



Arkansas Comprehensive Testing, Assessment, and Accountability Program

Teacher Handbook

Geometry

Mid-Year End-of-Course Examination

January 2007 Administration

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Arkansas Department of Education

Teacher Handbook—Geometry

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Introduction

The **Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP)** includes a Mid-Year End-of-Course Examination for students completing Geometry or the equivalent by the end of the first semester. The examination consists of multiple-choice and open-response questions that directly assess student knowledge. The *Arkansas Geometry Mathematics Curriculum Framework* is the basis for the development of the *Geometry Mid-Year End-of-Course Examination*.

In January 2007, all students who had completed or were completing the required course work for Geometry by the end of the first semester participated in the *Geometry Mid-Year End-of-Course Examination*. Results of the *Geometry Mid-Year End-of-Course Examination* will be provided to all students, schools, and districts to be used as the basis for instructional change.

The handbook provides information about the scoring of student responses to the Geometry open-response items. It describes the scoring procedures and the scoring criteria (rubrics) used to assess student responses. Copies of actual student responses are provided, along with scores given to those responses, to illustrate how the scoring criteria were applied in Geometry open-response items.

Additional information about the *Geometry Mid-Year End-of-Course Examination* is available through the Arkansas Department of Education. Questions can be addressed to Dr. Gayle Potter at 501-682-4558.

Scoring Student Responses to Geometry Open-Response Items

The multiple-choice and open-response test items for the *Geometry Mid-Year End-of-Course Examination* are developed with the assistance and approval of the Geometry Content Advisory Committee. This committee is composed of active Arkansas educators with expertise in Mathematics education. The Geometry Content Advisory Committee develops and reviews multiple-choice and open-response items to ensure that they reflect the *Arkansas Geometry Mathematics Curriculum Framework*.

While multiple-choice items are scored by machine to determine if the student chose the correct answer from four options, responses to open-response items must be scored by trained “readers” using a pre-established set of scoring criteria.

Reader Training

Before readers are allowed to begin assigning scores to any student responses, they go through intensive training. The first step in that training is for the readers to read the Geometry open-response items as they appear in the test booklet and to respond—just as the student test takers are required to do. This step gives the readers some insight into how the students might have responded. The next step is the readers’ introduction to the scoring rubric. All of the specific requirements of the rubric are explained by the Scoring Director who has been specifically trained to lead the scoring group. Then responses (anchor papers) that illustrate the score points of the rubric are presented to the readers and discussed. The goal of this discussion is for the readers to understand why a particular response (or type of response) receives a particular score. After discussion of the rubric and anchor papers, readers practice scoring sets of responses that have been pre-scored and selected for use as training papers. Detailed discussion of the responses and the scores they receive follows.

After three or four of these practice sets, readers are given “qualifying rounds.” These are additional sets of pre-scored papers, and, in order to qualify, each reader must score in exact agreement on at least 80% of the responses and have no more than 5% non-adjacent agreement on the responses. Readers who do not score within the required rate of agreement are not allowed to score the *Geometry Mid-Year End-of-Course Examination* responses.

Once scoring of the actual student responses begins, readers are monitored constantly throughout the project to ensure that they are scoring according to the criteria. Daily and cumulative statistics are posted and analyzed, and Scoring Directors or Team Leaders reread selected responses scored by the readers. These procedures promote reliable and consistent scoring. Any reader who does not maintain an acceptable level of agreement is dismissed from the project.

Scoring Procedures

All student responses to the *Geometry Mid-Year End-of-Course Examination* open-response test items are scored independently by two readers. Those two scores are compared, and responses that receive scores that are non-adjacent (a “1” and a “3,” for example) are scored a third time by a Team Leader or the Scoring Director for resolution.

On the following pages, open-response items are presented as they appeared in the January 2007 *Geometry Mid-Year End-of-Course Examination*. The specific scoring rubric for each item and annotated responses for each score point of the rubric follows. The goal is for classroom teachers and their students to understand how responses are scored. It is hoped that this understanding will help students see what kind of performance is expected of them on the *Geometry Mid-Year End-of-Course Examination*.

GEOMETRY

OPEN-RESPONSE ITEMS

Geometry Item A

- A. Trapezoid GHIJ has parallel sides $\overline{GH}$ and $\overline{IJ}$. The coordinates for the vertices are given in the table below.

Vertex	Coordinates
G	(-2, 5)
H	(6, 11)
I	(8, 7)
J	(-8, -5)

A median of a trapezoid is a segment that connects the midpoints of the sides that are **not** parallel. Let point W be the midpoint of $\overline{HI}$ and point Z be the midpoint of $\overline{GJ}$.

- Find the coordinates of points W and Z. Show all of your work and/or explain your answer.
- Find the slopes of $\overline{GH}$, $\overline{IJ}$, and $\overline{WZ}$. Show all of your work and/or explain your answer.
- Find the lengths of $\overline{GH}$, $\overline{IJ}$, and $\overline{WZ}$. Show all of your work and/or explain your answer.
- Use your answers from Parts 2 and 3 to describe two relationships that exist between trapezoid GHIJ's median and its parallel sides. Explain your answer.

Geometry Item A Scoring Rubric

SCORE	DESCRIPTION
4	The student earns 6 points. The response contains no incorrect work and credit is awarded for Part 4.
3	The student earns 6 points and credit is not awarded for Part 4 as noted in the Scoring Guide, or the student earns $4\frac{1}{2}$ – $5\frac{1}{2}$ points, or the student earns 4 points as noted in the Scoring Guide.
2	The student earns 4 points as noted in the Scoring Guide, or the student earns $2\frac{1}{2}$ – $3\frac{1}{2}$ points.
1	The student earns $\frac{1}{2}$ –2 points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

Geometry Item A Solution and Scoring

Part	Points
1	2 points possible 2 points: 2 correct midpoints: $W(7, 9)$, $Z(-5, 0)$ and Correct and complete procedure shown or explained for at least 1 point. Give credit for the following or equivalent: - Ex: midpoint of $\overline{HI} = W = \left(\frac{6+8}{2}, \frac{11+7}{2}\right) = \left(\frac{14}{2}, \frac{18}{2}\right) = (\#, \#)$ - Ex: midpoint of $\overline{GJ} = Z = \left(\frac{-2+8}{2}, \frac{5+5}{2}\right) = \left(\frac{-10}{2}, \frac{0}{2}\right) = (\#, \#)$ OR 1 ½ points: 1 correct midpoint with correct and complete procedure shown or explained. Work for 2nd midpoint may contain a calculation or copy error, or may be missing. OR 1 point: 2 correct midpoints with procedure missing. or Correct and complete procedure for finding at least 1 midpoint. Work for each point contains calculation or copy error. OR ½ point: 1 correct midpoint with procedure missing.
2	2 points possible 2 points: 3 correct slopes: $m \overline{GH} = \frac{3}{4}$, $m \overline{IJ} = \frac{3}{4}$, $m \overline{WZ} = \frac{3}{4}$ or $m \overline{WZ}$ may be based on incorrect coordinate(s) for W and/or Z in Part 1. and Correct and complete procedure for finding at least one of 1 slope. Give credit for the following or equivalent: $m \overline{GH} = \frac{11-5}{6-2} = \frac{6}{8} = \frac{3}{4}$ $m \overline{IJ} = \frac{7+5}{8+8} = \frac{12}{16} = \frac{3}{4}$ $m \overline{WZ} = \frac{0-9}{-5-7} = \frac{-9}{-12} = \frac{3}{4}$ - Student graphs the points and uses $\frac{\text{rise}}{\text{run}}$ to determine the slope. OR 1 ½ points: 1 or 2 correct slopes with correct and complete procedure. Work for 2nd and/or 3rd slope may contain a calculation or copy error, or may be missing. OR 1 point: 3 correct slopes with procedure missing. or Correct and complete procedure for finding at least 1 slope but no correct slopes. OR ½ point: 1 or 2 correct slopes with procedure missing.

Geometry Item A Solution and Scoring

Part	Points
3	2 points possible 2 points: 3 correct lengths: $GH = 10$, $IJ = 20$, $WZ = 15$ or Correct length of WZ based on incorrect coordinate(s) in Part 1. and Correct and complete procedure for at least 1 length. Give credit for the following or equivalent: • $GH = \sqrt{(6-(-2))^2 + (11-5)^2} = \sqrt{100} = \#$ • $IJ = \sqrt{(-8-8)^2 + (-5-7)^2} = \sqrt{400} = \#$ • $WZ = \sqrt{(-5-7)^2 + (0-9)^2} = \sqrt{225} = \#$ • The student graphs the coordinates and uses the Pythagorean Theorem to determine each length. OR 1 ½ points: 1 or 2 correct lengths with correct and complete procedure. Work for 2nd and/or 3rd length may contain a calculation or copy error, or may be missing. OR 1 point: 3 correct lengths with procedure missing. or Correct and complete procedure for finding at least 1 length but no correct lengths given. OR ½ point: 1 or 2 correct lengths with procedure missing.
4	Part 4 will be used to determine the difference between some 3's and 4's and some 2's and 3's. • If Parts 1, 2, and 3 are completely correct and two statements are made regarding either the slope and/or the length of the median, which are not incorrect, a score of "4" will be awarded; otherwise, the score will be "3." • If Parts 1 and 2 are completely correct and Part 3 is completely incorrect, and a correct statement is made regarding slope, a score of "3" is awarded; otherwise, the score will be "2." • If Parts 1 and 3 are completely correct and Part 2 is completely incorrect and a correct statement is made regarding length, a score of "3" is awarded; otherwise, the score will be "2."

Geometry Item A Sample Responses and Annotations

Handwritten student work for a geometry problem. The work is organized into four numbered sections:

- 1.** Midpoints of $\overline{HI}$ and $\overline{GJ}$.
 - Midpt. of $\overline{HI} = \left(\frac{6+8}{2}, \frac{11+7}{2}\right) = (7, 9)$. Labeled $W \rightarrow (7, 9)$.
 - Midpt. of $\overline{GJ} = \left(\frac{-2+8}{2}, \frac{5+5}{2}\right) = (-5, 0)$. Labeled $Z \rightarrow (-5, 0)$.
- 2.** Slopes of $\overline{GH}$, $\overline{IJ}$, and $\overline{WZ}$.
 - Slope of $\overline{GH} = \frac{11-5}{6+2} = \frac{6}{8} = \frac{3}{4}$.
 - Slope of $\overline{IJ} \rightarrow \frac{3}{4}$.
 - Slope of $\overline{WZ} \rightarrow \frac{3}{4}$.
 - Lengths: $\overline{GH} \rightarrow 10$, $\overline{IJ} \rightarrow 20$, $\overline{WZ} \rightarrow 15$.
- 3.** Distance formula calculations.
 - $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
 - For $\overline{GH}$: $d = \sqrt{(6+2)^2 + (11-5)^2} = \sqrt{64 + 36} = \sqrt{100} = 10$.
 - For $\overline{IJ}$: $d = \sqrt{(8+5)^2 + (7+5)^2} = \sqrt{1256 + 144} = \sqrt{1400} = 20$.
 - For $\overline{WZ}$: $d = \sqrt{(7+2)^2 + (9-0)^2} = \sqrt{144 + 81} = \sqrt{225} = 15$.
- 4.** Conclusion: "The slopes are the same and the length of $\overline{WZ}$ is half of the length of $\overline{GH}$ & $\overline{IJ}$ sum."

SCORE: 4

Part 1:

2 correct midpoints: (7, 9) and (-5, 0)
 Correct and complete procedure: Uses midpoint formula

Points

2

Part 2:

3 correct slopes: All slopes = $\frac{3}{4}$
 Correct and complete procedure: Finds $\frac{\Delta y}{\Delta x}$

2

Part 3:

Correct lengths: $\overline{GH} \rightarrow 10$, $\overline{IJ} \rightarrow 20$, $\overline{WZ} \rightarrow 15$
 Correct and complete procedure: Uses distance formula

2

Part 4:

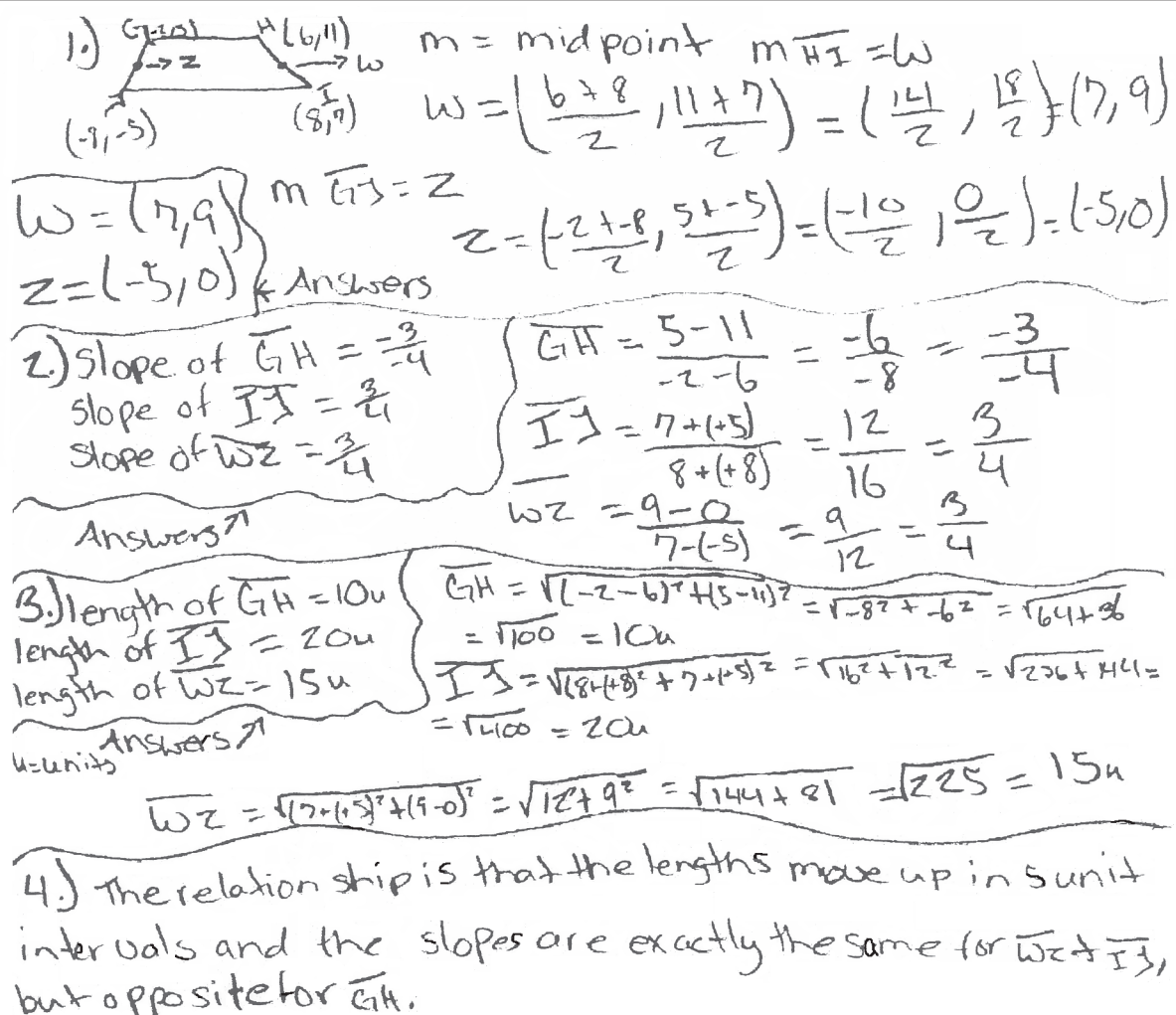
Correctly states that slopes are the same and that $\overline{WZ}$ is $\frac{1}{2}$ the sum of the lengths of $\overline{GH}$ and $\overline{IJ}$

TOTAL POINTS:

6

Note: No deduction is taken for either missing symbols in Part 2 ($m\overline{GH}$, $m\overline{IJ}$, $m\overline{WZ}$) or incorrect symbols in Part 3.

Geometry Item A Sample Responses and Annotations



SCORE: 3

Part 1:

2 correct midpoints: (7, 9) and (-5, 0)
 Correct and complete procedure: Uses midpoint formula

Points

2

Part 2:

3 correct slopes: All slopes = $\frac{3}{4}$
 Correct and complete procedure: Finds $\frac{\Delta y}{\Delta x}$

2

Part 3:

3 correct lengths: $\overline{GH} = 10$, $\overline{IJ} = 20$, $\overline{WZ} = 15$
 Correct and complete procedure: Uses distance formula

2

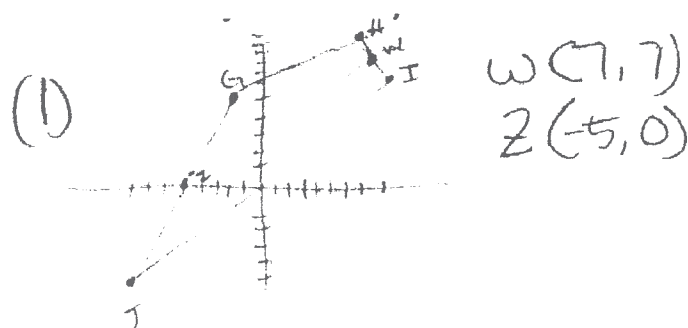
Part 4:

Correct statement regarding length. Incorrect statement regarding slopes:
 "... exactly the same for $\overline{WZ}$ and $\overline{IJ}$ but opposite for $\overline{GH}$."

TOTAL POINTS:

6

Geometry Item A Sample Responses and Annotations



(2) (GH) $\frac{5-11}{6-2} = \frac{-6}{8}$ (IJ) $\frac{7-8}{8-5} = \frac{12}{16}$ (WZ) $\frac{7-0}{7-(-5)} = \frac{7}{12}$

(3) $\sqrt{(6-11)^2 + (2-5)^2} = \sqrt{25+9} = \sqrt{34}$ $\sqrt{(8-7)^2 + (8-5)^2} = \sqrt{1+9} = \sqrt{10}$ $\sqrt{(7-(-5))^2 + (7-0)^2} = \sqrt{144+49} = \sqrt{193}$
 $\sqrt{100}$ $\sqrt{400}$ $\sqrt{193}$
 $\boxed{GH=10}$ $\boxed{IJ=20}$ $\boxed{WZ=13.9}$

SCORE: 2

Part 1:

1 correct midpoints: Z (-5, 0)

1 incorrect midpoint: (7, 7)

Missing procedure:

$\frac{1}{2}$

Part 2:

2 correct slopes: $IJ = \frac{12}{16}$, $WZ = \frac{7}{12}$ (based on incorrect midpoint from Part 1)

1 incorrect slope: $GH = -\frac{6}{8}$

Correct procedure for slopes of IJ and WZ

$1\frac{1}{2}$

Part 3:

3 correct lengths (based on midpoint from Part 1):

$GH = 10$, $IJ = 20$, $WZ = 13.9$

Correct and complete procedure:

Uses distance formula

2

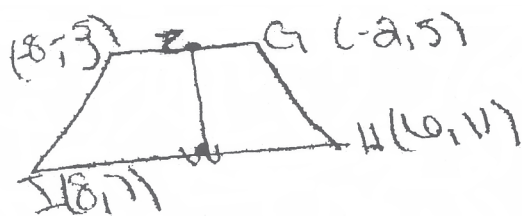
Part 4:

Not a factor in scoring

TOTAL POINTS:

4

Geometry Item A Sample Responses and Annotations



1. Point W is (4, 9) Point Z is (10, 10)

2.

SCORE: 0

Part 1:

2 incorrect midpoints:

$W(4, 9)$, $Z(10, 10)$

Missing procedure:

Points

-

Part 2:

Missing

-

Part 3:

Missing

-

Part 4:

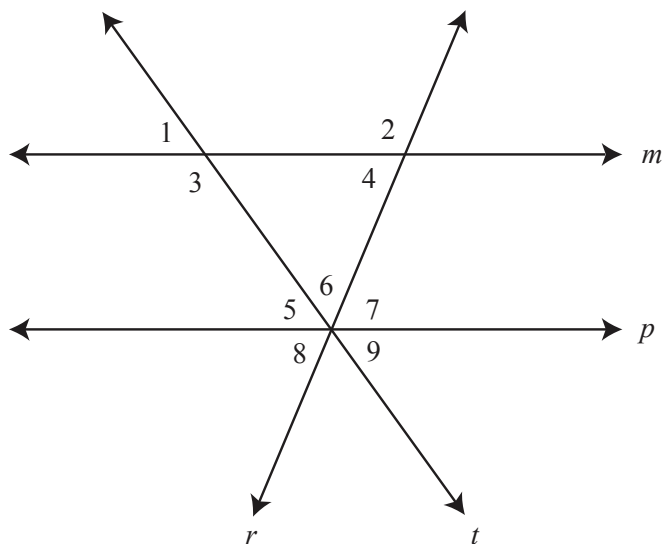
Not a factor in scoring

TOTAL POINTS:

0

Geometry Item B

- B.** Line m is parallel to line p . Both lines are cut by the transversals, line r and line t .



- What are two labeled angles that are congruent to $\angle 1$? Explain your answers by providing the name of the angle relationships.
- What are two **different** labeled angles that are supplementary to $\angle 2$? Explain your answers by stating the name of the angle relationships.

The table below gives measures, in terms of x , for several angles shown in the figure above.

Angle	Measure
1	$(x - 20)^\circ$
2	$(x + 20)^\circ$
3	$(x + 40)^\circ$

- What is the value of x ? What is the measure of $\angle 6$? Show all of your work and/or explain your answer.

Geometry Item B Scoring Rubric

SCORE	DESCRIPTION
4	The student earns 6 points. The response contains no incorrect work. The correct label of “degrees” or “°” is included in Part 3.
3	The student earns 4–5½ points.
2	The student earns 2–3½ points.
1	The student earns ½–1½ points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

Geometry Item B Solution and Scoring

Part	Points								
1	1 ½ points possible Note: Assume the name of the angle relationship is to $\angle 1$ unless otherwise stated. 1 ½ points: Correct Answer: 2 correct $\angle$'s with correct names. No incorrect $\angle$'s are included. <table> <tr> <th>Angle</th><th>Name of Angle Relationship</th></tr> <tr> <td>5</td><td>1 & 5 are Corresponding $\angle$'s</td></tr> <tr> <td>9</td><td>1 & 9 are Alternate (or opposite) Exterior $\angle$'s, or 9 & 5 are Vertical $\angle$'s</td></tr> </table> OR 1 point: 2 correct $\angle$'s with 1 correct name. No incorrect $\angle$'s are included. Other name incorrect or missing. OR ½ point: Give credit for any of the following: • 5 with correct name (1 other $\angle$ incorrect or missing) • 9 with correct name (1 other $\angle$ incorrect or missing) • 2 correct $\angle$'s (5 & 9)—Names are incorrect or missing	Angle	Name of Angle Relationship	5	1 & 5 are Corresponding $\angle$'s	9	1 & 9 are Alternate (or opposite) Exterior $\angle$'s, or 9 & 5 are Vertical $\angle$'s		
Angle	Name of Angle Relationship								
5	1 & 5 are Corresponding $\angle$'s								
9	1 & 9 are Alternate (or opposite) Exterior $\angle$'s, or 9 & 5 are Vertical $\angle$'s								
2	1 ½ points possible Note: Assume the name of the angle relationship is to $\angle 2$ unless otherwise stated. 1 ½ points: Correct Answer: 2 (out of 3) correct $\angle$'s with correct names. No incorrect $\angle$'s are included. <table> <tr> <th>Angle</th><th>Name of Angle Relationship</th></tr> <tr> <td>4</td><td>2 & 4 are a Linear pair</td></tr> <tr> <td>8</td><td>2 & 8 are Same-side Exterior $\angle$'s, or 4 & 8 are Corresponding $\angle$'s</td></tr> <tr> <td>7</td><td>7 & 4 are Alternate (or opposite) Interior $\angle$'s, or 7 & 8 are Vertical $\angle$'s</td></tr> </table> OR 1 point: 2 correct $\angle$'s with 1 correct name. No incorrect $\angle$'s are included. Other name incorrect or missing. OR ½ point: Give credit for any of the following: • 4 with correct name (other $\angle$ incorrect or missing) • 8 with correct name (other $\angle$ incorrect or missing) • 7 with correct name (other $\angle$ incorrect or missing) • 2 of the 3 correct $\angle$'s—Names are incorrect or missing	Angle	Name of Angle Relationship	4	2 & 4 are a Linear pair	8	2 & 8 are Same-side Exterior $\angle$'s, or 4 & 8 are Corresponding $\angle$'s	7	7 & 4 are Alternate (or opposite) Interior $\angle$'s, or 7 & 8 are Vertical $\angle$'s
Angle	Name of Angle Relationship								
4	2 & 4 are a Linear pair								
8	2 & 8 are Same-side Exterior $\angle$'s, or 4 & 8 are Corresponding $\angle$'s								
7	7 & 4 are Alternate (or opposite) Interior $\angle$'s, or 7 & 8 are Vertical $\angle$'s								

Geometry Item B Solution and Scoring

Part	Points
3	3 points possible Note: Do not give credit for $x = 80$ or $m\angle 6 = 40$ if there is evidence of incorrect procedure. Correct symbolism is not required (Ex: $\angle 6 = 40$). 3 points: The response includes the following: • Correct answer & procedure: $x = 80$ with adequate work shown At least $(x - 20) + (x + 40) = 180$ is shown • Correct answer & procedure: $m\angle 6 = 40$ with adequate work shown (you can follow what is being done) Example: Uses value of x to find measures of Angles 1, 2, and 3 (work not required): $m\angle 1 = x - 20 = 60^\circ$ $m\angle 2 = x + 20 = 100^\circ$ $m\angle 3 = x + 40 = 120^\circ$ Uses measures of angles 1, 2, and 3 and relationships found in Parts 1 and/or 2 to find measure of angle 6: $m\angle 1 = m\angle 5 = m\angle 9 = 60^\circ$ $m\angle 2 + m\angle 4 = 180^\circ$ $m\angle 4 = 80^\circ$ $m\angle 4 = m\angle 7 = m\angle 8 = 80^\circ$ Angles 5, 6, and 8 (or 5, 6, and 7) or (6, 7, and 9) add to 180° $m\angle 6 = 180 - m\angle 8 - m\angle 5 = 180 - 80 - 60 = 40^\circ$ or Uses the fact that the measures of the 3 angles in a triangle add to 180°: Third angle of triangle $\cong \angle 1 = 60^\circ$ (vertical angles) $m\angle 4 = 180 - m\angle 2 = 80^\circ$ $60^\circ + 80^\circ + m\angle 6 = 180 \quad m\angle 6 = 40^\circ$ OR 2 points: Value(s) are incorrect due to 1 calculation or copy error. Correct procedures are used—adequate work is shown in each part. or 2 correct values ($x=80$ and $m\angle 6 = 40$) are given. Correct procedures are used but work is incomplete. At least some work is shown in each part. OR 1 ½ points: 2 correct values are given. Work in one part is missing with at least some work in the other part. OR 1 point: 2 correct values are given (work is missing). or 1 correct value is given with adequate work (may be based on previous work). Other part uses incorrect procedure or procedure is missing. OR ½ point: 1 correct value is given (work is missing). or 1 correct procedure.

Geometry Item B Sample Responses and Annotations

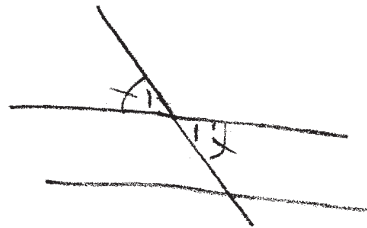
① $\angle 5$ is congruent to $\angle 1$.
They are corresponding angles.

$\angle 9$ is also congruent to $\angle 1$. It is a vertical angle to $\angle 5$, so it must also be congruent to $\angle 1$.

② $\angle 4$ is supplementary to $\angle 2$. $\angle 2$ and $\angle 4$ form a linear pair. Linear pairs always equal 180° . $\angle 8$ is also supplementary to $\angle 2$. It is a corresponding angle to $\angle 4$. If it is congruent $\angle 4$, then it is supplementary to $\angle 2$.

③

Angle Measure	
1	$(x - 20)^\circ$
2	$(x + 20)^\circ$
3	$(x + 40)^\circ$



$\angle 1$ and $\angle 3$ form a linear pair. They add up to 180° .

$$x - 20^\circ + x + 40^\circ = 180^\circ \quad x = 80^\circ$$

$$2x + 20^\circ = 180^\circ$$

$$\begin{array}{r} 2x + 20^\circ = 180^\circ \\ -20^\circ \quad -20^\circ \\ \hline 2x = 160^\circ \\ \hline x = 80^\circ \end{array}$$

$$80^\circ - 20^\circ = 60^\circ \quad \angle 1 = 60^\circ$$

$$80^\circ + 20^\circ = 100^\circ \quad \angle 2 = 100^\circ \quad 180^\circ - 100^\circ = 80^\circ$$

$\angle 4 = 80^\circ$ b/c $\angle 4$ & $\angle 2$ are a linear pair.

$\angle 4$, $\angle 6$ & $\angle 1'$ form a triangle. $180^\circ - 60^\circ - 80^\circ = 40^\circ$
 $\angle 6 = 40^\circ$

SCORE: 4

Part 1:

2 correct $\angle$'s and names: $\angle 5$ and $\angle 1$ are Corresponding $\angle$'s
 $\angle 9$ and $\angle 5$ are Vertical $\angle$'s

Points

1½

Part 2:

2 correct $\angle$'s and names: $\angle 2$ & $\angle 4$ are a Linear Pair
 $\angle 4$ and $\angle 8$ are Corresponding $\angle$'s

1½

Part 3:

Correct x with work: $x - 20 + x + 40 = 180$, etc. $x = 80$

Correct $m \angle 6$ with work: Finds $\angle$'s 1 (60), $1'$ (60),
2 (100) 4 (80 supplement Pt. 2)
 $\angle 4$, 6 and $1'$ form a triangle
 $m \angle 6 = 180 - 60 - 80 = 40^\circ$

3

TOTAL POINTS:

Correct label of "o" in Part 3 is included

6

$$(1) \angle 1 \cong \angle 5$$

because

$$\angle 1 \cong \angle 9$$

because $\angle 1 \cong \angle 5$ and

$\angle 5 \cong \angle 9$ because

the angles are vertical.

(2) $\angle 2$ is supplementary to angle 4 because the angles form a straight line.

$\angle 2$ is supplementary to angle 8 because $\angle 8$ is congruent to $\angle 4$.

$$(3) \angle 1 + \angle 3 = 180$$

$$x - 20 + x + 40 = 180$$

$$2x = 160$$

$$x = 80$$

$$\angle 1 = x - 20$$

$$\angle 1 = 80 - 20$$

$$\angle 1 = 60^\circ$$

$$\angle 5 = 60^\circ$$

$$\angle 2 = x + 20$$

$$\angle 2 = 80 + 20$$

$$\angle 2 = 100^\circ$$

$$\angle 1 \cong \angle 5$$

$$\angle 2 = \angle 5 + \angle 6$$

$$100 = 60 + \angle 6$$

$$\angle 6 = 40^\circ$$

SCORE: 3

Part 1:

2 correct $\angle$'s and 1 name: 5 - no name

9 - Vertical $\angle$ to 5

Points

1

Part 2:

2 correct $\angle$'s and 1 name: 2 & 4 - "angles form a straight line"

4 & 8 - no name

1

Part 3:

Correct x with work: $x - 20 + x + 40 = 180$, etc. $x = 80$

Correct $m \angle 6$ with work: $\angle 2 = \angle 5 + \angle 6$ (Corresponding $\angle$'s)

Finds $\angle 1 = 60 = \angle 5$ ($\cong$ Part 1)

Finds $\angle 2 = 100$

$$100 = 60 + m \angle 6 \quad m \angle 6 = 40^\circ$$

3

TOTAL POINTS:

5

Geometry Item B Sample Responses and Annotations

① $\angle 5$ because $\angle 5$ is supplementary to $\angle 1$.
 $\angle 9$ because $\angle 9$ is also supplementary to $\angle 1$ they form both a linear pair with other angles.

② $\angle 3$ and $\angle 4$ are both supplementary to $\angle 2$ because they form linear pairs (180°).

$$\begin{array}{r} \textcircled{3} \quad x - 20 + x + 40 = 180 \\ 2x \quad 20 \quad 180 \\ \quad -20 \quad -20 \\ \hline 2x \quad 140 \\ 2 \quad 2 \\ \hline x = 80 \end{array}$$

$$\begin{array}{l} \angle 1 = 60^\circ \\ \angle 2 = 100^\circ \\ \angle 3 = 120^\circ \\ 180 - 140 = 40^\circ \\ \angle 6 = 40^\circ \end{array}$$

SCORE: 2

Part 1:

2 correct $\angle$'s: 5, 9 (no correct names)

Points

$\frac{1}{2}$

Part 2:

1 correct $\angle$ and name: 4 (& 2) - linear pair

$\frac{1}{2}$

Part 3:

Correct x with work: $x - 20 + x + 40 = 180$, etc. $x = 80$

Correct m $\angle 6$ Finds $\angle$'s 1, 2 & 3, $180 - 140 = 40$

Incomplete work: No diagram or explanation to support work

2

TOTAL POINTS:

3

① $\angle 1 \cong \angle 5$
parallel angles
(on the same line)

$\angle 1 \cong \angle 9$
Opposite exterior
angles.

② $\angle 2$ is supplementary
to $\angle 4$.
they are vertical
angles.

$\angle 2$ is supplementary
to $\angle 8$.
Because $\angle 4$ and
 $\angle 8$ are parallel
angles (on the same line).

③

4		$(x + 60)^\circ$
5		$(x + 80)^\circ$
6		$(x + 100)^\circ$

SCORE: 1

Part 1:

2 correct $\angle$'s and 1 name: 5 (no correct name)
1 & 9 - opposite exterior $\angle$'s

Points

1

Part 2:

2 correct $\angle$'s: 4 & 8 (no correct names)

$\frac{1}{2}$

Part 3:

Missing answer &
procedure to find x : Lists incorrect values for $\angle$'s 4, 5 & 6 in terms of x
Missing answer &
procedure to find $m \angle 6$:

-

TOTAL POINTS:

1 $\frac{1}{2}$

① 4, 5, 6, 7, 8, 9

all have a
60° angle
congruent

② 3

2 + 3 have a
180° angle
so 2 + 3
are congruent,

③ $x = 180$ because

Angle 1 + 4 is
60°. $\angle 6$

$\angle 6 = 60^\circ$
because of
 $180 \div 3 = 60$

SCORE: 0

Part 1:

6 ∠'s are listed: 4, 5, 6, 7, 8, 9
(no credit)

Part 2:

No correct ∠'s: 3
(no credit)

Part 3:

Incorrect procedure to
find x : $x = 180$, etc.

Incorrect procedure to
find $m \angle 6$: $180 \div 3 = 60$ $m \angle 6 = 60$

TOTAL POINTS:

Points

-

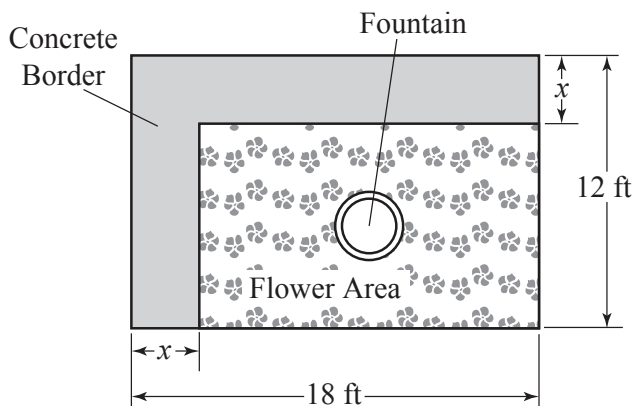
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-

0

Geometry Item C

- C. A city built the rectangular flower garden shown below. The garden is 18 ft long and 12 ft wide. The city put a concrete border along two sides, as shown by the shaded area. The perimeter of the flower area is 48 ft.



1. What is the width, x , of the concrete border? Show or explain all of your work even if you use mental math or a calculator.

A local company donated a circular fountain to be placed in the center of the flower area. The diameter of the fountain is 3 ft.

2. To the nearest square foot, what is the area of the section that remained for flowers after the fountain was installed? Use $\pi = 3.14$. Show all of your work and/or explain your answer.

Geometry Item C Scoring Rubric

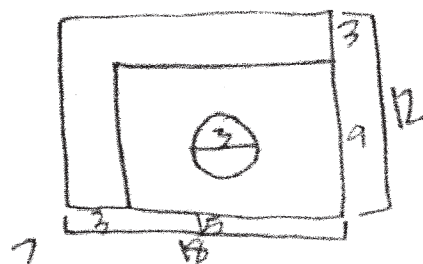
SCORE	DESCRIPTION
4	The student earns 4 points. The response contains no incorrect work. The correct label of "Feet" is included in Part 1. The answer is rounded to the nearest square foot and contains the correct label of "Square Feet" in Part 2.
3	The student earns 3–3½ points.
2	The student earns 2–2½ points.
1	The student earns ½–1½ points, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of "B" will be reported as "NA." (No attempt to answer the item. Score of "0" assigned for the item.)

Geometry Item C Solution and Scoring

Part	Points
1	2 points possible 1 point: Correct value for x: 3 (Correct label “feet” is required for a score of 4.) Note: Do not give credit if incorrect procedure is used. AND 1 point: Correct and complete procedure shown and/or explained. Work may contain a calculation or copy error. Give credit for the following or equivalent: - Sets up and solves an equation (all steps not required): $48 = 2(18 - x) + 2(12 - x)$ $48 = 36 - 2x + 24 - 2x$ $48 = 60 - 4x$ $-12 = -4x$ $x = \#$, or - Finds difference in perimeters and amount added to 4 sides: $2(18) + 2(12) = 60$ $60 - 48 = 12$ $12/4 = \#$, or - Guess and check (2 steps): $18 - 3 = 15$ $12 - 3 = 9$ $15 + 15 + 9 + 9 = 48$ Note: If guess and check is used, x must be correct. OR ½ point: Correct but incomplete procedure shown or explained. Examples: $60 - 48 = 12$ $18 - 3 = 15$ $12 - 3 = 9$ (doesn't show $P = 48$) $2(15) + 2(9) = 48$ (doesn't show each are 3 less than 18 and 12)
2	2 points possible 1 point: Note: Rounding to the nearest sq. ft. (with label) is required only for a score of 4. Correct area: 127.935, 128, or any correct answer correctly rounded. or Correct answer based on incorrect value for x or incorrect dimensions for the garden in Part 1. AND 1 point: Correct and complete procedure shown and/or explained. Work may contain a calculation copy or rounding error and/or may be based on an incorrect value for x in Part 1. Give credit for the following or equivalent: 3 steps Area of rectangle: $15 \times 9 = 135$ Area of fountain: $(3.14)(1.5)^2 = 7.065$ (may be rounded) Finds difference for Area for flowers: $135 - 7.065 = \#$ OR ½ point: Credit given for any of the following: Note: No credit is given for finding the difference only. - Correct but incomplete procedure shown or explained. - Correct procedure for area of garden <u>based on Part 1 answer.</u> - Correct procedure for area of circular fountain.

$$\begin{aligned}
 1. P &= 2l + 2w \\
 48 &= 2(18 - x) + 2(12 - x) \\
 48 &= 36 - 2x + 24 - 2x \\
 48 &= 60 - 4x \\
 -12 &= -4x \\
 \frac{-12}{-4} &= \frac{-4x}{-4} \\
 3 &= x
 \end{aligned}$$

The width is 3 ft.



$$\begin{aligned}
 2. \\
 A &= lw \\
 &9(15) \\
 A &= 135 \text{ ft}^2
 \end{aligned}$$

$$\begin{aligned}
 A &= \pi r^2 \\
 A &= 3.14(3/2)^2 \\
 A &= 3.14(1.5)^2 \\
 A &= 7.065
 \end{aligned}$$

$$\begin{aligned}
 135 - 7.065 \\
 127.935 \\
 128 \text{ ft}^2
 \end{aligned}$$

There is 128 ft² left for flowers.

SCORE: 4

Part 1:

Correct answer: 3 (ft.)
 Correct & complete procedure: Sets up equation and solves:
 $48 = 2(18 - x) + 1(12 - x)$, etc.

Points

1

1

Part 2:

Correct answer (rounded): 128 (sq. ft.)
 Correct & complete procedure: Area of rectangle: $15 \times 9 = 135$
 Area of fountain: $(3.14)(3/2)^2 = 7.065$
 Finds difference: $135 - 7.065 = 127.935$

1

1

TOTAL POINTS:

Correct label of "ft." in Part 1 and "ft." in Part 2 are included

4

$$P=48$$

$$1. \cancel{49} \div 4 = 12$$

$$60 - 49 = 12$$

$$14 - 3 = 15$$

$$12 - 3 = 9$$

$$15 \cdot 2 + 9 \cdot 2 = 48$$

$$X=3$$

$$2. A = \pi r^2$$

$$A = 7.065 \text{ ft}^2$$

$$15 \cdot 9 = 135 \text{ ft}^2$$

There was

128 ft² left

for the flowers

SCORE: 3

Part 1:

Points

Correct answer: 3

1

Correct & complete procedure:

Guess and check:

$$18 - 3 = 15 \quad 12 - 3 = 9$$

$$15(2) + 9(2) = 48$$

1

Part 2:

Correct answer (rounded): 128 (sq. ft.)

1

Correct but incomplete procedure:

$$\text{Area of rectangle: } 15 \times 9 = 135$$

$$\text{Area of fountain: } 7.065 \text{ (work missing)}$$

Difference not shown

$\frac{1}{2}$

TOTAL POINTS:

3 $\frac{1}{2}$

Label of "ft." in Part 1 is not an issue since the response does not receive "4" points

Geometry Item C Sample Responses and Annotations

$$\textcircled{1} 48 \div 2 = 24$$

$$18 - 12 = 6 \quad 6/2 = 3$$

$$\boxed{x = 3 \text{ ft}}$$

$$\textcircled{2} A = \pi r^2$$

$$A = \pi (1.5)^2$$

$$A = 7.06$$

$$18 - 3 = 15$$

$$12 - 3 = 9$$

$$15 \cdot 9 = 135$$

$$135 - 7.06 =$$

$$127.94$$

$$\boxed{128 \text{ ft}^2}$$

SCORE: 2

Part 1:

Correct answer using

incorrect procedure:

3 (no credit)

Incorrect procedure:

$$48 \div 2 = 24$$

$$18 - 12 = 6 \quad 6/2 = 3$$

Points

-

-

Part 2:

Correct answer (rounded): 128

1

Correct & complete

$$\text{Area of rectangle: } 15 \times 9 = 135$$

procedure:

$$\text{Area of fountain: } (\pi) (1.5)^2 = 7.06$$

$$\text{Finds difference: } 135 - 7.06 = \#$$

1

TOTAL POINTS:

2

Geometry Item C Sample Responses and Annotations

Handwritten student work on graph paper:

① 2 ft.

② πr^2
 $3.14 \times 3 = 9.42$
 $10 \times 16 = 160$
 $A = 150.58 \text{ ft}^2$

Diagram of a rectangle with dimensions 10 ft (width) and 16 ft (height). The width is labeled "10 = 1 ft." and the height is labeled "16". The rectangle is shaded with horizontal lines.

SCORE: 1

Part 1:

Incorrect answer: 2

Missing procedure:

Points

-

-

Part 2:

Incorrect answer (due to procedural error):

150.58

-

Some correct procedure:

Area of rectangle: $10 \times 16 = 160$

(Correct based on $x = 2$ in Part 1)

Uses πr^2 for A of fountain (incorrect)

$\frac{1}{2}$

TOTAL POINTS:

$\frac{1}{2}$

1.) $a^2 + b^2 = c^2$
 $18^2 + 12^2 = c^2$
 $324 + 144 = c^2$
 $\sqrt{468} = c$
 21.6 is the width
 of the concrete border.

2.) $A = bh$
 $A = 18 \cdot 12$
 $A = 216$ square
 feet is the area of
 the section that remained
 for flowers after the fountain
 was installed.

SCORE: 0

Part 1:

Incorrect answer: 21.6
 Missing procedure: uses Pythagorean Theorem

Points

-
 -

Part 2:

Incorrect answer (due to
 procedural errors): 216
 Incorrect procedures: Uses 18×12 rectangle

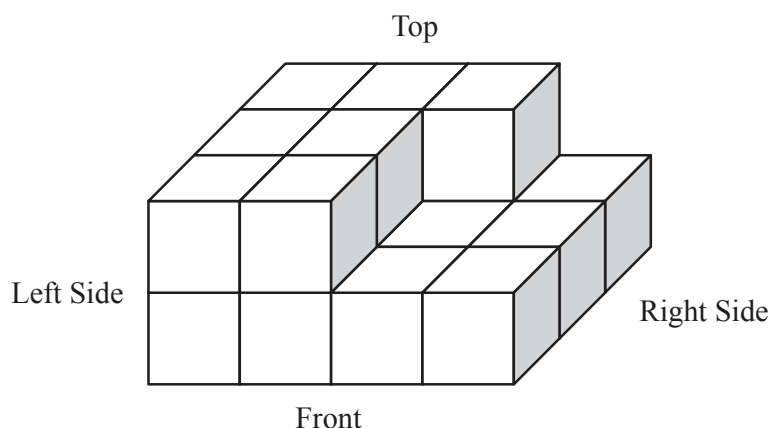
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TOTAL POINTS:

0

Geometry Item D

D. The three-dimensional drawing below is a model of a proposed new office building.

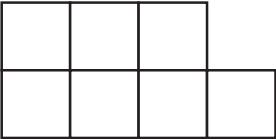
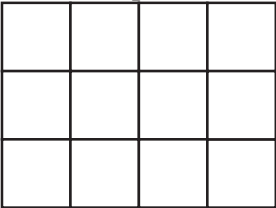
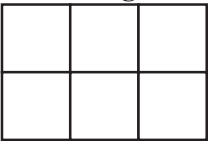


1. On the grid provided in your answer document, draw two-dimensional sketches of the office building from the perspectives below.
 - the front view of the office building
 - the top view of the office building
 - the right side view of the office building
2. Determine the actual volume of the building if each cube in the drawing represents a section of the office that measures 10 feet by 10 feet by 10 feet. Show all of your work and/or explain your answer.

Geometry Item D Scoring Rubric

SCORE	DESCRIPTION
4	The student earns 5 points. The response contains no incorrect work. The correct label of “Cubic Feet” is included in Part 2.
3	The student earns 4 points.
2	The student earns 3 points, or the student the student earns 2 points (both points from Part 2), or the student earns 2 points (1 point from Part 1 and 1 point from Part 2).
1	The student earns 2 points (both from Part 1), or the student earns 1 point, or some minimal understanding is shown. (Ex: Volume is correct in Part 2 based on a counting error for number of cubes, or no credit is awarded in Part 1.)
0	The student earns 0 points. No understanding is shown. (Ex: 19 cubes only in Part 2, or $10 \times 10 \times 10 = 1000$ only in Part 2.)
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

Geometry Item D Solution and Scoring

Part	Points
1	3 points possible Note: Labels (front, top, right view) are not required, but diagrams must be in the correct order if labels are missing in order to receive credit. Credit may be given if diagrams are out of order if they are correct and labeled. Squares do not have to be the same size. 1 point: Correct Front View:  AND 1 point: Correct Top View:  AND 1 point: Correct Right side view: 
2	2 points possible 1 point: Correct volume: 19,000 (correct label “cubic feet” is required for a score of 4) AND 1 point: Correct and complete procedure shown and/or explained. Work may contain a calculation (ex. $7 + 12 = 18$) or copy error. Do not give credit for a counting error of the # of cubes. Give credit for the following or equivalent: • Breaks up building into sections to find total V: $(10)(10)(10) + (30)(20)(10) + (20)(20)(30) = V$, or • $10^3 (12) + 10^3 (7) = V$, or • $19 \times 10 \times 10 \times 10 = V$, or • Volume of 1 cube = 1000 (or 10^3 or $10 \times 10 \times 10$) (V of cube identified) $1000 \times 19 = V$. Note: Do not give credit for incomplete procedure (Ex: $19 \times 1000 = V$). No work or explanation shown for 1000.

Geometry Item D Sample Responses and Annotations

①

②

volume of cube
side³

$V = s^3$
 $V = 10^3$
 $V = 1000 \text{ ft.}^3 \text{ per cube}$

of cubes

$3 \times 4 = 12$
 $3 \times 2 = 6$
 $12 + 6 = 18$
 $18 + 1 = 19 \text{ cubes}$

19
 $\times 1000$
 19,000

front

top

right

Volume of building = 19,000 ft³

SCORE: 4

Part 1:

Correct front view

Correct top view

Correct right-side view

Part 2:

Correct answer:

19,000 (ft.³)

Correct & complete procedure:

Finds V of 1 cube: $10^3 = 1000$

Finds total # of cubes: $12 + 6 + 1 = 19$

Finds total V: $19 \times 1000 = \#$

Points

1

1

1

1

1

5

TOTAL POINTS:

Correct label of "ft.³" in Part 2 is included

Geometry Item D Sample Responses and Annotations

②

$$40 \cdot 30 \cdot 10 = 12000$$

$$10 \cdot 10 \cdot 10 = 1000$$

$$20 \cdot 30 \cdot 10 = 6000$$

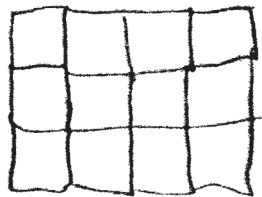
$$19000 \text{ ft}^3$$

①

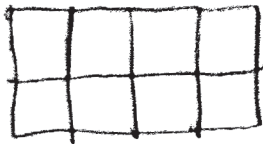
Front



Top



Right side



SCORE: 3

Part 1:

Correct front view

Correct top view

Incorrect right-side view

Points

1

1

-

Part 2:

Correct answer:

19,000

1

Correct & complete procedure:

Finds V of sections and adds for total:

$$40 \times 30 \times 10 = 12000$$

$$10 \times 10 \times 10 = 1000$$

$$20 \times 30 \times 10 = \underline{6000}$$

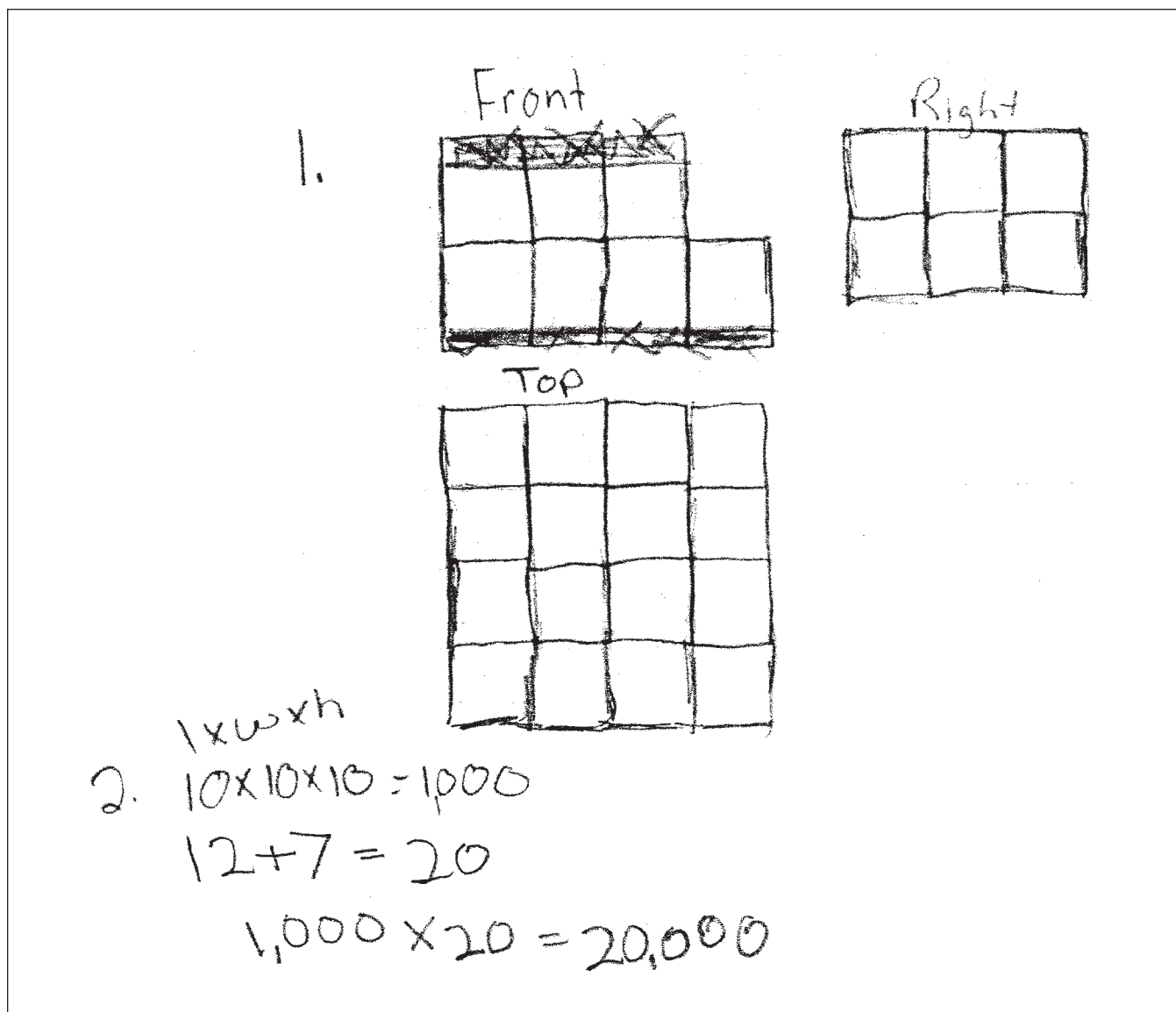
#

1

TOTAL POINTS:

4

Geometry Item D Sample Responses and Annotations



SCORE: 2

Part 1:

Correct front view

Incorrect top view

Correct right-side view

Points

1

-

1

Part 2:

Incorrect answer:

(due to calc. error)

Correct & complete

procedure:

20,000

V of 1 cube: $10 \times 10 \times 10 = 1000$

of cubes: $12 + 7 = 20$ (calc. error)

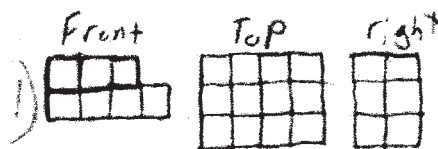
Total V: $1000 \times 20 = \#$

-

1

TOTAL POINTS:

3



$$2) 20 \cdot 40 \cdot 30 =$$

$$24000 \text{ ft}^3$$

20 = height

40 = length

30 = width

SCORE: 1

Part 1:

Correct front view

Correct top view

Incorrect right-side view (wrong orientation)

Part 2:

Incorrect answer: 24,000

Incorrect procedure: $20 \times 40 \times 30 = \#$

Points

1

1

-

-

-

2

TOTAL POINTS:

Note: The response receives a score of “1” since both points are awarded in Part 1.

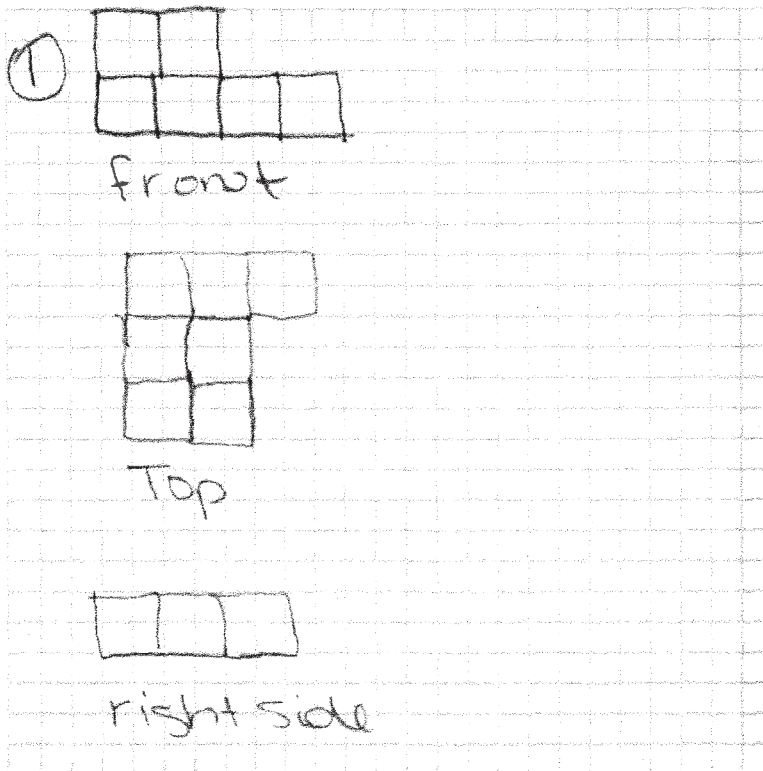
Geometry Item D Sample Responses and Annotations

② $\square = 10 \times 10$

19 cubes

$$\begin{array}{r} 10 \\ \times 10 \\ \hline 100 \end{array}$$

$$\begin{array}{r} 19 \\ \times 100 \\ \hline 1900 \text{ sq ft} \end{array}$$



SCORE: 0

Part 1:

Incorrect front view

Incorrect top view

Incorrect right-side view

Part 2:

Incorrect answer: 1900

Incorrect procedure: 19 cubes

$$10 \times 10 = 100, 19 \times 100 = \#$$

Points

-

-

-

-

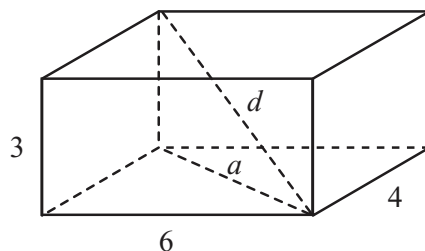
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TOTAL POINTS:

0

Geometry Item E

E. The figure below is of a rectangular prism.

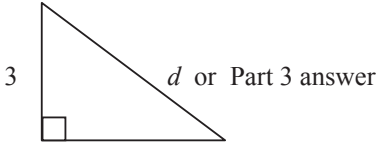


1. What is the length of diagonal a ? Show all of your work and/or explain your answer.
2. On the grid provided in your answer document, draw the triangle that is formed by diagonals a and d . Label all the known sides and/or measurements of the triangle.
3. What is the length of d , a diagonal of the prism? Show all of your work and/or explain your answer.

Geometry Item E Scoring Rubric

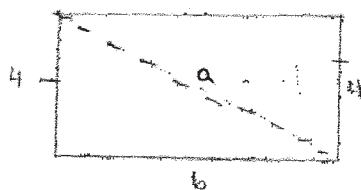
SCORE	DESCRIPTION
4	The student earns 5 points. The response contains no incorrect work.
3	The student earns 4 points.
2	The student earns 2–3 points.
1	The student earns 1 point, or some minimal understanding is shown.
0	The student earns 0 points. No understanding is shown.
B	Blank—No Response. A score of “B” will be reported as “NA.” (No attempt to answer the item. Score of “0” assigned for the item.)

Geometry Item E Solution and Scoring

Part	Points
1	2 points possible 1 point: Correct Answer: $\sqrt{52}$, $2\sqrt{13}$, or 7.211 Answer may be rounded to the nearest tenth or to any other decimal position. Rounding to the nearest integer is not acceptable. AND 1 point: Correct and complete procedure shown or explained. Work may contain 1 calculation, copy, or rounding error. Give credit for the following or equivalent (only the first step must be shown): $6^2 + 4^2 = a^2$ $36 + 16 = a^2$ $52 = a^2$ $\# = a$
2	1 point possible 1 point: Correct and complete drawing as shown below: Note: If grid lines are used to draw the sides of the triangle, a right angle symbol is not required. Note: Drawing does not have to be drawn to scale.  $2\sqrt{13}$ or Part 1 answer or “a” Note: Values for “a” and/or “d” may be based on incorrect lengths found in Part 1 and/or Part 3.
3	2 points possible 1 point: Correct Answer: $\sqrt{61}$, or 7.8102 or Correct length based on incorrect length for “a” found in Part 1. The answer may be rounded to nearest tenth or any other decimal position. Rounding to nearest integer is not acceptable. AND 1 point: Correct and complete procedure shown or explained. Work may contain 1 calculation, copy, or rounding error or may be based on incorrect length for “a” found in Part 1. Give credit for the following or equivalent: $3^2 + a^2 = d^2$ $3^2 + (2\sqrt{13})^2 = d^2$ (only this step must be shown) $9 + 52 = d^2$ $61 = d^2$ $\# = d$ - Example with incorrect length of a in Part 1: Part 1 answer is: $a = 6$ $3^2 + 6^2 = d^2$ (only this step must be shown) $9 + 36 = d^2$ $45 = d^2$ $\# = d$

Geometry Item E Sample Responses and Annotations

① base of rectangular prism



$$a^2 + b^2 = c^2$$

$$4^2 + 6^2 = c^2$$

$$16 + 36 = c^2$$

$$\sqrt{52} = \sqrt{c^2}$$

$$\sqrt{52} = c \text{ or } 7.81$$

$$a = \sqrt{52} \text{ or } 7.21110$$

③ $a^2 + b^2 = c^2$

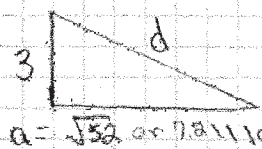
$$3^2 + 7.21110^2 = c^2$$

$$9 + 51.9999 = c^2$$

$$\sqrt{60.9999} = \sqrt{c^2}$$

$$d \approx 7.81$$

2.



SCORE: 4

Part 1:

Correct answer:

$$\sqrt{52} \text{ or } 7.21110$$

Points

1

Correct and complete procedure:

$$4^2 + 6^2 = c^2$$

$$c = \#$$

1

Part 2:

Correct drawing:

Right Δ with sides labeled

1

Part 3:

Correct answer:

$$7.81$$

1

Correct and complete procedure:

$$3^2 + 7.21110^2 = c^2$$

$$d = \#$$

1

TOTAL POINTS:

5

Geometry Item E Sample Responses and Annotations

$$\textcircled{1} a^2 + b^2 = c^2 \quad \textcircled{2}$$

$$4^2 + 6^2 = c^2$$

$$16 + 36 = 52$$

$$\sqrt{52} = 7.2$$

The length of diagonal
a is about 7.2
units.

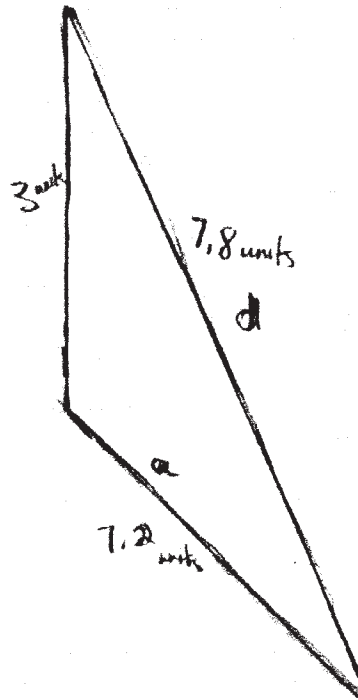
$$\textcircled{3} 3^2 + 7.2^2 = c^2$$

$$9 + 52 = 61$$

$$\sqrt{61} = 7.8$$

The measure of
diagonal d is about
7.8 units. I used the
formula $a^2 + b^2 = c^2$
to get the answer

$$3^2 + 7.2^2 = d^2 \quad 9 + 52 = 61 \quad \sqrt{61} = 7.8$$



SCORE: 3

Part 1:

Correct answer:

7.2 units

Points

1

Correct and complete procedure:

$$4^2 + 6^2 = c^2$$

$$16 + 36 = 52$$

$$\sqrt{52} = \#$$

1

Part 2:

Incorrect drawing:

Obtuse Δ (no right angle symbol)

-

Part 3:

Correct answer:

7.8

1

Correct and complete procedure:

$$3^2 + 7.2^2 = c^2$$

$$9 + 52 = 61$$

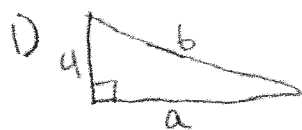
$$\sqrt{61} = \#$$

1

TOTAL POINTS:

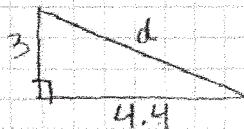
4

Geometry Item E Sample Responses and Annotations



$$\begin{aligned} a^2 + 4^2 &= 6^2 \\ a^2 + 16 &= 36 \\ a^2 &= 20 \\ a &= 4.4 \end{aligned}$$

2)



3)



$$\begin{aligned} 3^2 + 4.4^2 &= d^2 \\ 9 + 19.36 &= d^2 \\ 28.36 &= d^2 \\ 5.3 &= d \end{aligned}$$

The length of d is 5.3. I found this by using pythagorean theorem with the sides that I already knew.

SCORE: 2

Part 1:

Incorrect answer:

4.4

Points

-

Incorrect procedure:

$$a^2 + 4^2 = 6^2$$

$$a = \#$$

-

Part 2:

Correct drawing (based on Part 1):

Right Δ with sides labeled

1

Part 3:

Correct answer (based on Part 1):

5.3

1

Correct and complete procedure:

$$3^2 + 4.4^2 = d^2$$

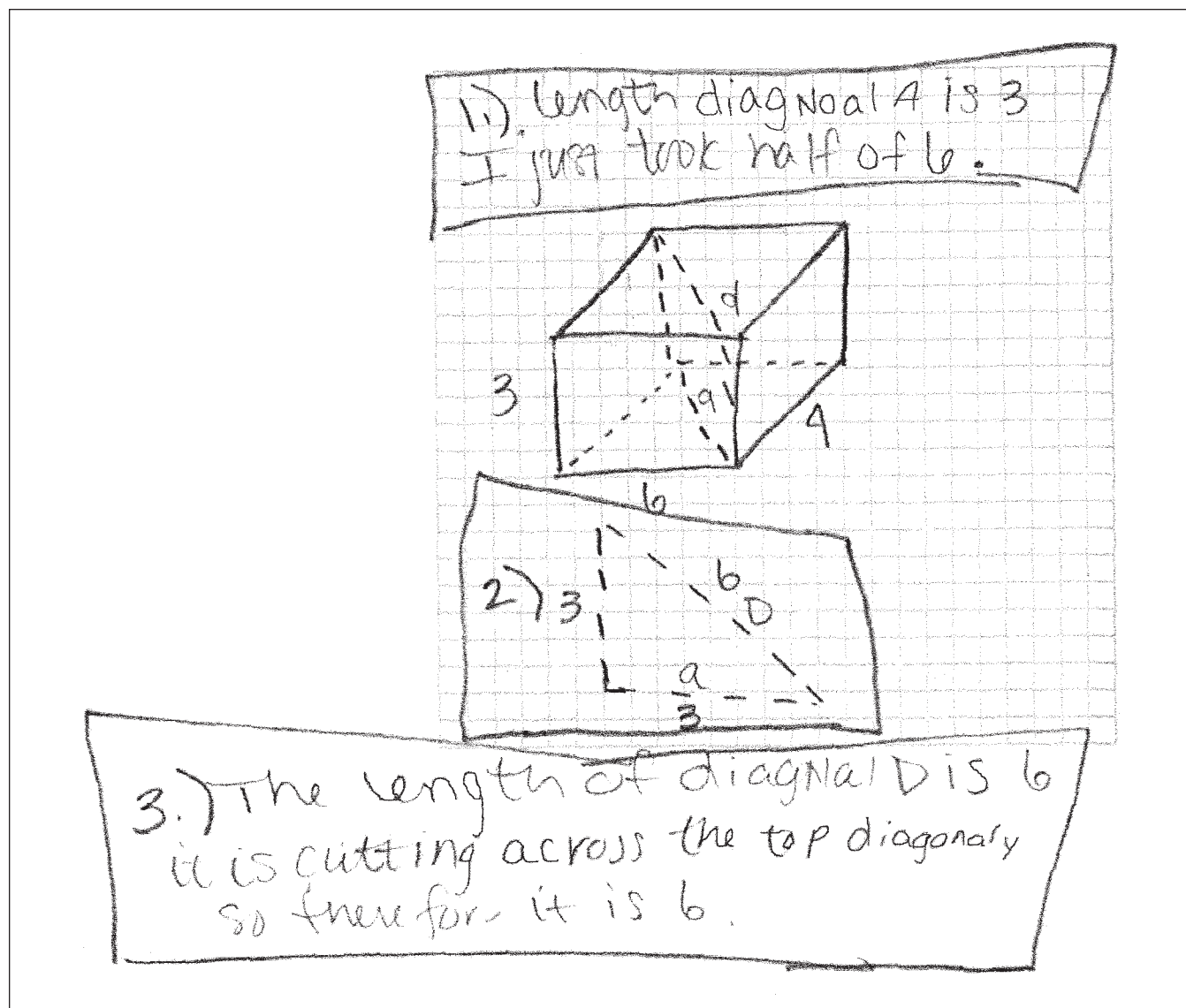
$$\# = d$$

1

TOTAL POINTS:

3

Geometry Item E Sample Responses and Annotations



SCORE: 1

Part 1:

Incorrect answer:

3

Points

-

Incorrect procedure:

"I just took half of 6."

-

Part 2:

Correct drawing (based on Part 1): Right Δ with sides labeled

1

Part 3:

Incorrect answer:

6

-

Incorrect procedure:

"... it is cutting across..."

-

TOTAL POINTS:

1

Geometry Item E Sample Responses and Annotations

$$1.) 3.14(3) = \boxed{9.42}$$

2)



$$3.) 3.14(4) = \boxed{12.56}$$

SCORE: 0

Part 1:

Incorrect answer:

9.42

Points

-

Incorrect procedure:

$3.14(3) = \#$

-

Part 2:

Correct drawing:

Right Δ

Incompletely labeled:

Side 3 not labeled

-

Part 3:

Incorrect answer:

12.56

-

Incorrect procedure:

$3.14(4) = \#$

-

TOTAL POINTS:

0



Arkansas Comprehensive Testing, Assessment, and Accountability Program

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