left</b> |
|---|---------------|------------------|
| 1st to leave:   | Dan           | 6:20             |
| 2nd to leave:   | Thom          | 6:30             |
| 3rd to leave:   | Miguel        | 6:45             |
| 4th to leave:   | Srey          | 6:55             |
| Last to leave:  | Kendra        | 7:00             |
| See diagram's to right. $\longrightarrow$                   |               |                  |
|   |               |                  |
|   |               |                  |
|   |               |                  |
|   |               |                  |
| Whom should Barbara call? <u>          Miguel          </u> |               |                  |

# Mathematics

15 (continued)

Additional work space.

Thom — 15 → Miguel — 5 → Kendra  
 Dan ← 25 ————— Srey ← 5 —

---

T — 15 — M  
 T — 30 — K  
 S — 5 — K  
 D — 25 — M

↓  
7:00

D (-10-) T (-15-) M (-10-) S (-5-) K  
 a h i r e  
 n o g e n  
 m v y d  
 e r  
 l a

### **Annotated Example of a 3-point response for question number 15 (continued):**

Annotations:

This response shows understanding of comparing, contrasting, and interpreting information or results in order to answer a question in a given situation by correctly listing the order in which people left, showing justifications for the order, and indicating that Miguel should be called. There is no explanation why Miguel should be called, preventing the response from earning full credit. This response earns three points.

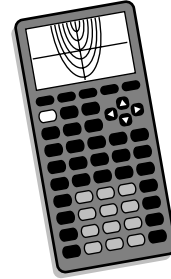
## Mathematics

### Annotated Example of a 2-point response for question number 15:

- 15** Barbara invited five friends over to her home. All her friends liked her new calculator and wanted to borrow it.

After everyone left, Barbara realized she needed the calculator to finish her homework. She could not remember to whom she had loaned it. She remembered the following:

She last saw the calculator at 6:40 P.M.  
 Miguel left 15 minutes after Tom.  
 Tom left 30 minutes before Kendra.  
 Kendra left 5 minutes after Srey.  
 Dan left 25 minutes before Miguel.  
 The last person left at 7:00 P.M.



- List the order and times in which people left.
- Whom should Barbara call, based on your analysis of the information?

Explain your reasoning using words, numbers, and/or diagrams.

|                | Person | Time Left |
|----------------|--------|-----------|
| 1st to leave:  | Tom    | 6:30      |
| 2nd to leave:  | Dan    | 6:35      |
| 3rd to leave:  | Migul  | 6:45      |
| 4th to leave:  | Strey  | 6:55      |
| Last to leave: | Kendra | 7:00      |

Tom or Dan do not have the calculator, because they left before 6:40.

Strey or Kendra may have it but it is very unlikely because they stayed there after 6:40 so if they did have it then Barbara probably would of seen it

Whom should Barbara call? Miguel



**15** (continued)

Additional work space.

because they stayed after 6:40. That leaves Miguel because he left the closest after 6:40. He left at 6:45 so it would be reasonable that Barbara never saw the calculator.

## Mathematics

### **Annotated Example of a 2-point response for question number 15 (continued):**

Annotations:

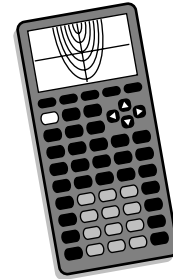
This response shows some understanding of comparing, contrasting, and interpreting information or results in order to answer a question in a given situation by correctly listing the last three friends in order with the correct times that they left and writing a correct conclusion. This response earns two points.

**Annotated Example of a 1-point response for question number 15:**

**15** Barbara invited five friends over to her home. All her friends liked her new calculator and wanted to borrow it.

After everyone left, Barbara realized she needed the calculator to finish her homework. She could not remember to whom she had loaned it. She remembered the following:

She last saw the calculator at 6:40 P.M.  
 Miguel left 15 minutes after Tom.  
 Tom left 30 minutes before Kendra.  
 Kendra left 5 minutes after Srey.  
 Dan left 25 minutes before Miguel.  
 The last person left at 7:00 P.M.



- List the order and times in which people left.
- Whom should Barbara call, based on your analysis of the information?

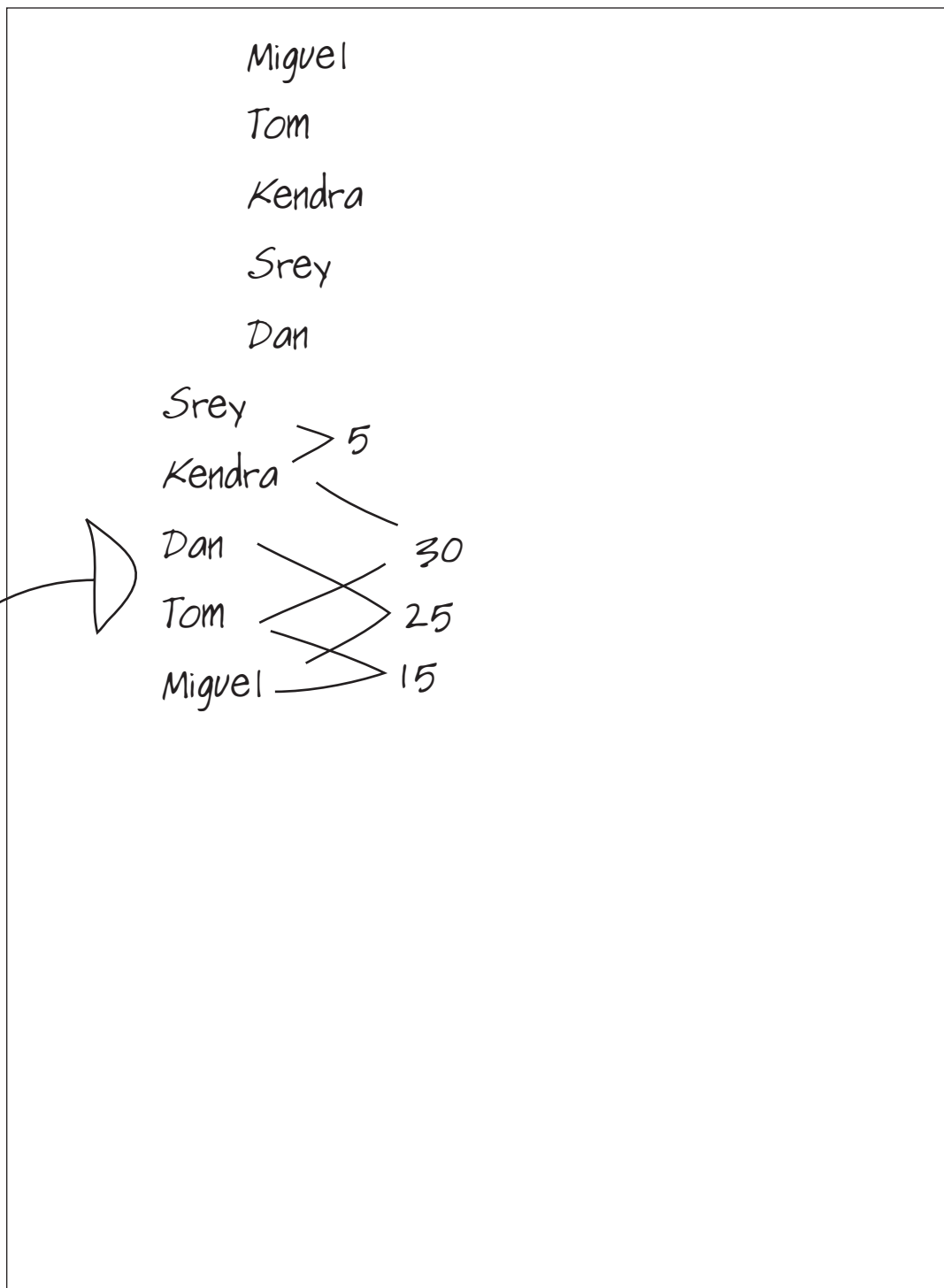
Explain your reasoning using words, numbers, and/or diagrams.

|  | <b>Person</b> | <b>Time Left</b> |
|--|---------------|------------------|
| 1st to leave:  | Srey          | 6:10             |
| 2nd to leave:  | Kendra        | 6:15             |
| 3rd to leave:  | Dan           | 6:35             |
| 4th to leave:  | Tom           | 6:45             |
| Last to leave:   | Miguel        | 7:00             |
| Barbara should call Tom and Miguel because they were the two that hadn't left before 6:40. Start with the times of two people and work it out so you have a little visual picture like mine. |               |                  |
| <b>Whom should Barbara call?</b> <u>Tom + Miguel</u>   |               |                  |

# Mathematics

15 (continued)

Additional work space.



**Annotated Example of a 1-point response for question number 15 (continued):**

Annotations:

This response shows little understanding of comparing, contrasting, and interpreting information or results in order to answer a question in a given situation by making a correct conclusion based on their calculated order and justifying the conclusion with “*Barbara should call Tom and Miguel because they were the two that hadn’t left before 6:40.*” This response earns one point.



**15** (continued)

Additional work space.

A large, empty rectangular box with a thin black border, intended for providing additional work space for the student.

## Mathematics

### **Annotated Example of a 0-point response for question number 15 (continued):**

Annotations:

This response shows very little or no understanding of comparing, contrasting, and interpreting information or results in order to answer a question in a given situation by providing no acceptable work. This response earns zero points.





