

WASL—Washington Assessment of Student Learning

A Component of the Washington State Assessment Program

Using Results to Improve Student Learning

Mathematics

Grade 10

2004 Released Items



August 10, 2004

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August 1, 2004

Dear Washington Educator:

I am delighted to offer this fourth annual publication of released test items from the 2004 Washington Assessment of Student Learning (WASL). My staff worked hard to make certain these materials were available in time for use during administration workshops and summer staff development activities, and I hope they are helpful in positively impacting instruction resulting in improved student learning.

I am particularly excited to tell you that this released item document is now available in an electronic format on our website. This electronic format provides you the opportunity to print sections of the document individually. In addition, we have already printed the state results for each test question in the data analysis box.

We release items from the WASL each year so that teachers and administrators can better analyze 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).

Using these test items and your school- and district-specific data that is provided by the state, you will be able to learn more about students in your school and district. By analyzing the differences in data and the relationship of each question to the EALRs, areas of strength and improvement will become apparent.

I encourage you to join with other staff before the start of the year to work with the item-specific scoring guides in reading, mathematics and science and the annotated student responses that illustrate each score point. Schools that have used this process have given very positive feedback about this experience. This year's writing prompts and annotations are also available on our website in a separate document.

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.

Please continue to visit our website, www.k12.wa.us, for additional resources.

I wish you a wonderful and successful school year as we continue our work toward improving student achievement in the 21st century.

Sincerely,

A handwritten signature in black ink that reads "Terry Bergeson". The signature is written in a cursive style with a large, prominent "T" and "B".

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 2004 operational test
- A table for each item where you can transfer the school-level and district-level data
- This year the state-level data has been already placed in the table
- 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 2004 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, 2002, and 2003 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 director or ESD 2004 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. To receive specific contact information, please email Beverly Neitzel, OSPI Mathematics Assessment Manager, 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.

Introduction to Tenth Grade Mathematics Released Items

Welcome to the Released Item Booklet for the WASL 2004 mathematics items. In this booklet you will find 13 items that were part of the spring 2004 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 three 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 13 items from the 2004 WASL assessment for mathematics, OSPI is releasing approximately 31% 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 Manager

2004 Mathematics Released Items

- 1 Alice, Bob, Farhana, and Jamal went out for pizza. When the bill came, they decided to split the check. Alice figured out what she owed by multiplying the bill by 0.25. Bob figured his share by finding 30% of the total. Farhana figured out her amount by dividing the total by 3. To determine what he owed, Jamal found 12% of the total. Who paid the most money?
- A. Alice
- B. Bob
- C. Farhana
- D. Jamal

Item Information

Correct Response: C

Tools: Yes

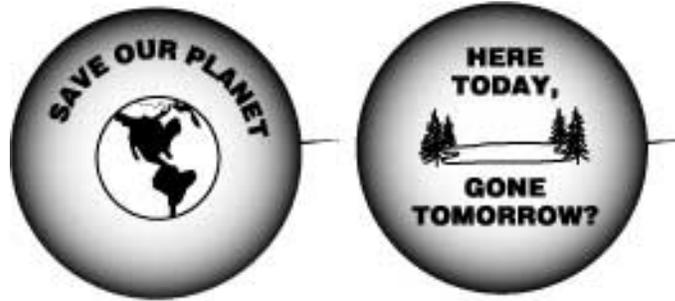
Strand: Number Sense

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

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		7.1%	A
		23.0%	B
		64.5%	C*
		4.6%	D
		0.8%	NR

- 2 For Earth Day, the school plans to sell the following buttons to students and the community.



The school will have to pay \$18 for 15 dozen buttons. How much will the school have to pay for 50 dozen buttons?

- A. \$90.00
- B. \$60.00
- C. \$45.00
- D. \$41.67

Item Information

Correct Response: B

Tools: No

Strand: Number Sense

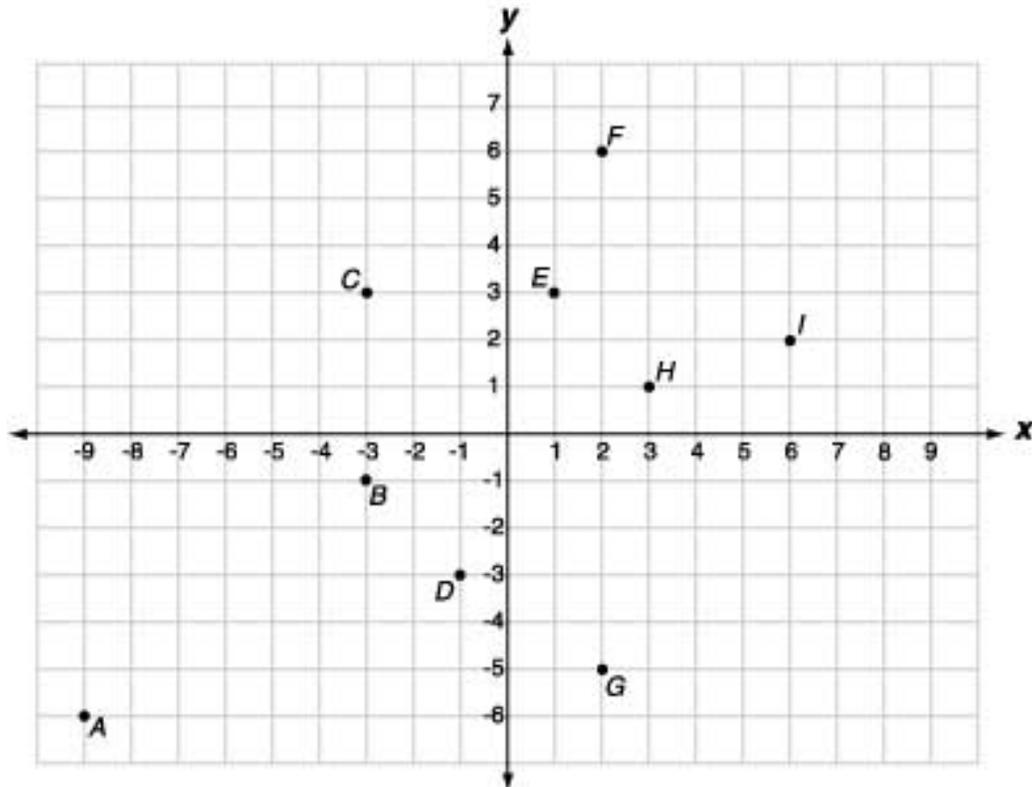
Learning Target: NS06: (Ratio and Proportion) Demonstrate an understanding of and apply the concepts of ratio and both direct and inverse proportion (1.1.4)

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		11.1%	A
		76.5%	B*
		8.4%	C
		3.7%	D
		0.3%	NR

Mathematics

- 3 On Enrique's grid below, find all the points whose x coordinate is one third of its y coordinate.



- A. Points D , E , and F
- B. Points D , E , F , and G
- C. Points B , H , and I
- D. Points B , H , I , and G

3 (continued)

Item Information

Correct Response: A

Tools: Yes

Strand: Geometric Sense

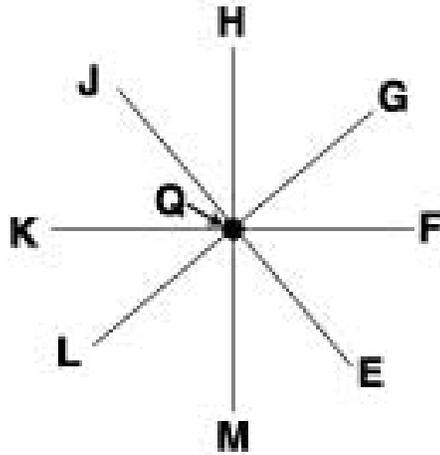
Learning Target: GS02: (Location) Demonstrate an understanding of and use coordinate grids (1.3.5)

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		61.9%	A*
		11.0%	B
		22.5%	C
		3.9%	D
		0.7%	NR

Mathematics

- 4 In the diagram, \overline{HM} is perpendicular to \overline{KF} .



If you are at Q facing H and turn 315° clockwise, then 45° counterclockwise, what point will you be facing?

- A. H
- B. F
- C. M
- D. K

4 (continued)

Item Information

Correct Response: D

Tools: Yes

Strand: Geometric Sense

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

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		8.0%	A
		13.2%	B
		17.8%	C
		60.6%	D*
		0.4%	NR

Mathematics

- 5 Henrietta is stacking soup cans for a display in the grocery store where she works. The bottom level of the display has 100 cans arranged in a square. The next level up has 81 cans in a square. The level above that has 64 cans in a square. She continues this pattern until she has just one can at the top. How many cans does she have altogether in this display?
- A. 246
- B. 385
- C. 450
- D. 550

Item Information

Correct Response: B

Tools: Yes

Strand: Algebraic Sense

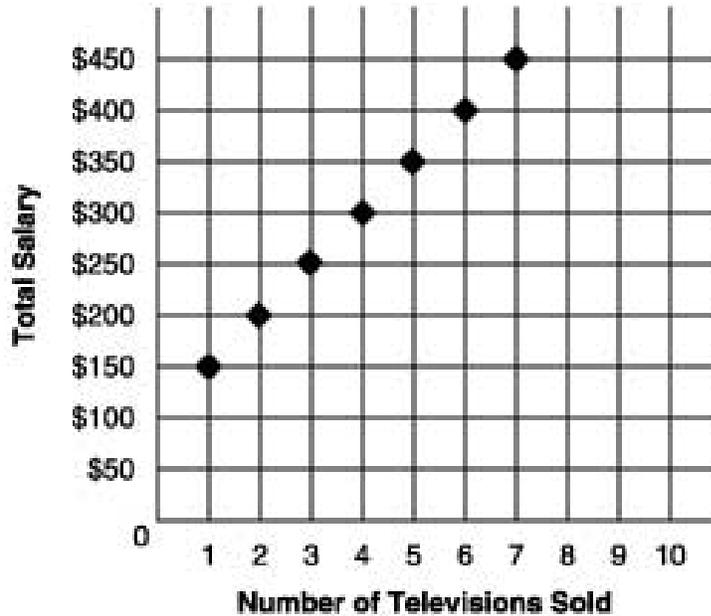
Learning Target: AS01: (Patterns and Functions) Recognize, extend, and create patterns, sequences, and functions; generalize and express rules for patterns, sequences, and functions (1.5.1, 1.5.2)

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		11.6%	A
		73.6%	B*
		11.0%	C
		3.2%	D
		0.6%	NR

- 6 The chart below shows the amount of total salary (commission plus base salary) paid to employees of a store that specializes in big screen televisions.

Total Salary Based on Number of Televisions Sold



Which equation best represents the total salary (T) that an employee makes for selling any (n) number of television sets?

- A. $T = 50n + 100$
- B. $T = 100(n + 50)$
- C. $T = 100n + 50$
- D. $T = 50(n + 100)$

Mathematics

6 (continued)

Item Information

Correct Response: A

Tools: No

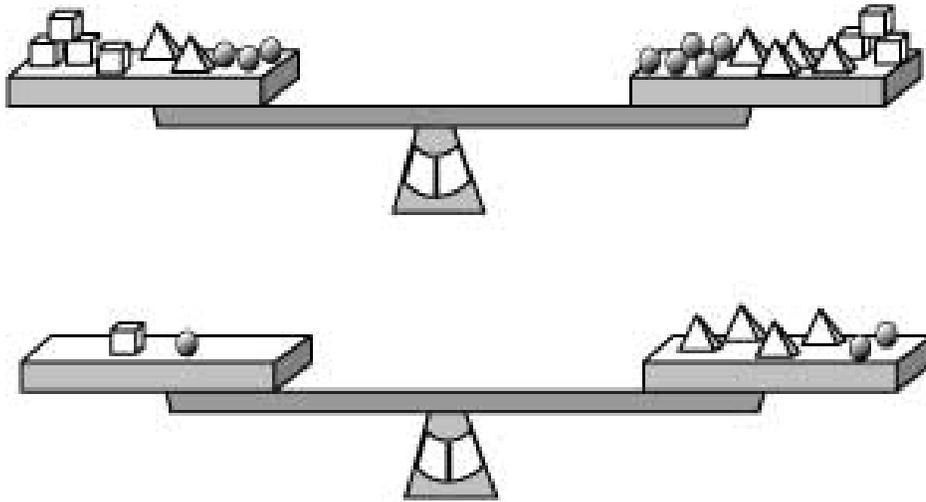
Strand: Algebraic Sense

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

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		64.5%	A*
		13.0%	B
		13.8%	C
		8.3%	D
		0.4%	NR

7 Kent is using the scale to compare the weight of various solids.



How many spheres will balance one cube?

- A.** 2 spheres
- B.** 3 spheres
- C.** 4 spheres
- D.** 5 spheres

Mathematics

7 (continued)

Item Information

Correct Response: B

Tools: No

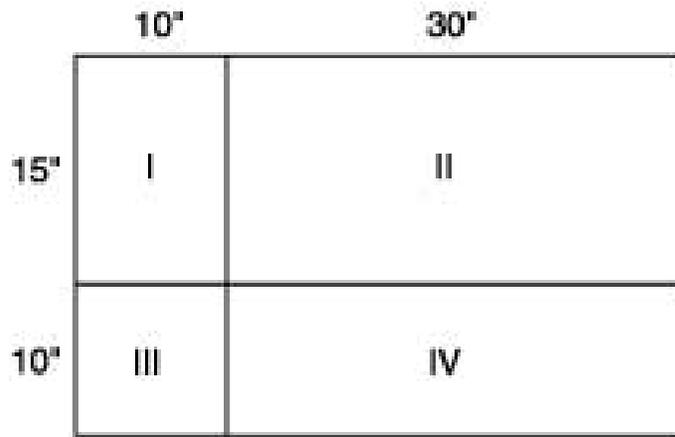
Strand: Solves Problems and Reasons Logically

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

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		22.0%	A
		41.8%	B*
		22.9%	C
		12.6%	D
		0.6%	NR

- 8 The school carnival has a dart game.



If a dart randomly hits the board, what is the probability that it will hit in region II?

- A. $\frac{9}{20}$
- B. $\frac{6}{13}$
- C. $\frac{1}{4}$
- D. $\frac{1}{3}$

Mathematics

8 (continued)

Item Information

Correct Response: A

Tools: Yes

Strand: Making Connections

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

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

Percent Distribution			
School	District	State	Responses (* = correct response)
		49.7%	A*
		18.7%	B
		18.9%	C
		12.0%	D
		0.6%	NR

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

9 (continued)

Item Information

Score Points: 2

Tools: No

Strand: Number Sense

Learning Target: NS04: (Computation) Compute with rational numbers, powers, and roots (1.1.6)

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

Percent Distribution			
School	District	State	Points
		25.7%	0
		28.9%	1
		42.8%	2
		2.6%	NR
		1.2	Mean

Mathematics

Scoring Guide for question number 9:

A **2-point** response: The student shows understanding of how to do multiple step computations in a real-world context by doing the following:

- explains or shows how to correctly calculate the cost for driving
- indicates that driving would be more expensive or that flying would be less expensive.

Example:

$$(\$29/\text{day})(3 \text{ days}) = \$87 \text{ for car rental}$$
$$(\$0.19/\text{mi})(1970 \text{ mi}) = \$374.30 \text{ for mileage}$$
$$\$87 + \$347.30 = \$461.30 \text{ cost to drive}$$

Driving is more expensive.

Note: Rounding or estimation is acceptable. Also, allow round-trip calculations: \$800 for flying, \$748.60 + \$174 for driving.

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

- shows the correct procedure to determine the cost of driving, but makes one or two errors (computational or transcription), and the conclusion is consistent with the computation shown
- shows that the cost to drive is \$461.30, but does not state which is more expensive or concludes that flying would be more expensive.

A **0-point** response: The student shows very little or no understanding of how to do multiple step computations in a real-world context.

Annotated Example of a 2-point response for question number 9:

- 9** Earl is planning to travel from Seattle to Oklahoma City. His destination is 1,970 miles one-way. If he flies, he can get a one-way ticket for \$400. If he drives, it will take him 3 days to get there, and the cost of renting a car would be \$29 per day plus \$0.19 per mile.

Considering his transportation costs alone, would it cost more if he flew or drove? **Explain in detail** your answer using words, numbers, and/or diagrams.

<p>400 vs. x</p>	$3(29) + 1970(.19)$ $\$87 + 1970(.19)$ <p style="text-align: right; margin-right: 20px;">Assume 2000(.2)</p> $\$87 + \approx \400
<p>If he was driving 2000 miles for 20¢ a mile, it would cost</p>	
<p>him 400 dollars for gas alone, which is then added to the</p>	
<p>\$87 for renting a car. Even though he didn't drive 2000</p>	
<p>miles for 20¢ a mile, the difference is relatively small; less</p>	
<p>than \$10. So it would still make more sense to fly.</p>	
<p>Which way would be more expensive? <u>driving</u></p>	

Mathematics

Annotated Example of a 2-point response for question number 9 (continued):

Annotations:

The response shows thorough understanding of how to do multiple step computations in a real-world context by explaining or showing how to correctly calculate the cost for driving with complete computations for the cost to rent a car for 3 days “ $29 \times 3 = 87$,” adding the cost per mile for the total mileage “ $1970 \times .19$ ” shown as an estimation “ $2000 (.2)$ ” to compare $\$87 + \approx \400 with 400 (for flying); and indicating that “*driving*” would be more expensive. The response with a correct answer and complete supporting work using estimation earns two points.

Annotated Example of a 1-point response for question number 9:

- 9** Earl is planning to travel from Seattle to Oklahoma City. His destination is 1,970 miles one-way. If he flies, he can get a one-way ticket for \$400. If he drives, it will take him 3 days to get there, and the cost of renting a car would be \$29 per day plus \$0.19 per mile.

Considering his transportation costs alone, would it cost more if he flew or drove? **Explain in detail** your answer using words, numbers, and/or diagrams.

d = 1,970 miles one way		one way \$400
dv = 3 days \$29/day + \$. A mile		fly = \$400
(3)(29)	1,970 miles	(1970)(.19)
≈ 87		≈ 374.30
		+ <u>87</u>
		375.17
We know it will cost \$400 to fly. 3 days mult. by \$29. This will		
come to 87 dollars a day. Since it is 1,970 miles away, mult. that		
by \$.19 because that is the cost per mile. Add that answer to 87		
& you get \$375.17 which is cheaper then flight of \$400.		
Which way would be more expensive? <u>flight</u>		

Mathematics

Annotated Example of a 1-point response for question number 9 (continued):

Annotations:

The response shows partial understanding of how to do multiple step computations in a real-world context by showing the cost to rent a car “ $(3)(29) \approx 87$,” “ $(1970)(.19) \approx 374.30$,” then adding 87 to 374.30 to get “375.17”; and indicating that “*flight*” would be more expensive based on the computation error made. The response with a complete procedure, one computation error and a conclusion consistent with that error earns one point.

Annotated Example of a 0-point response for question number 9:

- 9** Earl is planning to travel from Seattle to Oklahoma City. His destination is 1,970 miles one-way. If he flies, he can get a one-way ticket for \$400. If he drives, it will take him 3 days to get there, and the cost of renting a car would be \$29 per day plus \$0.19 per mile.

Considering his transportation costs alone, would it cost more if he flew or drove? **Explain in detail** your answer using words, numbers, and/or diagrams.

$\begin{array}{r} 29 \\ \times 3 \\ \hline \$87 \end{array}$	$\begin{array}{r} 1970 \\ .19 \\ \hline \end{array}$	$\$400$
$87+$	$\begin{array}{r} \underline{0104} \times 3 \\ .19 \quad 70 \\ \quad 76 \\ \hline \end{array}$	302
Which way would be more expensive? <u>flying</u>		

Mathematics

Annotated Example of a 0-point response for question number 9 (continued):

Annotations:

The response shows very little or no understanding of how to do multiple step computations in a real-world context by showing “ $29 \times 3 = \$87$,” and “ $70 \div .19 = \$104 \times 3 = 312$ ”; and indicating that “*flying*” would be more expensive. The response earns zero points.

Mathematics

10 (continued)

Item Information

Score Points: 2

Tools: No

Strand: Measurement

Learning Target: ME01: (Attributes and Dimensions) Demonstrate an understanding of how changes in dimension affect perimeter, area, surface area, and volume (1.2.1)

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

Percent Distribution			
School	District	State	Points
		68.5%	0
		9.0%	1
		19.2%	2
		3.3%	NR
		0.5	Mean

Scoring Guide for question number 10:

A **2-point** response: The student shows an understanding of how changes in dimensions can impact other measurable attributes by doing the following:

- indicates 160 ft for length of the new fences
- shows work and/or explanation supporting the new fence length
- indicates 1600 sq. ft for area of the new garden
- shows work and/or explanation supporting the new area.

Example:

Old Garden

$$80 \div 4 = 20 \text{ ft per side}$$

$$\text{Area} = 20 \times 20 = 400 \text{ sq. ft}$$

New Garden

$$\text{Area} = 400 \times 4 = 1,600 \text{ sq. ft}$$

$$\text{Side} = \sqrt{1600} = 40 \text{ ft}$$

$$\text{Perimeter} = 40 \times 4 = 160 \text{ ft}$$

Note: Allow one computation error as long as conceptual understanding is clear.

A **1-point** response: The student does two or three of the following:

- indicates 160 ft for length of the new fences
- shows work and/or explanation supporting the new fence length
- indicates 1600 sq. ft for area of new garden
- shows work and/or explanation supporting the new area.

A **0-point** response: The student shows very little or no understanding of how changes in dimensions can impact other measurable attributes.

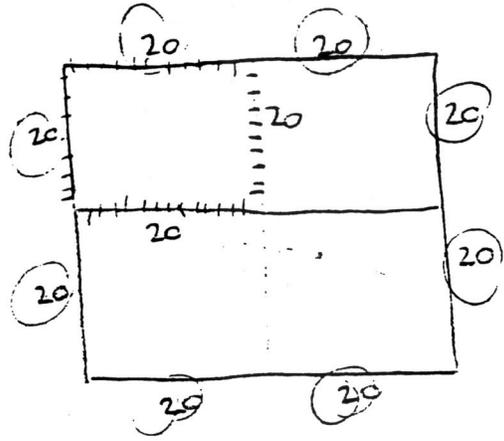
Mathematics

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

- 10** Mr. Lansing has a square garden that is completely surrounded by an old, rickety fence. He plans to tear down the old fence and make his new square garden 4 times the area of his old garden. If the old fence has a total length of 80 ft, how long will the new fence be?

In the box below, tell the total length of the new fence and the area of the new garden.

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

 <p>= 160 ft</p>
First, I found out the length of each side by dividing 80 by 4.
Then I drew 3 other boxes that were 20 feet on each side also.
Next, I added each side of the new sides together which got me
40 feet on each side now I multiplied by 4 because there are 4
sides and to get the area I multiplied $l \times w$ and that got me 1600
sq ft.
The total <u>length</u> of the new fence will be <u>160</u> ft.
The <u>area</u> of the new garden will be <u>1600</u> sq. ft.

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

Annotations:

The response shows complete understanding of the concept by accurately computing the fence length and garden area. An explanation and calculations support answers given earning the response two points.

Mathematics

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

- 10** Mr. Lansing has a square garden that is completely surrounded by an old, rickety fence. He plans to tear down the old fence and make his new square garden 4 times the area of his old garden. If the old fence has a total length of 80 ft, how long will the new fence be?

In the box below, tell the total length of the new fence and the area of the new garden.

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

<p>old fence 80ft $P = 4W$</p> <p>20ft 20ft = 80ft</p> <p>area = 400</p> <p>$\begin{array}{r} \times 4 \\ \hline 1600 \end{array}$</p> <p>$\begin{array}{r} 5 \overline{)1600} \\ \underline{320} \end{array}$</p>
It said the old garden was a square so all sides are
congruent and $80 \div 4 = 20$. The area of a square is $b \times H$ so I
multiplied $20 \times 20 = 400$. 400×4 since it has to be 4 times
larger and then divided by 5 because the fence is 5 times smaller
than the area.
The total <u>length</u> of the new fence will be <u>320</u> ft.
The <u>area</u> of the new garden will be <u>1,600</u> sq. ft.

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

Annotations:

The response shows partial understanding of the concept by accurately computing the garden area with a supporting explanation and calculations. The fence length is inaccurately calculated. The response earns one point.

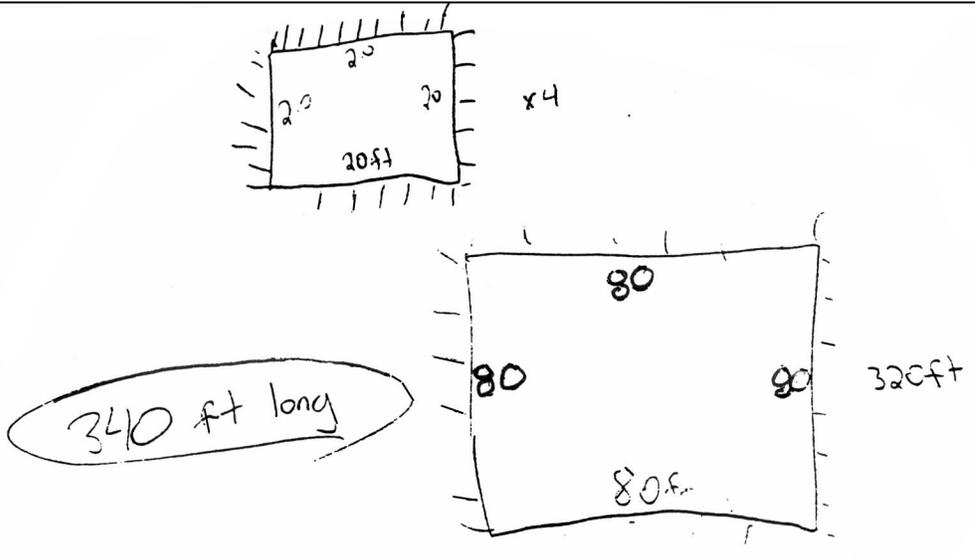
Mathematics

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

- 10 Mr. Lansing has a square garden that is completely surrounded by an old, rickety fence. He plans to tear down the old fence and make his new square garden 4 times the area of his old garden. If the old fence has a total length of 80 ft, how long will the new fence be?

In the box below, tell the total length of the new fence and the area of the new garden.

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


I took 80 and divided it by 4 so I could get each side of the fence. Then I times each side by four so I could get the new length. Thats how I found the length of the fence. Then for the area I just took the new length and times it by itself and got the area.
<p>The total <u>length</u> of the new fence will be <u>320</u> ft.</p> <p>The <u>area</u> of the new garden will be <u>6400</u> sq. ft.</p>

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

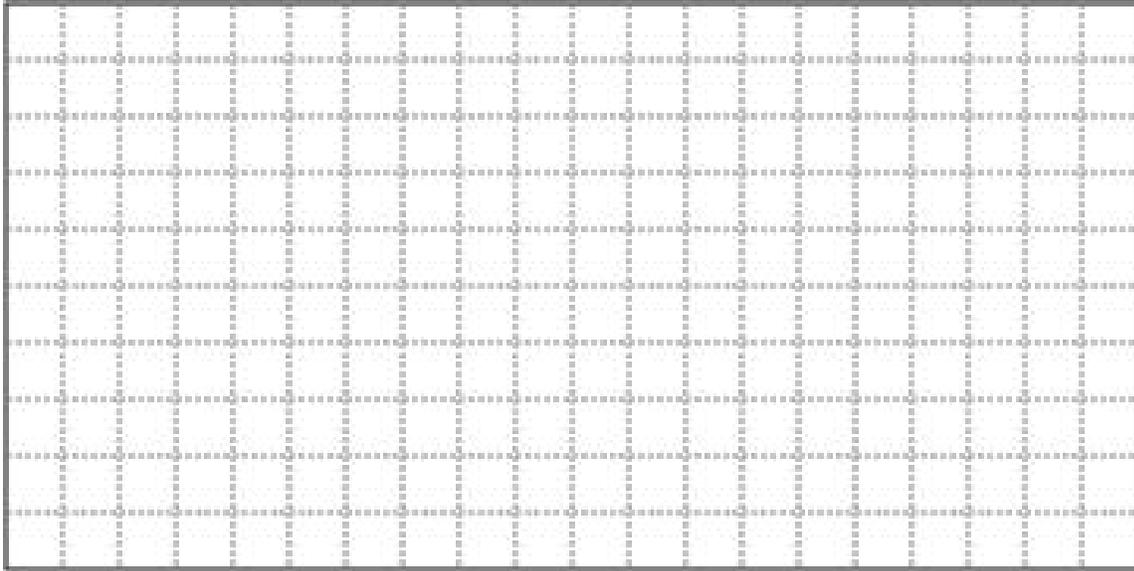
Annotations:

The response shows very little or no understanding of the concept. Each side is increased four times and that dimension is used to find the length of the fence and the area resulting in incorrect answers. The response earns zero points.

Mathematics

11 On the grid below:

- Draw a right triangle with one angle equal to 60°
- Label the 60° angle



11 (continued)

Item Information

Score Points: 2

Tools: Yes

Strand: Geometric Sense

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

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

Percent Distribution			
School	District	State	Points
		17.5%	0
		41.8%	1
		38.3%	2
		2.4%	NR
		1.2	Mean

Mathematics

Scoring Guide for question number 11:

A **2-point** response: The student shows understanding of geometric properties and relationships by drawing a right triangle ($90^\circ \pm 2^\circ$). The 60° ($\pm 2^\circ$) angle is clearly labeled.

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

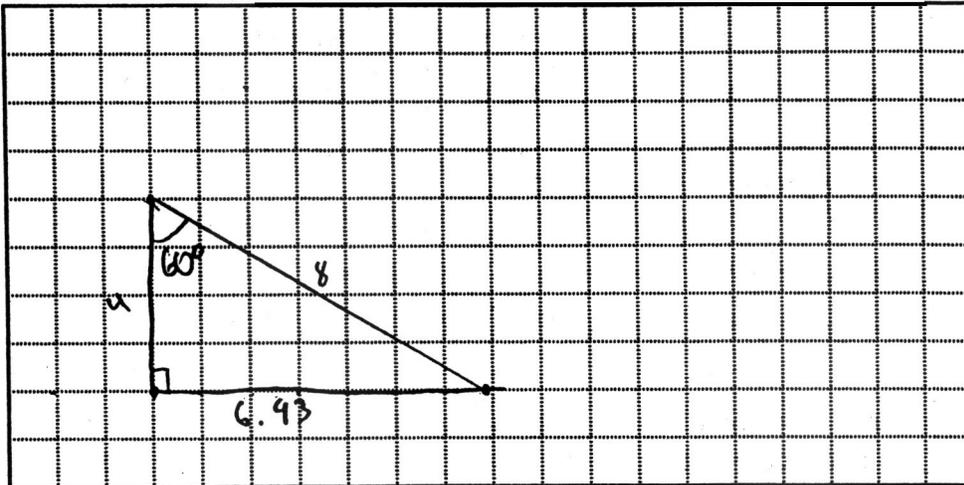
- draws a triangle that is not a right triangle but includes 60° ($\pm 2^\circ$) angle and labels it
- draws a right triangle ($90^\circ \pm 2^\circ$).

A **0-point** response: The student shows very little or no understanding of geometric properties and relationships.

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

11 On the grid below:

- Draw a right triangle with one angle equal to 60°
- Label the 60° angle



Annotations:

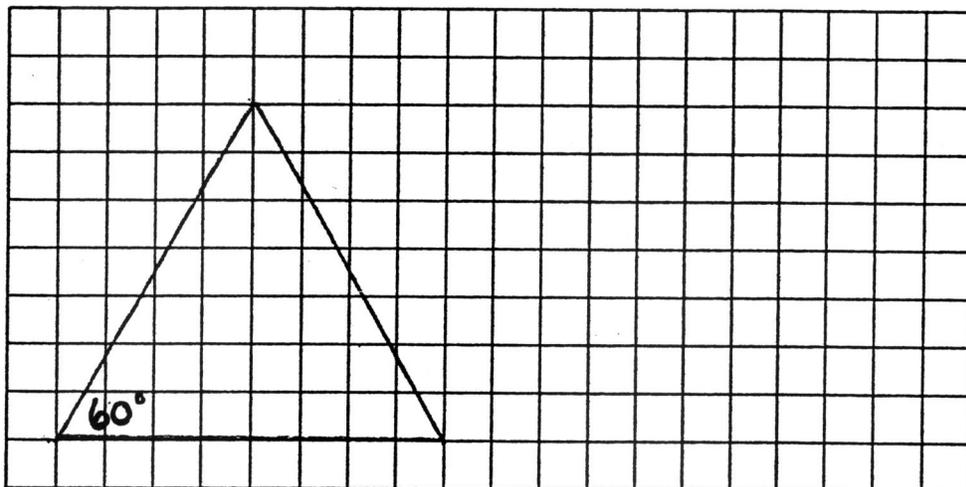
The response shows complete understanding of geometric properties and relationships by drawing a right triangle with one angle equal to 60° . The 90° and 60° angles are both within the tolerance of $\pm 2^\circ$ and the 60° angle is clearly labeled. The response earns two points.

Mathematics

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

11 On the grid below:

- Draw a right triangle with one angle equal to 60°
- Label the 60° angle



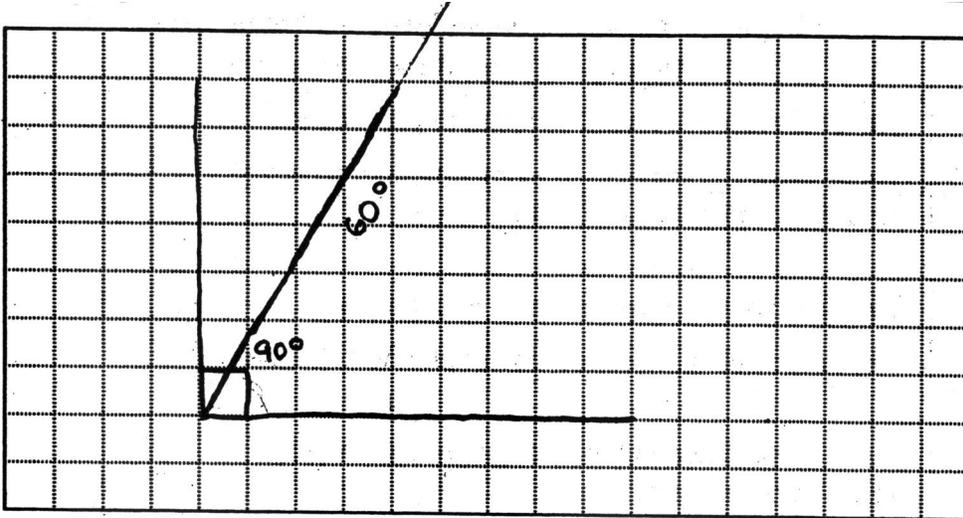
Annotations:

The response shows partial understanding of geometric properties and relationships by drawing a triangle with one angle equal to 60° . The 60° angle is within the tolerance of $\pm 2^\circ$ and it is clearly labeled. The response has an equilateral triangle rather than a right triangle, but a 60° angle is labeled. The response earns one point.

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

11 On the grid below:

- Draw a right triangle with one angle equal to 60°
- Label the 60° angle

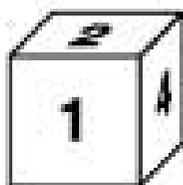


Annotations:

The response shows very little or no understanding of geometric properties and relationships by drawing an incomplete triangle with an unlabeled 60° angle. The response shows no right triangle and an unlabeled 60° angle. The response earns zero points.

Mathematics

- 12 Joseph and Cindy made up a game in their mathematics class. To earn points in the game, each player rolls a six-sided cube with numbers 1 through 6 on the sides and then flips a coin. If the coin lands “tails up,” the player gets a total number of points equal to the number at the top of the cube. If the coin lands “heads up,” the player’s points are doubled for that turn.



In the box below, list all the possible outcomes for each turn. Then indicate the probability of a player getting 6 points in one turn.

12 (continued)

Item Information

Score Points: 2

Tools: Yes

Strand: Probability and Statistics

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

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

Percent Distribution			
School	District	State	Points
		16.8%	0
		30.1%	1
		46.8%	2
		6.3%	NR
		1.3	Mean

Mathematics

Scoring Guide for question number 12:

A **2-point** response: The student shows an understanding of determining the size of a sample space and/or listing all possible outcomes of an experiment to determine the probability of a certain outcome by doing the following:

- shows all 12 coin/number cube combinations (1 H, 1 T, 2 H, 2 T, ...) OR all the correct possible game point totals: 1, 2, 3, 4, 5, 6, 8, 10, and 12
- indicates that the probability of getting 6 points is $\frac{2}{12}$ or $\frac{1}{6}$.

NOTE: If the student doubles the tails column instead of the heads column, that alone will not affect the student's score.

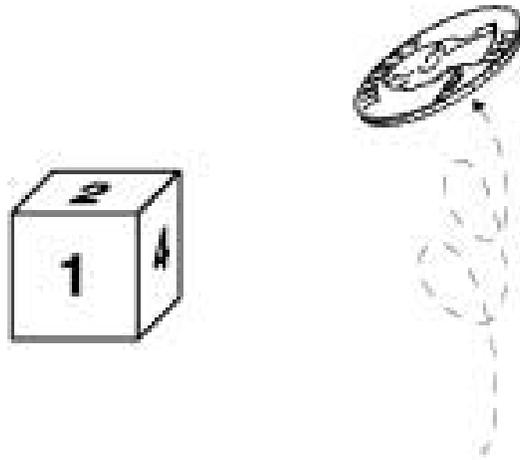
A **1-point** response: The student does one of the following:

- correctly lists at least nine of the possible outcomes or totals and no more than three additional outcomes or totals that are incorrect. The response also gives a probability that agrees with the possible outcomes or totals shown
- indicates the correct probability but fails to list all the possible outcomes or totals
- lists all the possible outcomes or totals but gives an incorrect or no probability.

A **0-point** response: The student shows very little or no understanding of determining the size of a sample space and/or listing all possible outcomes of an experiment to determine the probability of a certain outcome.

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

12 Joseph and Cindy made up a game in their mathematics class. To earn points in the game, each player rolls a six-sided cube with numbers 1 through 6 on the sides and then flips a coin. If the coin lands “tails up,” the player gets a total number of points equal to the number at the top of the cube. If the coin lands “heads up,” the player’s points are doubled for that turn.



In the box below, list all the possible outcomes for each turn. Then indicate the probability of a player getting 6 points in one turn.

1 heads x 2 1 tails 2 heads x 2 2 tails 3 heads x 2 3 tails 4 heads x 2 4 tails	5 heads x 2 5 tails 6 heads x 2 6 tails 1, 2, 4, 2, 6, 3, 8, 4, 10, 5, 12, 6
The probability of a player getting 6	
is about 2 in 12 or 1 in 6.	

Mathematics

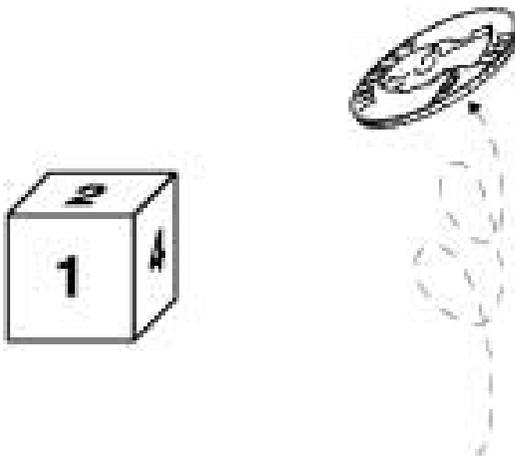
Annotated Example of a 2-point response for question number 12 (continued):

Annotations:

The response shows thorough understanding of determining the size of a sample space and/or listing all possible outcomes of an experiment to determine the probability of a certain outcome by showing all 12 coin/number cube combinations and all the correct possible game point totals; and indicating that the probability of getting 6 points in one turn is “2 in 12 or 1 in 6.” The response listing all combinations, or all point totals, and the correct probability earns two points.

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

12 Joseph and Cindy made up a game in their mathematics class. To earn points in the game, each player rolls a six-sided cube with numbers 1 through 6 on the sides and then flips a coin. If the coin lands “tails up,” the player gets a total number of points equal to the number at the top of the cube. If the coin lands “heads up,” the player’s points are doubled for that turn.



In the box below, list all the possible outcomes for each turn. Then indicate the probability of a player getting 6 points in one turn.

# on dice	coin	# on dice	total amount	H = Heads T = Tails
1	- H	1	- T - 1	
2	- H	2	- T - 4	
3	- H	3	- T - 6	
4	- H	4	- T - 8	
5	- H	5	- T - 10	
6	- H	6	- T - 12	
The probability of a player getting 6 pts				
in one turn is $\frac{1}{6}$ chance of rolling a				
6 and $\frac{1}{2}$ chance of getting a heads up.				
$\frac{1}{3}$ chance of getting the #3 and $\frac{1}{2}$				
chance of getting a tails on the coin.				

Mathematics

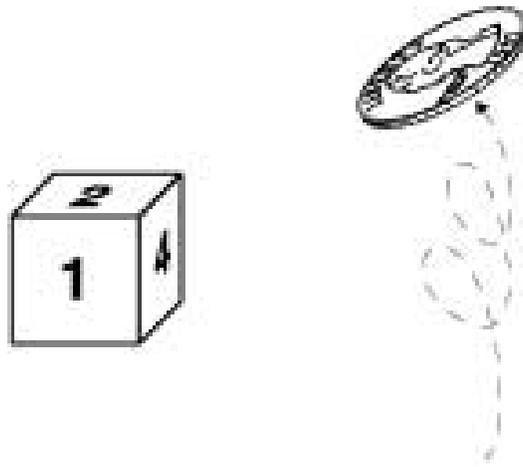
Annotated Example of a 1-point response for question number 12 (continued):

Annotations:

The response shows partial understanding of determining the size of a sample space and/or listing all possible outcomes of an experiment to determine the probability of a certain outcome by showing all 12 coin/number cube combinations. The listing of game point totals includes an error (“1-T-1” should be 1-T-2) and cannot receive credit. The probability “ $\frac{1}{6}$ ” listed in the explanation is for “*chance of rolling a 6*” and is not the final answer for the probability of getting six points in one turn. The response listing all possible combinations earns one point.

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

12 Joseph and Cindy made up a game in their mathematics class. To earn points in the game, each player rolls a six-sided cube with numbers 1 through 6 on the sides and then flips a coin. If the coin lands “tails up,” the player gets a total number of points equal to the number at the top of the cube. If the coin lands “heads up,” the player’s points are doubled for that turn.



In the box below, list all the possible outcomes for each turn. Then indicate the probability of a player getting 6 points in one turn.

<p>All possible outcomes for each turn: 1, 2, 2, 3, 4, 4, 5, 6, 6, 8, 8, 10, 10, 12, 12</p> <p>probability of rolling a 6 = $\frac{1}{6}$</p> <p>probability of rolling a 3 = $\frac{1}{6}$</p> <p>probability of getting heads = $\frac{1}{2}$</p> <p>probability of getting tails = $\frac{1}{2}$</p> <p>probability of getting 6 points in one turn = 8.33%</p>

Mathematics

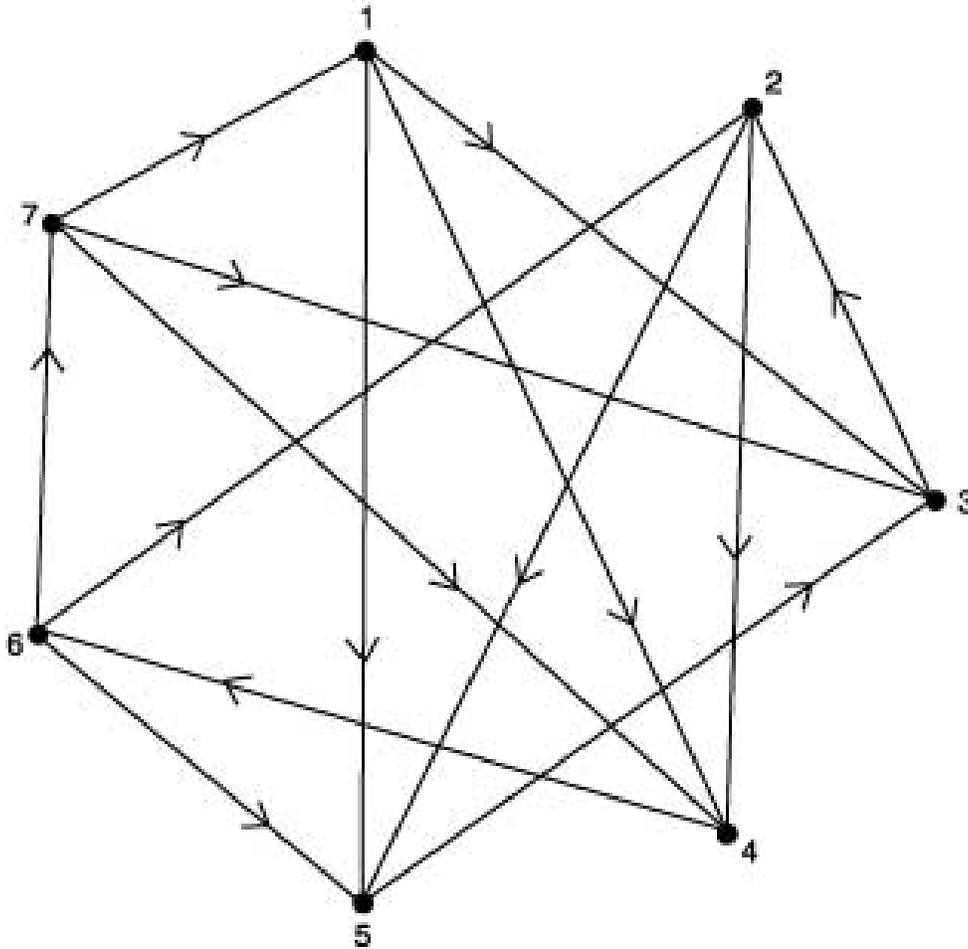
Annotated Example of a 0-point response for question number 12 (continued):

Annotations:

The response indicates very little or no understanding of determining the size of a sample space and/or listing all possible outcomes of an experiment to determine the probability of a certain outcome by showing more than 15 outcomes; and indicating the probability of getting 6 points in one turn is “8.33%”. The response having too many outcomes listed and a probability that does not match the listed outcomes earns zero points.

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

13 (continued)

Item Information

Score Points: 4

Tools: No

Strand: Solves Problems and Reasons Logically

Learning Target: SR05: (Construct Solutions and Justify) Use viable strategies and appropriate concepts and procedures to construct a solution and justify results using evidence, validate thinking and mathematical ideas and/or check for reasonableness of results (2.3.3, 3.3.1, 3.3.2, 3.3.3)

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

Percent Distribution			
School	District	State	Points
		23.5%	0
		18.6%	1
		12.8%	2
		14.0%	3
		23.5%	4
		7.7%	NR
		2.0	Mean

Mathematics

Scoring Guide for question number 13:

A 4-point response: The student shows understanding of organizing information to construct a solution and justify results using evidence from the problem by doing all of the following:

Organization

- shows win and/or loss records for all seven players. Allow for missing labels or one error.
- shows the remaining opponents for all seven players or the records of the remaining opponents for all seven players

Justification of a solution

- chooses a player with the most difficult matches left to play and identifies their opponents with their records or chooses a player with the most difficult matches left to play, identifies their opponents and gives a nonspecific comparison of the opponents' win/loss records that is supported by the student's organized information (e.g., win/loss table)
- provides a justification, which is based on correct facts from the given information, and supports the student's choice of player with the most difficult matches left to play.

A 3-point response: The student provides three of the requirements listed in the 4-point response.

A 2-point response: The student provides two of the requirements listed in the 4-point response.

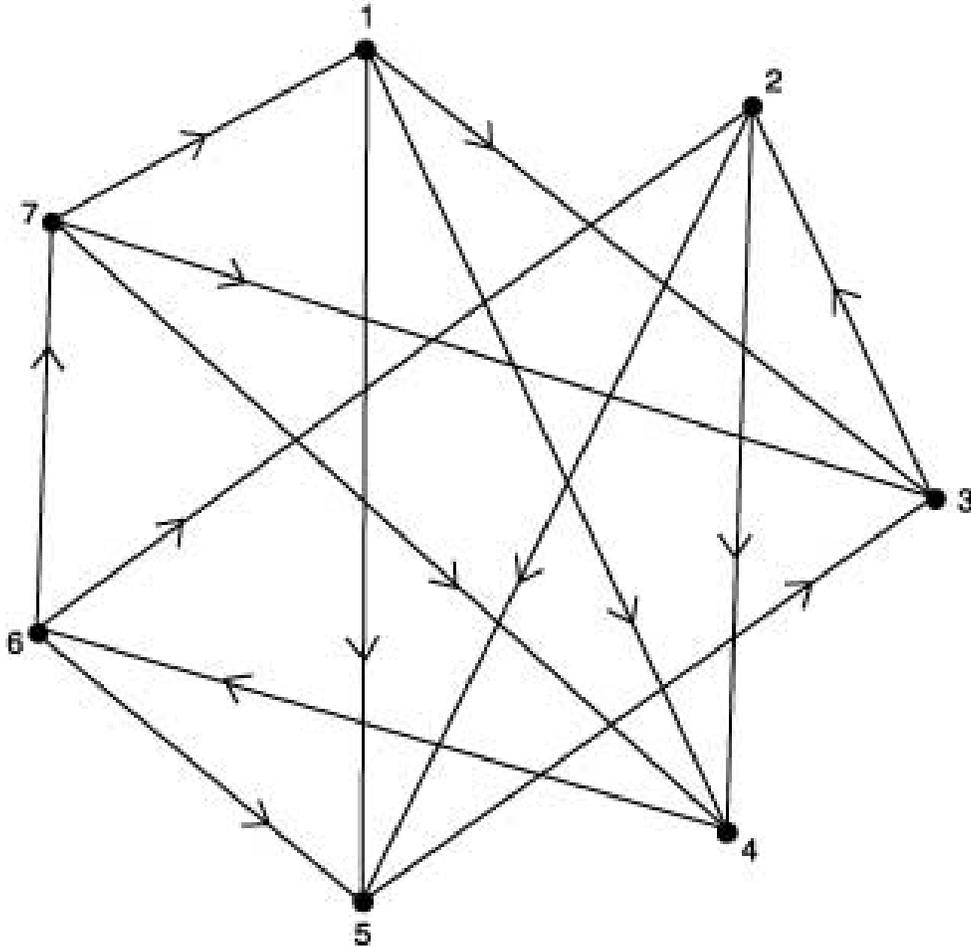
A 1-point response: The student provides one of the requirements listed in the 4-point response.

A 0-point response: The student shows very little or no understanding of organizing information to construct a solution or justify results using evidence from the problem.

Annotated Example of a 4-point response for question number 13:

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

Mathematics

13 (continued)

Show your work to support your answers using words, numbers, and/or diagrams.

Player	1	2	3	4	5	6	7
1	X	?	W	W	W	?	L
2	?	X	L	W	W	L	?
3	L	W	X	?	L	?	L
4	L	L	?	X	?	W	L
5	L	L	W	?	X	L	?
6	?	W	?	L	W	X	W
7	W	?	W	W	?	L	X

Key:
 W-Win
 L-Lose
 ?-Didn't play yet

Through my chart, I have gained the knowledge of the records that each player, and in turn, who will have the toughest matches to play

	Record of upcoming oponents		I conclude
1	(2-2)	(3-1)	that player
2	(3-1)	(3-1)	2 has the
3	(1-3)	(3-1)	most difficult
4	(1-3)	(1-3)	oponents yet to
5	(1-3)	(3-1)	face because
6	(3-1)	(1-3)	they are both
7	(2-2)	(3-1)	3-1.

Which player has the most difficult remaining matches left to play? 2

Annotated Example of a 4-point response for question number 13 (continued):

Annotations:

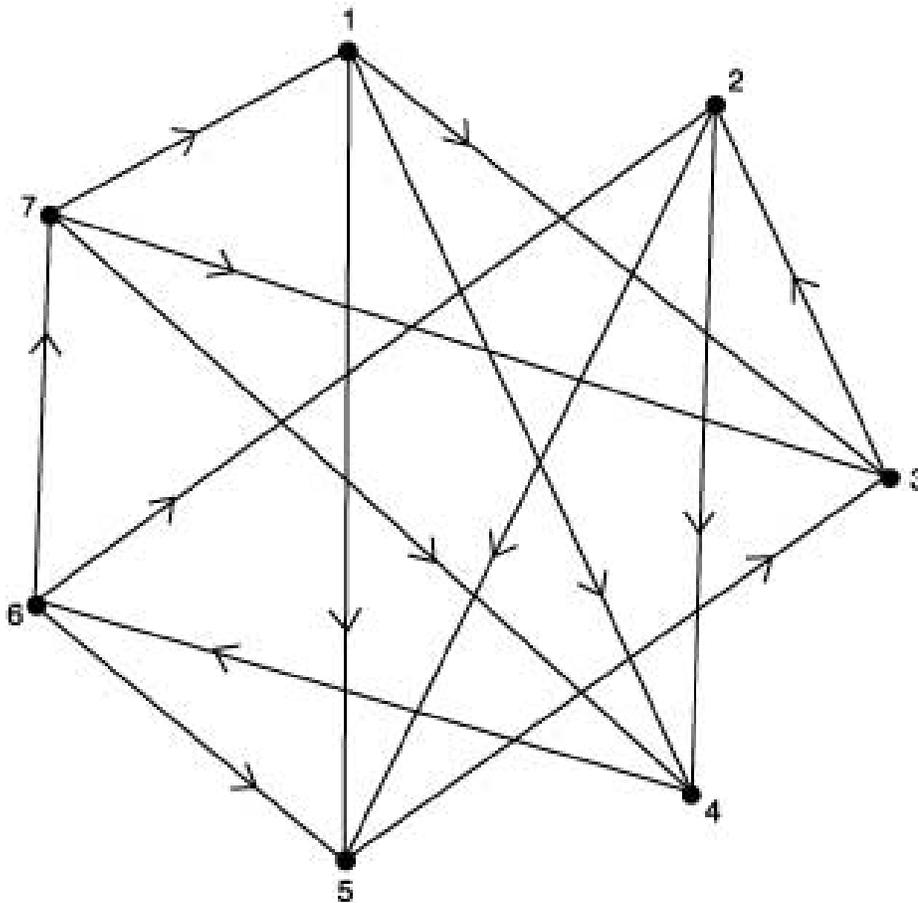
The response completely organizes information to construct a solution and justifies results using evidence from the problem by correctly completing a table that shows the win/loss records for all seven players and the remaining opponents for all seven players. The response chooses a player and identifies the records of that player's remaining opponents (the remaining opponents are identified in the table) and provides a justification which is based on correct facts from the given information and supports the choice. The response earns four points.

Mathematics

Annotated Example of a 3-point response for question number 13:

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

13 (continued)

Show your work to support your answers using words, numbers, and/or diagrams.

	W	L
Player 1 ≈	3	1
Player 2 ≈	2	2
Player 3 ≈	1	3
Player 4 ≈	1	3
Player 5 ≈	1	3
Player 6 ≈	3	1
Player 7 ≈	3	1

player 2 has the most difficult matches left to play. So far
player 2 has played most of the easy matches. Players 1, 6 + 7
have a pretty good record and so far from those 3 hard teams
he's only played 1 which is player six.

Which player has the most difficult remaining matches left to play? _____

Mathematics

Annotated Example of a 3-point response for question number 13 (continued):

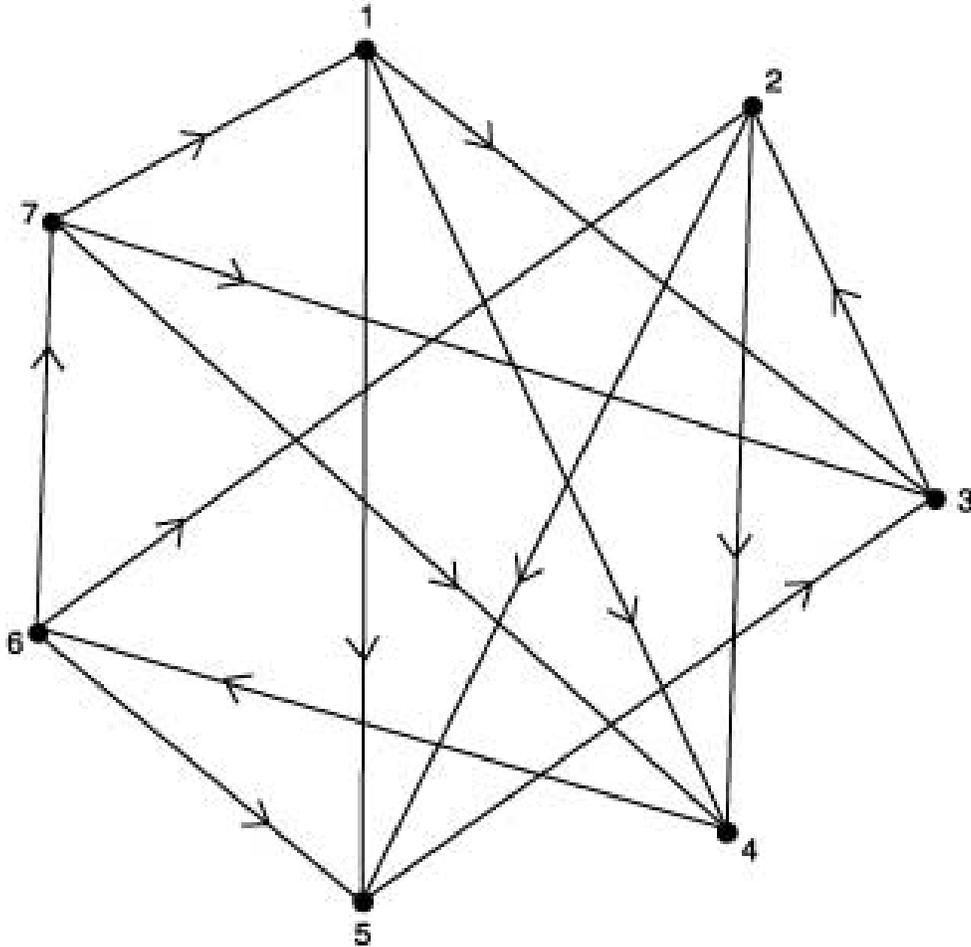
Annotations:

The response organizes information to construct a solution and justifies results using evidence from the problem by correctly completing a win/loss chart for all seven players. The response chooses a player and identifies their opponents with their records and provides a justification which is based on correct facts from the given information and supports the choice. The response neglects to show the remaining opponents for all seven players. The response earns three points.

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

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

Mathematics

13 (continued)

Show your work to support your answers using words, numbers, and/or diagrams.

Person	# of Win	# of loses	matches played	Person haven't played
1	3 P3, P4, P7	1 to P7	4	2 & 6
2	2 P3, P4	2 to P3, P6	4	1 & 7
3	1 to P4	3 to P1, P2, P7	4	4 & 6
4	1 to P6	3 to P1, P2, P7	4	3 & 5
5	1 to P3	3 to P1, P2, P7	4	4 & 7
6	3 to P1, P2, P7	1 to P4	4	1 & 3
7	3 to P1, P2, P4	1 to P6	4	2 & 5

key
P = Player #

Because what I had done was went threw and tabled their numbers of wins and loses and who they were to. Then I went threw the players and scatched out the ones with the most losses under the other players category to see what a difficulty level they had played so far. Then on the end I wrote who they haven't played yet. Then I see if the person they have to play is hard or difficult.

Which player has the most difficult remaining matches left to play? 2

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

Annotations:

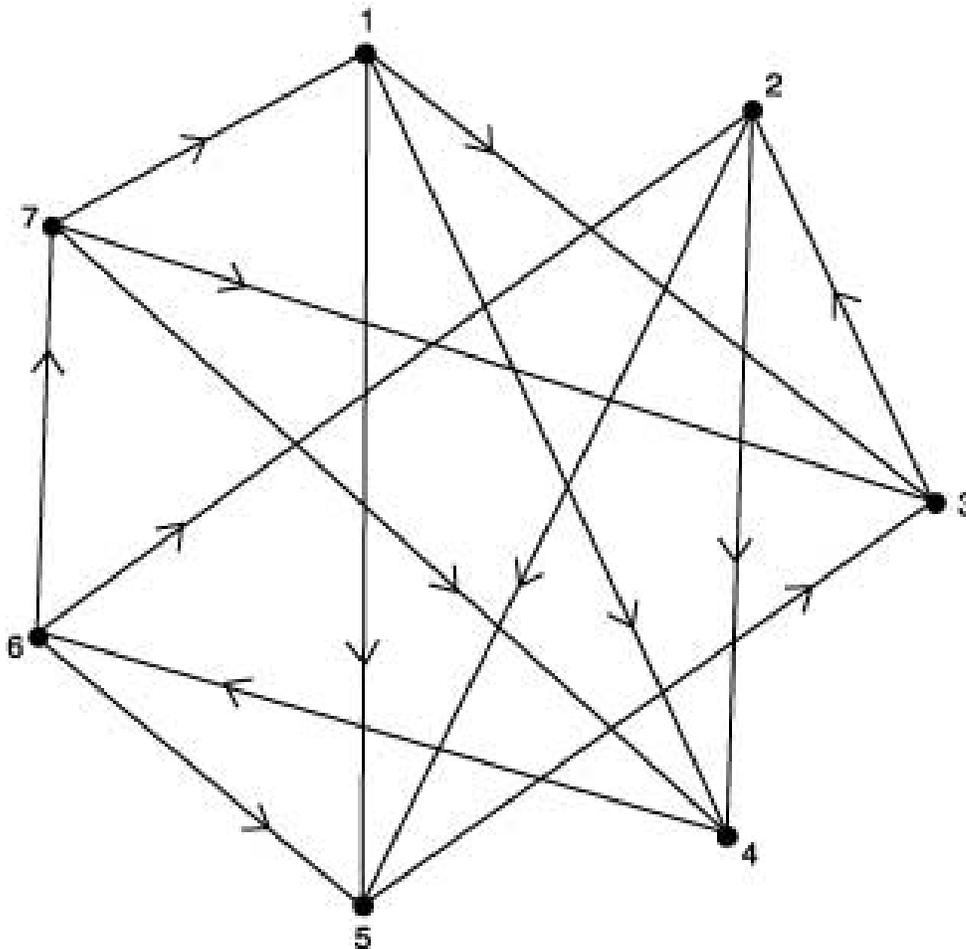
The response organizes some information to construct a solution and justifies results using evidence from the problem by correctly completing a chart that shows the win/loss records for all seven players and the remaining opponents for all seven players. The response does not give a justification of the solution, it simply describes a process. The response earns two points.

Mathematics

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

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

13 (continued)

Show your work to support your answers using words, numbers, and/or diagrams.

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Player six has most difficult matches left to play, because players 1 & 7 won over player #4, but player 6 couldn't beat 4, so that means 1 & 7 are gonna be difficult for 6 to beat.

Which player has the most difficult remaining matches left to play? 6

Mathematics

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

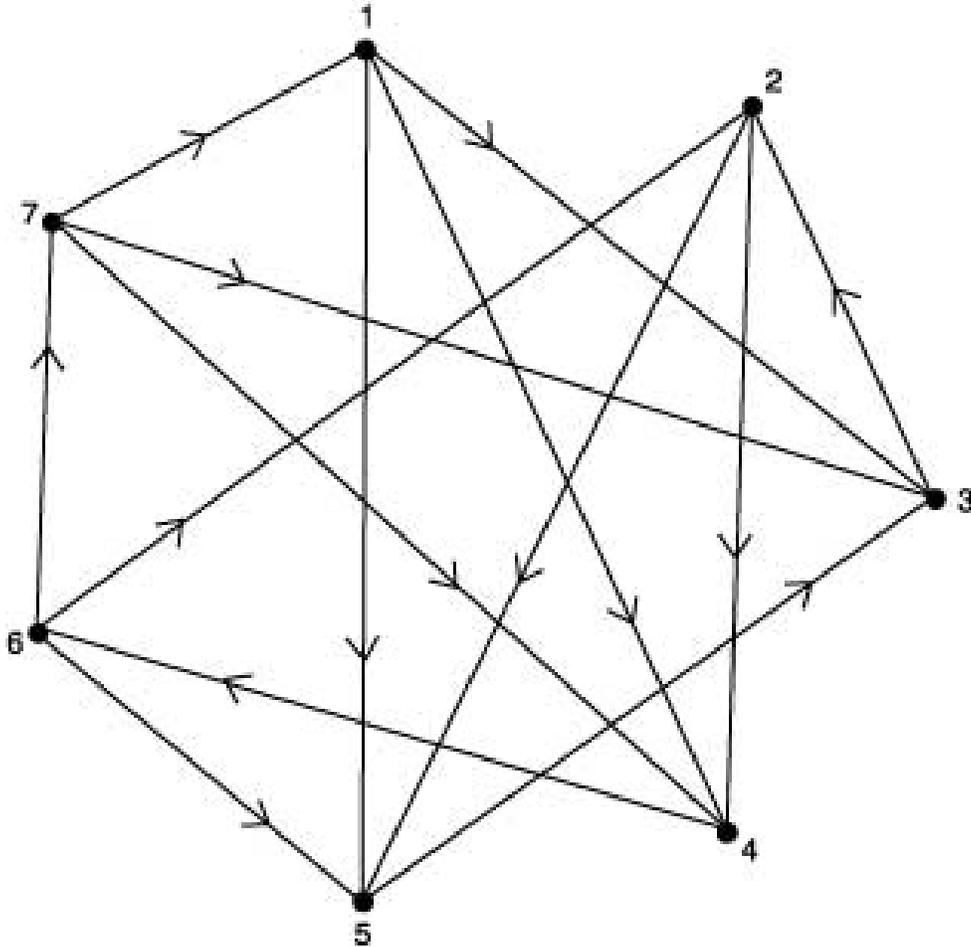
Annotations:

The response organizes little information to construct a solution and justifies results using evidence from the problem by completing a chart with the win/loss records of all seven players, one error occurring with the record of player 5. The response, which neglects to show the remaining opponents for all seven players, chooses a player but misidentifies that player's remaining opponents, and justifies the choice with an incorrect statement. The response earns one point.

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

- 13** The diagram below shows some of the results of a seven-person contest. When the contest is over, each person will have played one match against every other person. (Not all matches have been played yet.)

An arrow pointing from one player to another means that the first player defeated the second player in their match. For example, player 1 defeated player 3 in their match.



Each player has 2 matches left to play.

Which player has the most difficult matches left to play?

- Organize your results in a way that helps you look for patterns and helps explain your answer. You may want to draw a diagram or make a table.
- Explain the reasons for your answer using information from the diagram.

Mathematics

13 (continued)

Show your work to support your answers using words, numbers, and/or diagrams.

--

4 has the most difficult matches left to play. Because every one
--

keeps defeating him.

--

--

--

--

--

--

--

<p style="text-align: center;">Which player has the most difficult remaining matches left to play?_____</p>
--

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

Annotations:

The response shows very little or no organization of information and gives an imperfect justification of the results. The response earns zero points.

