WASL - Washington Assessment of Student Learning

A Component of the Washington State Assessment Program

Using Results to Improve Student Learning

Mathematics
Grade7
2003 Released Items

Dr. Terry Bergeson
State Superintendent of
Public Instruction

Using Results to Improve Student Learning
Mathematics
Grade 7
Released Items 2003

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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, 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 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, 11, and 15. To receive specific contact information, please email Beverly Neitzel, OSPI Mathematics Assessment Specialist, at 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.

4

Introduction to Seventh 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) 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

1 A food stand buys ice cream cones in packages of 8. Each carton of ice cream will make 12 cones. What is the **least** number of packages of ice cream cones and cartons of ice cream that need to be bought to have an equal number of each?

○ **A.** 9 packages of ice cream cones and 6 cartons of ice cream

○ **B.** 6 packages of ice cream cones and 4 cartons of ice cream

○ **C.** 4 packages of ice cream cones and 3 cartons of ice cream

○ **D.** 3 packages of ice cream cones and 2 cartons of ice cream

Item Information:

Correct Response: D

Tools: No

Strand: Number Sense

Learning Target: NS02: (Number Theory) Demonstrate an understanding of the properties of the rational number system; demonstrate an understanding of concepts and processes involving prime and composite numbers, factors and multiples, and divisibility (Mathematics EALR 1.1.1, 1.1.3)

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

2 Choose the correct order of operations needed to evaluate the following expression:

$$22 - 6 \times (4 + 7)$$

○ **A.** Multiply 6 by 4.
Add the product to 7.
Subtract the sum from 22.

○ **B.** Add 4 and 7.
Subtract 6 from 22.
Multiply the difference by 6.

○ **C.** Subtract 6 from 22.
Add 4 and 7.
Multiply the difference by the sum.

○ **D.** Add 4 and 7.
Multiply the sum by 6.
Subtract the product from 22.

Item Information:

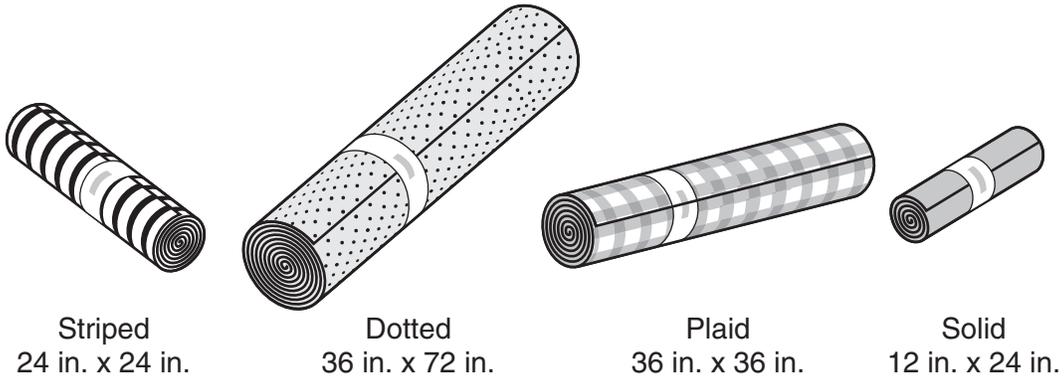Correct Response: D

Tools: Yes

Strand: Number Sense

Learning Target: NS04: (Computation) Add, subtract, multiply, and divide non-negative whole numbers, fractions, and decimals using rules for order of operations (Mathematics EALR 1.1.6)

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

3 Karl wants to buy a roll of paper for an art project. He needs about **2 square yards** of paper. He is considering buying one of the following rolls.

Striped	Dotted	Plaid	Solid
24 in. x 24 in.	36 in. x 72 in.	36 in. x 36 in.	12 in. x 24 in.

Which of these rolls would give Karl just enough paper?

○ **A.** The striped roll

○ **B.** The dotted roll

○ **C.** The plaid roll

○ **D.** The solid roll

3 (continued)

<u>Item Information:</u>

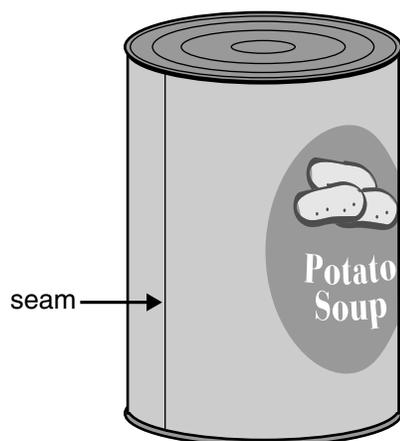Correct Response: B

Tools: Yes

Strand: Measurement

Learning Target: ME03: (Approximation and Precision) Demonstrate an understanding of how precision is affected by the unit of measurement; know when estimating is appropriate and estimate to obtain reasonable approximations (Mathematics EALR 1.2.4, 1.2.5)

<u>Performance Data</u> (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

4 Dominique's school is collecting labels from soup cans. Dominique peels the label off the can shown below, without tearing the paper. After she peels the label off along its seam, she flattens it.

seam

What do you know for sure about the shape of the flattened label?

○ **A.** It is a circle.

○ **B.** It is a square.

○ **C.** It is a cylinder.

○ **D.** It is a rectangle.

4 (continued)

Item Information:

Correct Response: D
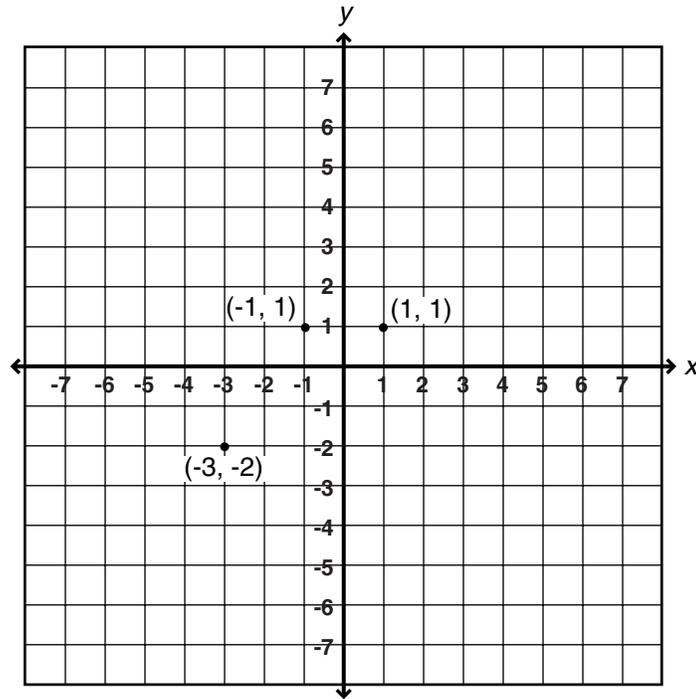
Tools: Yes

Strand: Geometric Sense

Learning Target: GS01: (Properties and Relationships) Identify and use properties and relationships of plane geometry to describe shapes and figures; identify, describe, or draw objects in the surrounding environment in geometric terms (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.):

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

5 Kishma is trying to draw an isosceles trapezoid. Three of the vertices are shown.

Which of the following ordered pairs represents the fourth vertex?

○ **A.** $(3, -2)$

○ **B.** $(-2, 3)$

○ **C.** $(2, -2)$

○ **D.** $(-2, 2)$

5 (continued)

Item Information:

Correct Response: A

Tools: No

Strand: Geometric Sense

Learning Target: GS02: (Location) Identify and describe location of objects on a coordinate grid in any of the four quadrants (Mathematics EALR 1.3.5)

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

6 Central Jr. High School's student council will be hosting a talent show. Jackie will be performing in a band in the talent show. For this performance, the band members have all agreed to wear long pants, a long-sleeved shirt, and a vest, each of which must be solid black, white, or red. Jackie has the following clothes to choose from:

Long pants	Long-sleeved shirts	Vests
1 pr. black	1 white	1 red
1 pr. white	1 red	1 black
	1 black	

How many different choices of outfits does Jackie have?

○ **A.** 12

○ **B.** 7

○ **C.** 6

○ **D.** 3

Item Information:

Correct Response: A

Tools: Yes

Strand: Probability and Statistics

Learning Target: PS01: (Probability) Demonstrate an understanding of measures of chance; use counting procedures and calculations to determine the number of outcomes and/or probability of a simple event; compare results of experiments and simulations with mathematical probabilities (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

7 The track team was surveyed for a story in the school paper. The reporter asked how many times each team member won a race last year. Here are the data he collected:

8, 7, 6, 10, 9, 4, 3, 7, 12, 14, 6, 6, 5

What is the mode number of races won?

○ **A.** 6

○ **B.** 7

○ **C.** 7.5

○ **D.** 14

Item Information:

Correct Response: A

Tools: No

Strand: Probability and Statistics

Learning Target: PS03: (Data Organization and Analysis) Organize and display data in appropriate forms; calculate and appropriately use range and measures of central tendency to describe data (Mathematics EALR 1.4.5, 1.4.6)
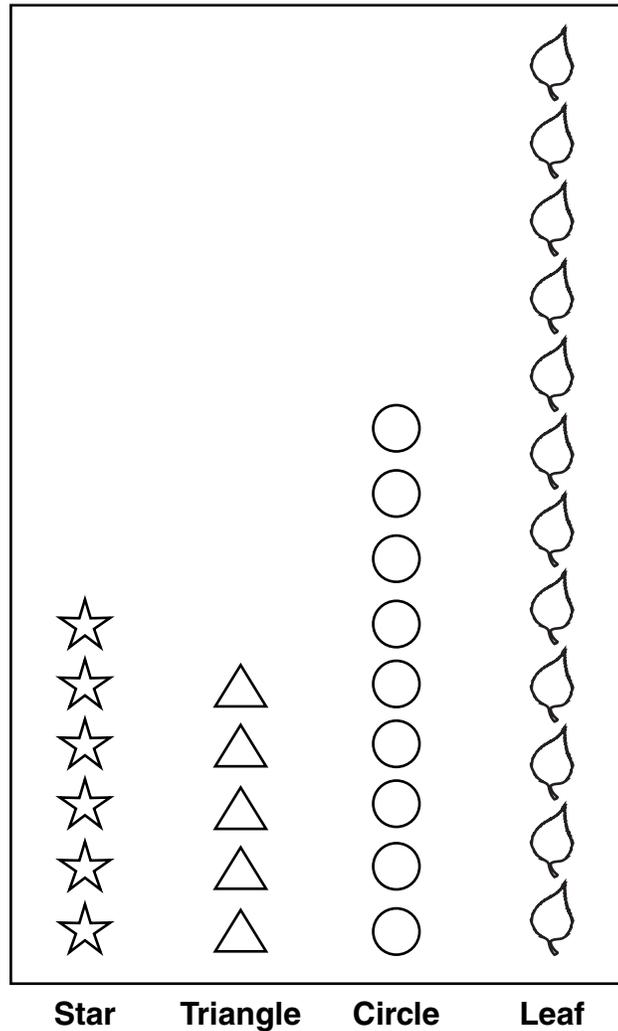
Performance Data (Use this space to fill in student performance information for your school, your district, and the state.):

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

8 You open a package of stickers. The picture below shows how many stickers you have of each shape.

Stickers in Package

| Star | Triangle | Circle | Leaf |

Which number sentence could you use to find how many more leaf stickers you have than star and triangle stickers combined?

○ **A.** $12 + (5 + 6) = \square$

○ **B.** $(12 - 6) + 5 = \square$

○ **C.** $12 - (6 + 5) = \square$

○ **D.** $(12 - 5) + 6 = \square$

8 (continued)

Item Information:

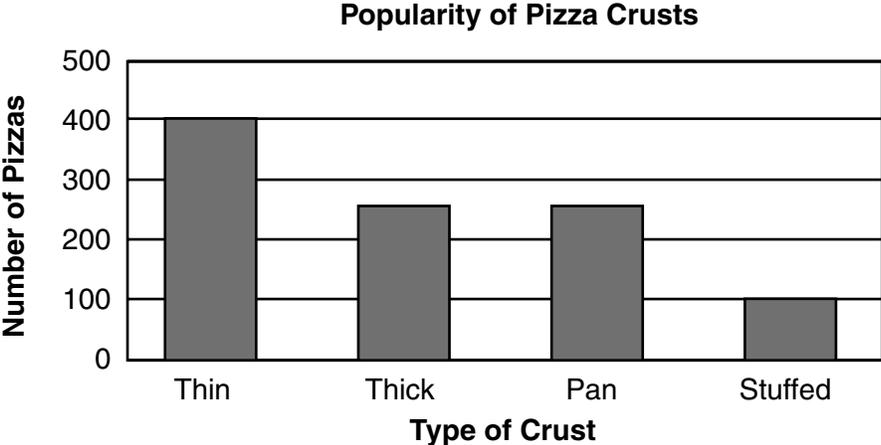Correct Response: C

Tools: No

Strand: Algebraic Sense

Learning Target: AS02: (Symbols and Notations) Symbolically write simple 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

9 The Pizza Cellar keeps a record of the types of crusts its customers have ordered for the last 1,000 pizzas, as shown below.

Popularity of Pizza Crusts

Use the data on the graph to predict how many of the next 200 pizzas sold would be thick-crust pizzas.

○ **A.**   25

○ **B.**   40

○ **C.**   50

○ **D.** 100

9 (continued)

Item Information:

Correct Response: C

Tools: Yes

Strand: Makes Connections

Learning Target: MC01: (Connect within Mathematics) Use concepts and procedures from a variety of the mathematics content strands in a given problem or situation; relate and use 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.):
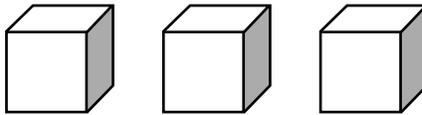
Percent Distribution			
School	District	State	Responses (* = correct response)
			A
			B
			C*
			D
			NR

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

10 Look at the boxes.

$$\frac{1}{3}$$

$$\frac{3}{8}$$

$$.25$$

Place the boxes in order from **least to greatest** by writing their numbers on the blank boxes below.

Describe or show how you determined the order using words, pictures, and/or numbers.

10 (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Number Sense

Learning Target: NS01: (Number and Numeration) Demonstrate an understanding of the pictorial and symbolic representations of integers, fractions, decimals, percents, and place value of decimals; compare and order integers, fractions, and decimals (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.):

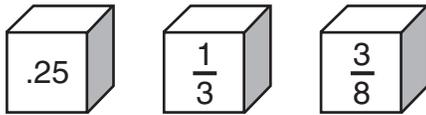| Percent Distribution			
School	District	State	Points
			0
			1
			2
			NR
			Mean

Scoring Guide for question number 10:

A **2-point** response: The student demonstrates an understanding of comparing fractions and decimals by accurately placing the correct numbers on the blocks in the correct order. Supporting work shows understanding of how to translate between fractions and decimals.

Example:

$.25 = \frac{1}{4} = \frac{6}{24}, \frac{1}{3} = \frac{8}{24}, \frac{3}{8} = \frac{9}{24}$

$\frac{6}{24} < \frac{8}{24} < \frac{9}{24}, .25 < .3\overline{3} < .375, .25 < \frac{1}{3} < \frac{3}{8}$

NOTE: Allow for one conversion or representation error if it does not make the order incorrect.

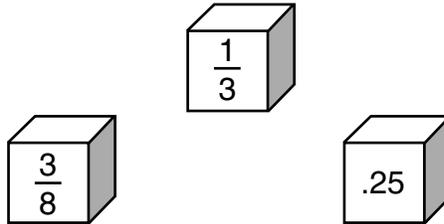A **1-point** response: The student does <u>one</u> of the following:
- places the blocks in order but does not describe or show how the order was determined
- places the blocks in the wrong order because of one conversion or representation error
- explains the conversions but does not put the boxes in order either by labeling the boxes or through a written explanation
- has correct conversions or representations but places the fractions and decimals in reverse order.

A **0-point** response: The student shows very little or no mathematical understanding of demonstrating an understanding of comparing fractions and decimals.
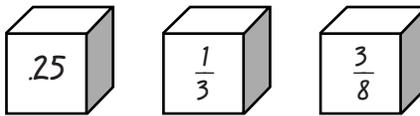
Mathematics

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

10 Look at the boxes.

Place the boxes in order from **least to greatest** by writing their numbers on the blank boxes below.

Describe or show how you determined the order using words, pictures, and/or numbers.

They are all equivilent to⁻

$$\frac{6}{24} < \frac{8}{24} < \frac{9}{24}$$
$$(.25) \quad (\tfrac{1}{3}) \quad (\tfrac{3}{8})$$

I just found a common denominator — 24 (.25 = $\frac{1}{4}$). I knew that

to make the numerator correct you multiply it by the same

number you multiplied the denominator by. Then, it was easy.

24

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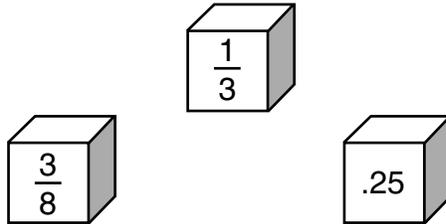number 10 (continued):**

Annotations:

This response shows thorough understanding of comparing fractions and
decimals by accurately placing the correct numbers on the blocks in the correct
order. There is correct translation between fractions and decimal fractions.
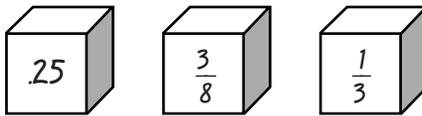This response earns two points.

Mathematics

10 Look at the boxes.

$$\frac{1}{3}$$

$$\frac{3}{8}$$

$$.25$$

Place the boxes in order from **least to greatest** by writing their numbers on the blank boxes below.

$$.25 \qquad \frac{3}{8} \qquad \frac{1}{3}$$

Describe or show how you determined the order using words, pictures, and/or numbers.

.25 is the smallest and $\frac{1}{3}$ which is ecuvilant to $.3\overline{3}$ and $\frac{3}{8}$ is next

which is ecvilant to .375.

26

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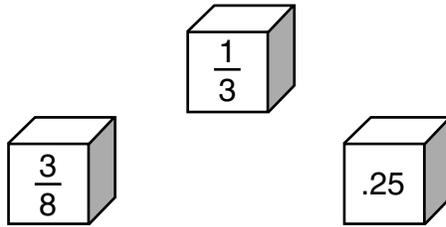
Annotations:

This response shows partial understanding of conversions by explaining the correct order but does not place the boxes in the correct order. This response earns one point.
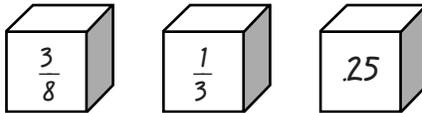
Mathematics

10 Look at the boxes.

$\dfrac{1}{3}$

$\dfrac{3}{8}$

.25

Place the boxes in order from **least to greatest** by writing their numbers on the blank boxes below.

$\dfrac{3}{8}$ $\dfrac{1}{3}$ .25

Describe or show how you determined the order using words, pictures, and/or numbers.

.25

I just choose it because I got taught that way. And It is just less than that way. $\frac{3}{8}$ is less than $\frac{1}{3}$ and .25 than it $\frac{1}{3}$ & .25

28

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

Annotations:

This response shows very little or no understanding of translating fractions and decimals by providing an inappropriate method and placing the boxes in the wrong order. This response earns zero points.

11 The perimeter of the rectangle below is 26 units. When a and b are whole numbers, find a possible width (a) and length (b), and calculate the area of the rectangle.

b

a

Show your work.

Width (side a) _____

Length (side b) _____

Area _____

11 (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Measurement

Learning Target: ME02: (Measuring and Calculating) Measure directly and indirectly and use measurements to describe and compare objects; demonstrate an understanding of the concept of rate, calculate rates and other derived 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.):

Percent Distribution			
School	District	State	Points
			0
			1
			2
			NR
			Mean

Scoring Guide for question number 11:

A **2-point** response: The student shows understanding of determining linear dimensions given perimeter and finding area based on linear dimensions by stating a correct length and width of a rectangle that gives a perimeter of 26 and finds the corresponding area. The student also shows work.

Possible Combinations

Width (side a)	1	2	3	4	5	6
Length (side b)	12	11	10	9	8	7
Area	12	22	30	36	40	42

NOTE: One computational error is acceptable.

NOTE: The dimensions are whole numbers.

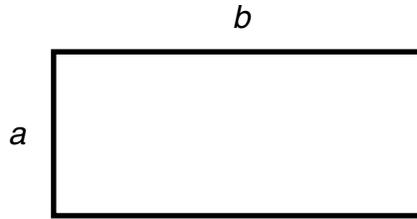A **1-point** response: The student does <u>one</u> of the following:
- gives a length and width, but the resulting perimeter does not equal 26, and the area using the given dimensions is computed accurately
- gives a length and a width with a sum of 13
- gives a correct width, length, and area but shows no work.

NOTE: When the answer given for the area is 26, there must be appropriate supporting work.

A **0-point** response: The student shows very little or no understanding of determining linear dimensions given perimeter and finding area based on linear dimensions.

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

11 The perimeter of the rectangle below is 26 units. When a and b are whole numbers, find a possible width (a) and length (b), and calculate the area of the rectangle.

b

a

Show your work.

b

a

$a = \frac{1}{2}$ of b

$9 + 9 + 4 + 4 = 26$

$P = 26$

$L \times W = a$

9

$4 \qquad 4$

9

23
12
$\overline{11}$

$\begin{array}{r} 8 \\ 8 \end{array} \Big\rangle 16$

$\begin{array}{r} 4 \\ 4 \end{array} \Big\rangle 8$

$\overline{24}$

$\begin{array}{r} 9 \\ + 9 \\ \hline 18 \end{array}$

$\begin{array}{r} 26 \\ -18 \\ \hline 8 \end{array}$

$\begin{array}{r} 4 \\ + 4 \\ \hline 8 \end{array}$

Width (side a) ____4____

Length (side b) ____9____
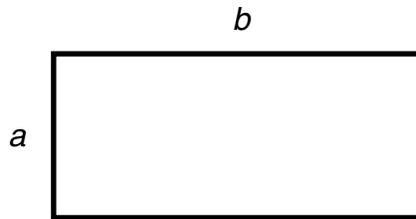
Area ____36____

33

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

Annotations:

This response shows thorough understanding of determining linear dimensions
given perimeter and finding area based on linear dimensions by stating a
correct length and width of a rectangle that gives a perimeter of 26 and finding
the corresponding area. This response earns two points.

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

11 The perimeter of the rectangle below is 26 units. When a and b are whole numbers, find a possible width (a) and length (b), and calculate the area of the rectangle.

b

a

Show your work.

$a = (W \times 2) + (L \times 2)$

$26 = (W \times 2) + (L \times 2)$

$26 = (5 \times 2) + (8 + 2)$

$26 = 10 + 16$

Width (side a) _____5_____

Length (side b) _____8_____

Area _____26_____

35

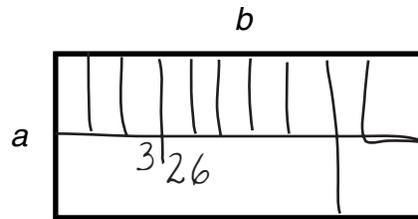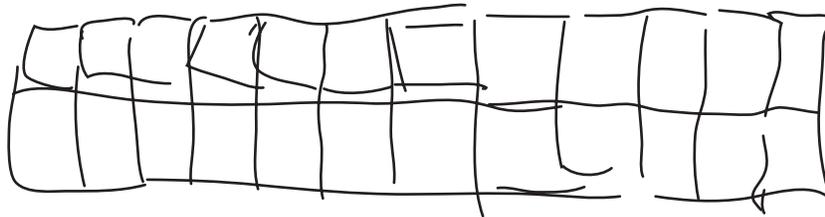**Annotated Example of a 1-point response for question number 11 (continued):**

Annotations:

This response shows partial understanding of determining linear dimensions given perimeter and finding area based on linear dimensions by giving a correct width, 5, and a correct length, 8, that creates a perimeter of 26. However, the area is miscalculated as 26 instead of 40. This response earns one point.

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

11 The perimeter of the rectangle below is 26 units. When a and b are whole numbers, find a possible width (a) and length (b), and calculate the area of the rectangle.

Show your work.

Width (side a) _____2_____

Length (side b) _____12_____

Area _____26_____

37

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

Annotations:

This response shows very little or no understanding of determining linear dimensions given perimeter and finding area based on linear dimensions by indicating an incorrect width, 2, and an incorrect length, 12, that results in a perimeter of 28 units. The area is incorrectly given as 26. This response earns zero points.

12 The student council is charging $2.50 per student or child and
$1.00 more per adult for tickets to a talent show.

Set up an equation to find t, the total amount of money that will be
brought in from ticket sales. Let a = number of adult tickets and
s = number of student or child tickets.

12 (continued)

Item Information:

Score Points: 2

Tools: Yes

Strand: Algebraic Sense

Learning Target: AS02: (Symbols and Notations) Symbolically write simple 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	Points
			0
			1
			2
			NR
			Mean

Scoring Guide for question number 12:

A **2-point** response: The student shows understanding of representing situations with simple equations by writing <u>one</u> of the following equations:

> $t = \$2.50s + (\$2.50 + \$1.00)a$
> OR
> $t = \$2.50c + (\$2.50 + \$1.00)a$
> OR
> $t = \$2.50s + \$3.50a$
> OR
> $t = \$2.50c + \$3.50a$

NOTE: Students may use different variables, but the variables must be clearly defined.

NOTE: Students may interchange s and a, but they must clearly define both variables.

NOTE: Students may write out the equation completely using words (e.g., number of students).

A **1-point** response: The student does <u>one</u> of the following:
- uses one or more different (undefined) variable names (e.g., total = \$2.50 student or child + (\$2.50 + \$1.00) adult)
- uses the same symbol to represent two different variable amounts, and the symbol is defined
- writes an explanation that is not an equation
- writes an equation or expression that does not accurately represent the situation

> e.g., $t = \$2.50s + \$2.50 + \$1.00a$
> OR
> $t = \$2.50s + \$1.00a$
> OR
> $t = \$2.50 + (\$2.50 + \$1.00)a$
> OR
> $\$2.50s + (\$2.50 + \$1.00)a$
> OR
> $t = \$2.50a + \$3.50s$

- uses a system of equations, one of which is the appropriate simple equation from the 2-point response.

A **0-point** response: The student shows very little or no understanding of representing a situation with a simple equation.

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

12 The student council is charging $2.50 per student or child and $1.00 more per adult for tickets to a talent show.

Set up an equation to find t, the total amount of money that will be brought in from ticket sales. Let a = number of adult tickets and s = number of student or child tickets.

$$\$2.50s + \$3.50a = t$$

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

Annotations:

This response shows understanding of representing situations with simple equations by writing "*$2.50s + $3.50a = t.*" The student uses "*s*" to represent the number of student tickets, "*a*" for the number of adult tickets, and "*t*" for the total amount of money made. The student uses "*$2.50*" for the price of one student or child ticket. The student uses "*$3.50*" for the price of one adult ticket, as it is $1.00 more than the student ticket. This response earns two points.

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

12 The student council is charging $2.50 per student or child and
$1.00 more per adult for tickets to a talent show.

Set up an equation to find t, the total amount of money that will be
brought in from ticket sales. Let a = number of adult tickets and
s = number of student or child tickets.

$(a \times \$1.00) + (s \times 2.50) = t$

s × 2.50 will find the cost of all studant tickets,

adults are $1.00 more per adult.

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

Annotations:

This response shows partial understanding of representing situations with simple equations by writing "*(a × \$1.00) + (s × 2.50) = t*." The student correctly uses "*t*" to represent the total amount of money earned, "*s*" to represent the number of student tickets multiplied by \$2.50, the cost of one student ticket, but the equation was incomplete. The student used "*a*" to represent the number of adult tickets and multiplied that by \$1.00, which does not include the \$2.50 that must be added to it. This response earns one point.

12 The student council is charging $2.50 per student or child and $1.00 more per adult for tickets to a talent show.

Set up an equation to find t, the total amount of money that will be brought in from ticket sales. Let a = number of adult tickets and s = number of student or child tickets.

$a + s = t$

because a = adult and adult is 1.00 more so add

that to s = student or child then add the number

of s then you get t = total.

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

Annotations:

This response shows very little or no understanding of representing situations with simple equations by writing "$a + s = t$." The student neither multiplies a by ($\$2.50 + \$1.00$) for adult tickets nor multiplies the s by $\$2.50$ for student tickets. This response earns zero points.

13 Look at the equation below.

$$72 + 58 = 130$$

Chris added 70 and 60 to find the sum instead of using the number sentence above.

Clearly explain or show why Chris's method results in the same answer.

13 (continued)

Item Information:

Score Points: 2

Tools: Yes

Strand: Communicates Understanding

Learning Target: CU02: (Organize, Represent, and Express) Clearly organize, represent, and express mathematical information, and ideas, using mathematical language, in ways appropriate for the given audience and purpose (Mathematics EALR 4.2.1, 4.3.1, 4.3.2)

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

Percent Distribution			
School	District	State	Points
			0
			1
			2
			NR
			Mean

Scoring Guide for question number 13:

A **2-point** response: The student clearly communicates mathematical information by doing <u>one</u> of the following:
- subtracts 2 from the 72 and adds 2 to the 58 (70 + 60), which results in an answer that is the same as 72 + 58
- subtracts the 2 from the 72, subtracts the 8 from the 58 and adds the 2 and the 8 to get 10; then they add the 10 to the 50 and get 60; and finally add 70 and 60 to get 130.

A **1-point** response: The student does <u>one</u> of the following:
- explains the adding and subtracting of 2 correctly but does not show that 70 + 60 = 130
- uses a method other than Chris's and explains how that method was used
- subtracts the 2 from the 72, subtracts the 8 from the 58 and adds the 2 and the 8 to get 10; then they add the 10 to the 70 and get 80; and finally add 80 and 50 to get 130
- subtracts the 2 from the 72, subtracts the 8 from the 58 and adds the 2 and the 8 to get 10; then they add the 70 to the 50 and get 120 and then add 10 to get 130
- gives half of an acceptable method and shows the results when adding 60 and 70.

A **0-point** response: The student shows very little or no understanding of communicating mathematical information.

NOTE: Rounding alone is not an acceptable method.

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

13 Look at the equation below.

72 + 58 = 130

Chris added 70 and 60 to find the sum instead of using the number sentence above.

Clearly explain or show why Chris's method results in the same answer.

7②+ 5⑧= 130

2 + 8 = 10

70 + 50 + 10 = 130
            or
70 + 60 = 130

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

Annotations:

This response shows thorough understanding of communicating mathematical information by subtracting 2 from 72, subtracting 8 from 58, and adding the 2 and the 8 to get 10; then they add the 10 to the 50 and get 60; and finally add 70 and 60 and get 130. This response earns two points.

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

13 Look at the equation below.

72 + 58 = 130

Chris added 70 and 60 to find the sum instead of using the number sentence above.

Clearly explain or show why Chris's method results in the same answer.

Because the 2 in 72 + the 8 in 58 = an extra 10, so if you add 70 and 50, and then added the extra 10, you would still get 130.

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

Annotations:

This response shows partial understanding of communicating mathematical
information by using a method other than Chris's to show how the sum will be
the same by subtracting 8 and 2 from 58 and 72 and then adding the resulting
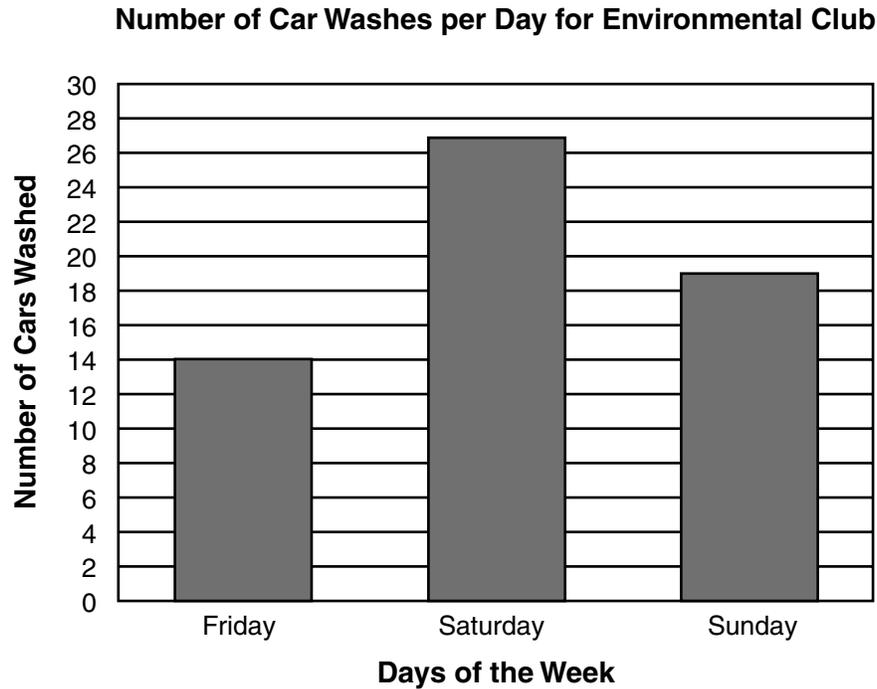sum of 10 to 70 and 50. This response earns one point.

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

13 Look at the equation below.

$$72 + 58 = 130$$

Chris added 70 and 60 to find the sum instead of using the number sentence above.

Clearly explain or show why Chris's method results in the same answer.

Because if you were to add 2 to 130 it would = 132

and then if you subtract 2 from 132 ther it = 130 which

is what chris is doing

130 + 2 = 132

132−2 = 130

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

Annotations:

This response shows very little or no understanding of communicating mathematical information by giving an incorrect explanation as to why the method works. This response earns zero points.

14 The Environmental Club held a car wash to earn money to buy trees for a park. A car wash costs $5.00. The graph below shows how many cars were washed each day.

Number of Car Washes per Day for Environmental Club

Jamie's dad is donating the location and all supplies for the car wash. Each tree costs $16.00, including tax. How many trees was the Environmental Club able to purchase?

Show your work.

How many trees was the Environmental Club able to purchase? _____

14 (continued)

Item Information:

Score Points: 2

Tools: No

Strand: Makes Connections

Learning Target: MC01: (Connect within Mathematics) Use concepts and procedures from a variety of the mathematics content strands in a given problem or situation; relate and use 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	Points
			0
			1
			2
			NR
			Mean

Scoring Guide for question number 14:

A **2-point** response: The student shows conceptual and procedural understanding between the number sense and probability and statistics content strands by showing that 18 trees can be purchased and explains the answer using words, numbers, or pictures.

Example:

$14 + 27 + 19 = 60$ cars washed; $60 \times \$5 = \$300$; $\$300 \div 16 \approx 18$ trees. The student may state that there is $12 remaining.

NOTE: Any reasonable justification for buying an extra tree for a total of 19 will also be allowed, such as stating that someone will add $4. ($16 \times 19 = 304$)

NOTE: Allow for one error that results in an answer of 18.

A **1-point** response: The student does <u>one</u> of the following:
*   shows how they arrived at $300
*   extracts pertinent information (14, 27, and 19) and uses all of the appropriate procedures (adds, subtracts, multiplies, and divides) and may have an incorrect answer
*   gives an answer other than 18 that is the result of one error.

Example:

$14 + 27 + 19 = 50$ cars washed; $50 \times \$5 = \$250$; $\$250 \div 16 \approx 15$ trees;

Using $300 in revenue from the car wash, dividing by 16, and using the fractional or decimal part of the quotient to add another tree (19) or stating 18 plus a decimal or fractional part.

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

Mathematics

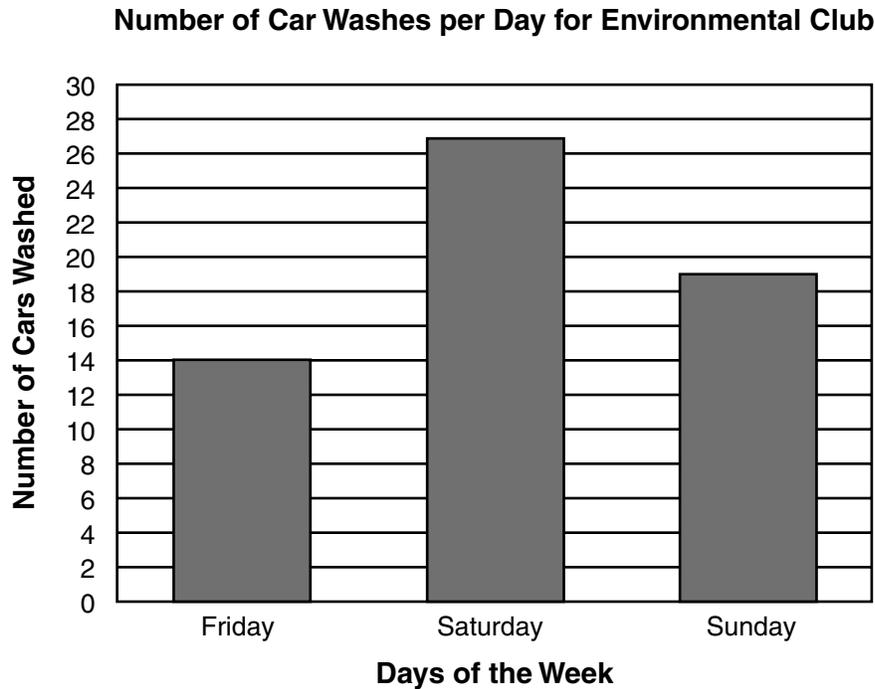**Annotated Example of a 2-point response for question number 14:**

14 The Environmental Club held a car wash to earn money to buy trees for a park. A car wash costs $5.00. The graph below shows how many cars were washed each day.

Number of Car Washes per Day for Environmental Club

Jamie's dad is donating the location and all supplies for the car wash. Each tree costs $16.00, including tax. How many trees was the Environmental Club able to purchase?

Show your work.

friday = $\overset{2}{1}$4, carwash   trees = $16

sat = 27$\overset{11}{)}$ " $16\overline{)300}$ $\overset{5\ 4}{}$

sun = + 19$\overset{0}{)}$ " $\underline{-16}$

 $\overline{60 \text{ total carwash}}$ $\overset{19}{1}$40

$\underline{\times 5}$ $\underline{-128}$

$\overline{\$300 \text{ total \$ made}}$ 12

How many trees was the Environmental Club able to purchase? ___18___

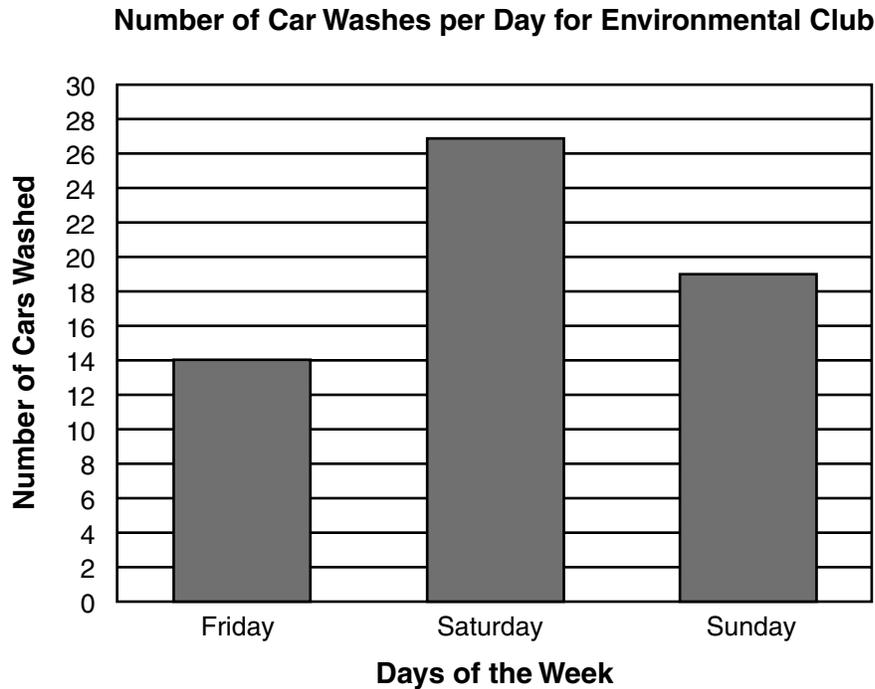**Annotated Example of a 2-point response for question number 14 (continued):**

Annotations:

This response shows thorough conceptual and procedural understanding between number sense and probability and statistics content strands by showing that 18 trees can be purchased and explains the answer using words, numbers, or pictures. This response earns two points.

Mathematics

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

14 The Environmental Club held a car wash to earn money to buy trees for a park. A car wash costs $5.00. The graph below shows how many cars were washed each day.

Number of Car Washes per Day for Environmental Club

Number of Cars Washed (y-axis: 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30)

Days of the Week (Friday, Saturday, Sunday)

Jamie's dad is donating the location and all supplies for the car wash. Each tree costs $16.00, including tax. How many trees was the Environmental Club able to purchase?

Show your work.

$$\begin{array}{c} ^2\\ 14 \\ \times\ 5 \\ \hline \$70.00 \end{array} \quad + \quad \begin{array}{c} ^3\\ 27 \\ \times\ 5 \\ \hline \$135.00 \end{array} \quad + \quad \begin{array}{c} ^4\\ 19 \\ \times\ 5 \\ \hline \$95.00 \end{array}$$

$$\begin{array}{c} ^3\\ 16 \\ 16 \\ 16 \\ 16 \\ 16 - 6 - 6 \\ \hline 80 \end{array} \Big> 12 \Big> 12 \Big\} 24$$

$$\begin{array}{c} ^1\\ 70 \\ 135 \\ 95 \\ \hline 290 \end{array}$$

$$16\overline{)290} \\ \underline{16} \\ 130$$

$$\begin{array}{c} ^4\\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ 16 \\ \hline 128 \end{array}$$

> 12 > 12 > 12 > 12 > 12 > 12 > 12 > 12 → 24 → 24 → 24 → 48

How many trees was the Environmental Club able to purchase? ____8____

$$\begin{array}{c} ^1\\ 128 \\ 16 \\ \hline 144 \end{array}$$

62

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

Annotations:

This response shows partial understanding of conceptual and procedural understanding between number sense and probability and statistics content strands by extracting pertinent information and using all of the appropriate procedures but has an incorrect answer, 8, not 18. This response earns one point.

Mathematics

14 The Environmental Club held a car wash to earn money to buy trees for a park. A car wash costs $5.00. The graph below shows how many cars were washed each day.

Number of Car Washes per Day for Environmental Club

Jamie's dad is donating the location and all supplies for the car wash. Each tree costs $16.00, including tax. How many trees was the Environmental Club able to purchase?

Show your work.

```
'26.50        03
 14.00     16)59
+ 18.50       48
 ──────       ──
 59.00        11
```

How many trees was the Environmental Club able to purchase? ___3___

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

Annotations:

This response makes very little or no connection between number sense and
probability and statistics content strands. This response earns zero points.

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has enough bodies to make 50 scooters. He has 160 wheels. How many three-wheel scooters and four-wheel scooters can he make? He must use **all** the bodies and **all** the wheels.

Show **all** your work. Use words, pictures, and/or numbers.

Number of three-wheel scooters _____

Number of four-wheel scooters _____

Additional work space.

15 (continued)

Item Information:

Score Points: 4

Tools: No

Strand: Solves Problems and Reasons Logically

Learning Target: SR03: (Construct Solutions) Organize relevant 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.):

Percent Distribution			
School	District	State	Points
			0
			1
			2
			3
			4
			NR
			Mean

Scoring Guide for question number 15:

A **4-point** response: The student shows understanding of organizing information and using a viable strategy to construct a solution by doing the following:

- shows the total number of bodies/scooters to be 50 or has two numbers in the answer spaces that total 50

- shows the total number of wheels to be 160

- has a strategy that uses both the numbers 3 and 4 appropriately

- gives answers of 40 3-wheel and 10 4-wheel scooters.

Example:

3-wheel scooters	4-wheel scooters	Total Number of Wheels
a	*b*	$3a + 4b$
0	50	200
10	40	190
20	30	180
30	20	170
40	10	160

A **3-point** response: The student does <u>three</u> of the following:

- shows the total number of bodies/scooters to be 50 or has two numbers in the answer spaces that total 50

- shows the total number of wheels to be 160

- has a strategy that uses both the numbers 3 and 4 appropriately

- gives answers of 40 3-wheel and 10 4-wheel scooters.

A **2-point** response: The student does <u>two</u> of the following:

- shows the total number of bodies/scooters to be 50 or has two numbers in the answer spaces that total 50

- shows the total number of wheels to be 160

- has a strategy that uses both the numbers 3 and 4 appropriately

- gives answers of 40 3-wheel and 10 4-wheel scooters without supporting work.

Scoring Guide for question number 15 (continued):

A **1-point** response: The student does <u>one</u> of the following:
- shows the total number of bodies/scooters to be 50 or has two numbers in the answer spaces that total 50
- shows the total number of wheels to be 160
- has a strategy that uses both the numbers 3 and 4 appropriately
- gives answers of 40 3-wheel and 10 4-wheel scooters without supporting work.

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

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

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has enough bodies to make 50 scooters. He has 160 wheels. How many three-wheel scooters and four-wheel scooters can he make? He must use **all** the bodies and **all** the wheels.
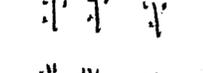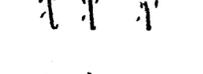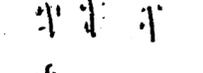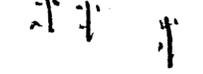
Show **all** your work. Use words, pictures, and/or numbers.

50 scooters

# of 3-wheeled	# of 4-wheeled	total # of wheels	work
25	25	175	25x3=75 25x4=100 100+75=175
30	20	170	30x3=90 20x4=80 80+90=170
40	10	160	40x3=120 10x4=40 120+40=160

✻

I started with just doing half and half, but that was too many wheels, so I had to do more 3-wheeled than 4-wheeled. I tried 30 3-wheel & 20 4-wheel, but that was still too much. Since by increasing the # of 3-wheeled by 5 and decreasing the number of 4-wheeled by 5 it lowered the total # of wheels by 5, I knew I needed to increase and decrease by 10 more, so that I could get the total # of wheels down by 10, to 160. Since 30+10=4 and 20-10=10, I knew he needed to make

Number of three-wheel scooters _____40_____

Number of four-wheel scooters _____10_____

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

Additional work space.

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

Annotations:

This response shows complete understanding of organizing information and using a viable strategy to construct a solution by showing the relationship between 3 and 4 and the total of 50 bodies and 160 wheels. The guess and check strategy is appropriate and results in the correct answer (A) of 40 and 10. This response earns four points.

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

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has enough bodies to make 50 scooters. He has 160 wheels. How many three-wheel scooters and four-wheel scooters can he make? He must use **all** the bodies and **all** the wheels.

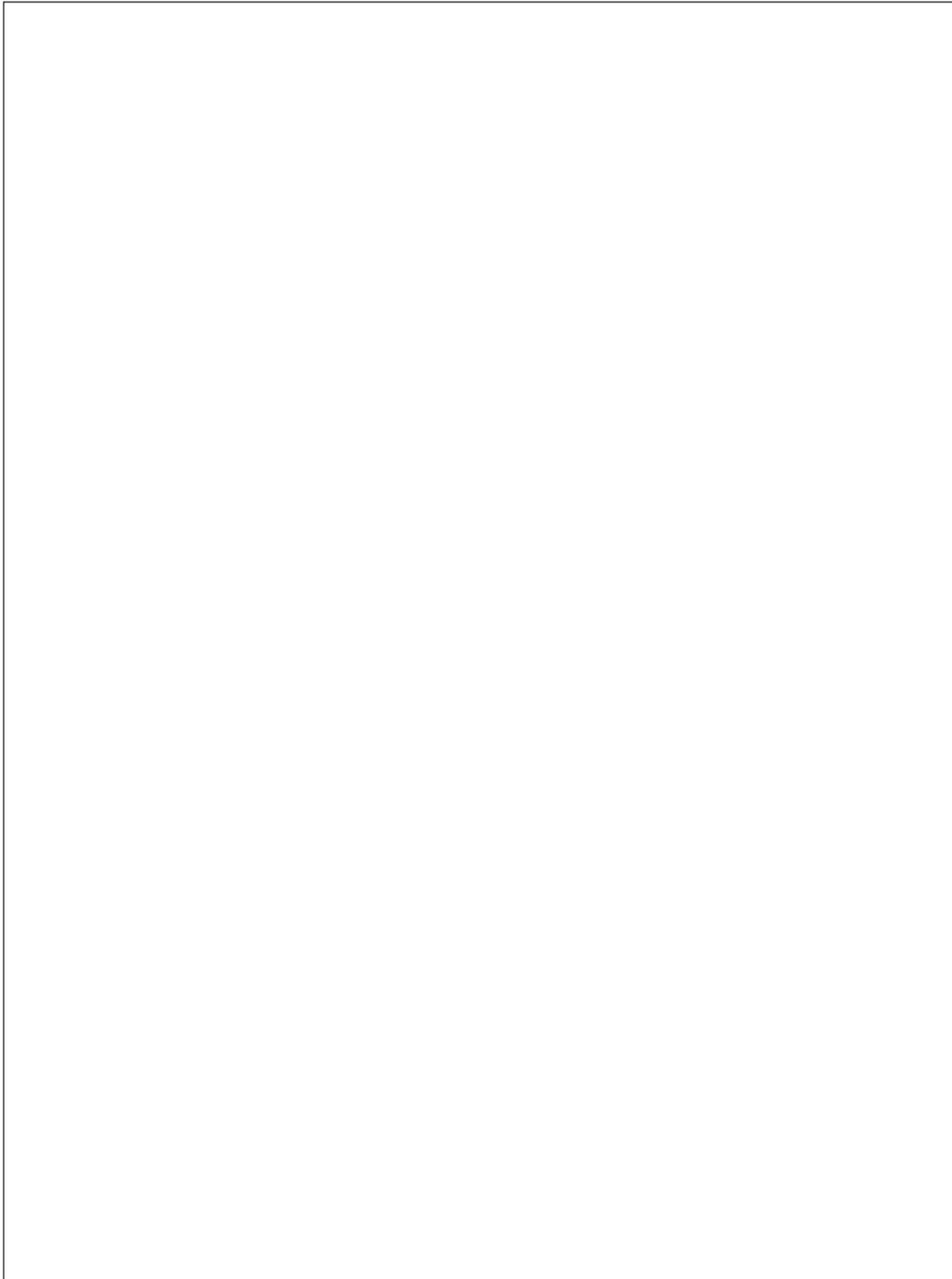Show **all** your work. Use words, pictures, and/or numbers.

Scooter = 1
wheel = ●

= 20
= 20
= 15
= 15
= 15
= 15
= 15
= 15
= 15
= 15

Number of three-wheel scooters ___120___

Number of four-wheel scooters ___40___

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

Additional work space.

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

Annotations:

This response shows understanding of organizing information and using a
viable strategy by showing a relationship between three and four on the
picture of 50 scooters and a total of 160 in both the picture and the answers.
This response earns three points.

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

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has enough bodies to make 50 scooters. He has 160 wheels. How many three-wheel scooters and four-wheel scooters can he make? He must use **all** the bodies and **all** the wheels.

Show **all** your work. Use words, pictures, and/or numbers.

3, 4   3, 4   3, 4   3, 4   3, 4   3, 4   3, 4   3, 4   3, 4

3, 4   3, 4   3, 4   3, $\overset{-91}{4}$ 3, 4   3, $\overset{-105}{4}$ 3, 4

3, 4   3, 4   3, 4   3, 4   3, 4   3, 4   3, 3

$$24 \text{ –3 wheels}$$
$$+\ 22 \text{ –4 wheels}$$
$$\overline{46 \text{ scooters}}$$

He can only make 46 scooters

$$20$$
$$\times\ 7$$
$$\overline{140}$$

$$^{1}22$$
$$\times\ 7$$
$$\overline{154}$$
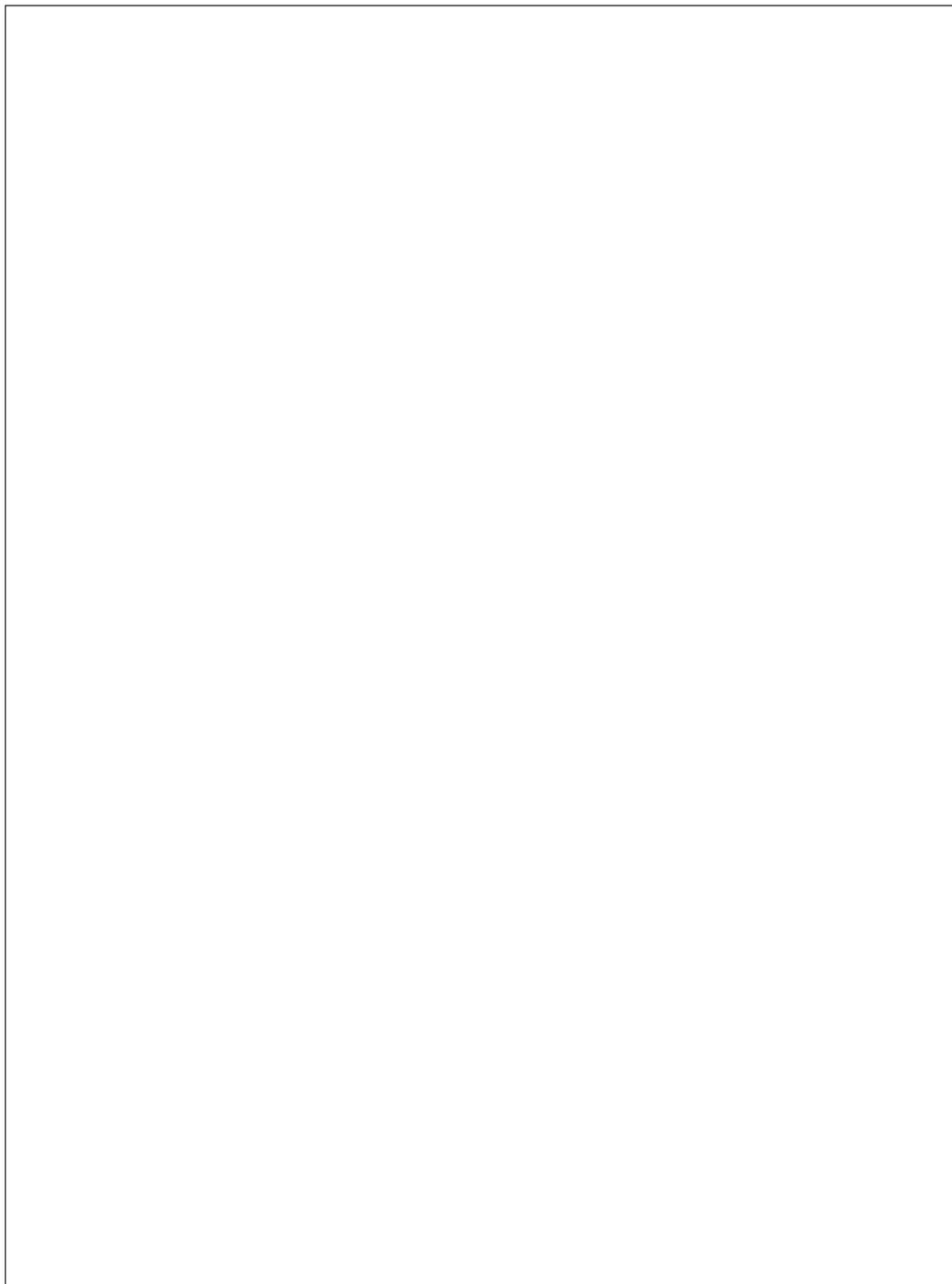$$+\ \ 3$$
$$\overline{157}$$
$$+\ \ 3$$
$$\overline{160}$$

Number of three-wheel scooters _____24_____

Number of four-wheel scooters _____22_____

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

Additional work space.

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

Annotations:

This response shows some understanding of organizing information and using
a viable strategy by showing a relationship between 3 and 4, the total of 160
wheels by not 50 bodies. The strategy is appropriate but results in the incorrect
answer of 24 and 22. The answer of 24 and 22 is based on the misunderstanding
of 50 bodies. This response earns two points.

Mathematics

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has <u>enough</u> bodies to make <u>50 scooters.</u> He has <u>160</u> wheels. How many <u>three-wheel scooters</u> and <u>four-wheel scooters can he make?</u> He must use **all** the bodies and **all** the wheels.

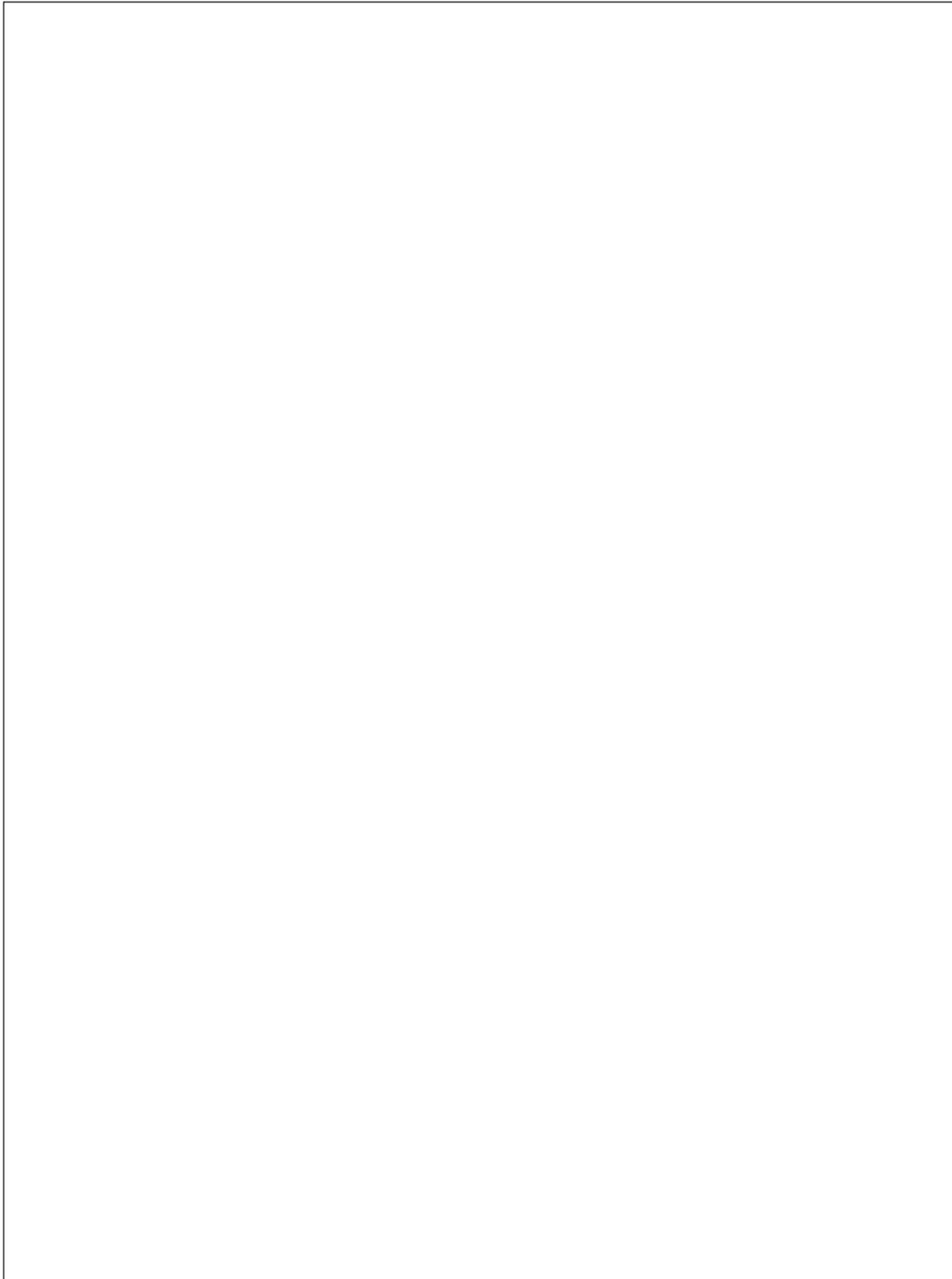Show **all** your work. Use words, pictures, and/or numbers.

160 wheels   = 50 scooters

40 4-wheel scooters

10 3-wheel scooters

$$4\overline{)40}$$
$$4\overline{)160}$$

$$\begin{array}{r} 50 \\ -40 \\ \hline 10 \end{array}$$

Number of three-wheel scooters ___10___

Number of four-wheel scooters ___40___

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

Additional work space.

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

Annotations:

This response shows little understanding of organizing information and using a viable strategy by showing a total of 50 bodies in the answers of *"10"* three-wheel scooters and *"40"* four-wheel scooters. This strategy does not show the relationship between three and four. This response earns one point.

Annotated Example of a 0-point response for question number 15:

15 A scooter designer uses the same body to make scooters with three wheels and scooters with four wheels. He has enough bodies to make 50 scooters. He has 160 wheels. How many three-wheel scooters and four-wheel scooters can he make? He must use **all** the bodies and **all** the wheels.

Show **all** your work. Use words, pictures, and/or numbers.

if you muiltiple 3 by 160 you get
480 and if you divide 480 by 4 you
get 120 then divide 480 by 3 you
get 160. Then you have your answer.

Number of three-wheel scooters _____160_____

Number of four-wheel scooters _____120_____

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

Additional work space.

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

Annotations:

This response shows very little or no understanding of how to effectively and
appropriately interpret, organize, and/or represent relevant mathematical
information from a problem situation and apply problem-solving strategies to
construct a solution. This response earns zero points.