

# Summative Assessment #2 for Data, Detectives and Decisions



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## Summative Assessment #2 Instructions

### Collecting Clues and Analyzing Answers

#### Constructed Response

**Duration:** 40-50 minutes

**Standard(s) Assessed:** MA.E.1.2.1.5.1, MA.E.1.2.1.5.3, MA.E.1.2.1.5.5, MA.E.1.2.1.5.6, MA.E.1.2.2.5.1, MA.E.1.2.2.5.2, MA.E.3.2.1.5.3, MA.E.3.2.1.5.4, and LA.B.2.2.1.5.1

**Description of Assessment Activity:** Given sets of collected data, students organize information in tables, construct bar and circle graphs and a stem-and-leaf plot to analyze the data. Students are asked to explain why data is often organized in different ways (bar, circle, and line graphs), and when the range, average, median, and mode can be used to interpret collected data. After organizing, displaying, and analyzing data, students draw conclusions that can be supported by the data in order to solve a problem.

**Teacher Directions:** Prepare separate copies of “Collecting Clues and Analyzing Answers” (summative version) which determine students’ comprehension of the process of data collection and analysis. Reassure the students that their pre-tests will provide information for you about needed instruction; only the post-assessment is to be scored for a grade.

**Student Directions:** “Mike, one of the data detectives in our unit, has been investigating the homework habits of his classmates in order to answer the following question: ‘How can I make a good grade on my homework?’ The results of his investigation are presented on the following pages. Read each section carefully and follow the directions given. Help Mike analyze the clues he has collected so he can find an answer to his perplexing problem!”

**Scoring Method & Criteria:** See the Scoring Criteria for Summative Assessment #2 and Short-Answer Question Rubric to evaluate student’s work.

### Short-Answer Question Rubric

	<b>2 points</b>	<b>1 point</b>	<b>0 points</b>
<b>Answering the Problem</b>	You arrive at a correct answer.	You arrive at a partially correct answer.	Your answer was incorrect or not given at all.
<b>Showing your Work</b>	You follow the given directions in order to show how you solved the problem. All of the steps show correct math procedures.	You follow the given directions in an attempt to show how the problem was solved. Some of the steps show correct math procedures.	You make no attempt to show how you solved the problem, or all of the steps shown are incorrect.
<b>Explaining &amp; Interpreting your Answer</b>	You explain how you solved the problem so <u>correctly</u> and completely that someone else can find the answer. When asked, you make true statements about the given answer.	You explain how you solved the problem, but leave out steps that are needed to guide the reader to the correct answer. When asked, you attempt to make true statements about the given answer.	Your explanations and interpretations are not correct, understood, or given.
<b>Remember:</b>	A score of <b>two</b> means your work shows a complete understanding of the math concepts and procedures used in the problem.	A score of <b>one</b> means your work shows a partial understanding of the math concepts and procedures used in the task.	A score of <b>zero</b> means your work was completely incorrect, not understood, or that you gave no response at all.

## Scoring Criteria for Summative Assessment #2

(A sample score sheet has been attached at the end. Feel free to copy and use this sheet as needed as each student's pre-test is scored.)

### Table 1

- This section should not be formally scored because "creating a table" is not taught or assessed in this unit. However, this table does allow a student to organize his/her thoughts and should be used as a tool.

### Part A

- (2 points): Students choose a reasonable title (Ex: "Homework Hints & Helps")
- (2 points): Students choose an appropriate scale
- (2 points): Students label each of the four bars of the graph
- (4 points): Students accurately graph the four bars of data

### Part B

- (10 points): Five points per correct, comparative statement. For example, students may note that most of the students advised Mike to check his work or ask for help. Also, very few students advised Mike to copy someone else's work. (Statements may vary but should be supported by the data presented.)

### Table 2

- (8 points): Two points for each correct completion of the "Number of Students" for the type of "Advice Given." (9-15-3-3)
- (8 points): One point for each correct "Fraction of the Class" (9/30, 15/30, 3/30, 3/30) and its simplified version (3/10, 5/10, 1/10, 1/10). (The simplified version should be used in the circle graph in order to make the graphing easier by using a common fraction such as tenths.)

### Part C

- (2 points): Students choose a reasonable title
- (2 points): Students label the four parts of the circle graph
- (6 points): Students accurately graph the data on the circle graph (Different colors or designs may be used to distinguish each part of the circle graph, if desired.)

### Part D

- (10 points): Five points per correct, comparative statement. For example, students may note that 8/10 or 4/5 of the class gave Mike sound advice on how to improve his homework grade. Also, 2/10 or 1/5 of the class advised Mike to either copy someone else's work or follow directions in order to improve his grade. (Statements may vary but should be supported by the data presented.)

### Analyzing Answers (#1-4)

- (16 points): Use the green-highlighted area of the Short-Answer Question Rubric (SAQR) titled "Explaining & Interpreting Your Answer" to assess whether the explanation is *correct and complete*. Weigh each point value from "Explaining & Interpreting Your Answer" X 2 (for example, do students explain their answer so correctly and completely that someone else can follow their reasoning? If so, they would score 2 points on the SAQR Rubric that would then be multiplied by 2 for a final score of 4 points). (Possible *correct and complete* answers for: (1) The line graph was not appropriate because it is used to display data that *changes over time*. The information collected from the survey reflects a only a single instance. (2) The bar graph helps to show comparison between things. (3) The circle graph does a better job of showing percentages and relationships of the part to the whole. (4) The only measure that could be used to interpret the data was the mode-all of the others require the use of numerical data to calculate.)

### Analyzing Answers (#5)

- (8 points): Students select the conclusion "I should ask for help when I need it, and check my work" since it can be supported by the data.

### Analyzing Answers (#6)

- (20 points): Students correctly draw all four stem-and-leaf plots. Also, they accurately determine the range, mean, median, and mode of each type of answer given.

Measures of Central Tendency → Type of student response ↓	Range	Mean	Median	Mode
Check Your Work	5	11.57	12	12
Ask For Help	5	12	12	12 and 14
Copy Someone Else	3	2.57	3	3
Follow Directions	4	4.71	5	6

## Total Points Awarded for Summative Assessment #2

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<b>Collecting Clues and Analyzing Answers</b>		
Student:		
<b>Table 1</b>	<b>No points available</b>	Comments:
<b>Part A</b>	___ out of 10 points	Comments:
<b>Part B</b>	___ out of 10 points	Comments:
<b>Table 2</b>	___ out of 8 points ___ out of 8 points	Comments:
<b>Part C</b>	___ out of 10 points	Comments:
<b>Part D</b>	___ out of 10 points	Comments:
<b>AA: #1-4</b>	AA#1 ___ out of 4 points AA#2 ___ out of 4 points AA#3 ___ out of 4 points AA#4 ___ out of 4 points	Comments:
<b>AA:# 5</b>	___ out of 8 points	Comments:
<b>AA:#6</b>	___ out of 20 points	
<b>TOTAL POINTS:</b>	___ out of 100 points	Comments:

## Summative Assessment #2

### "Collecting Clues and Analyzing Answers"

#### COLLECTING CLUES

Mike surveyed the homework habits of his classmates. He wants to answer the following question: "How can I make a good grade on my homework?" The results of his investigation are shown below.

### Homework Hints and Helps

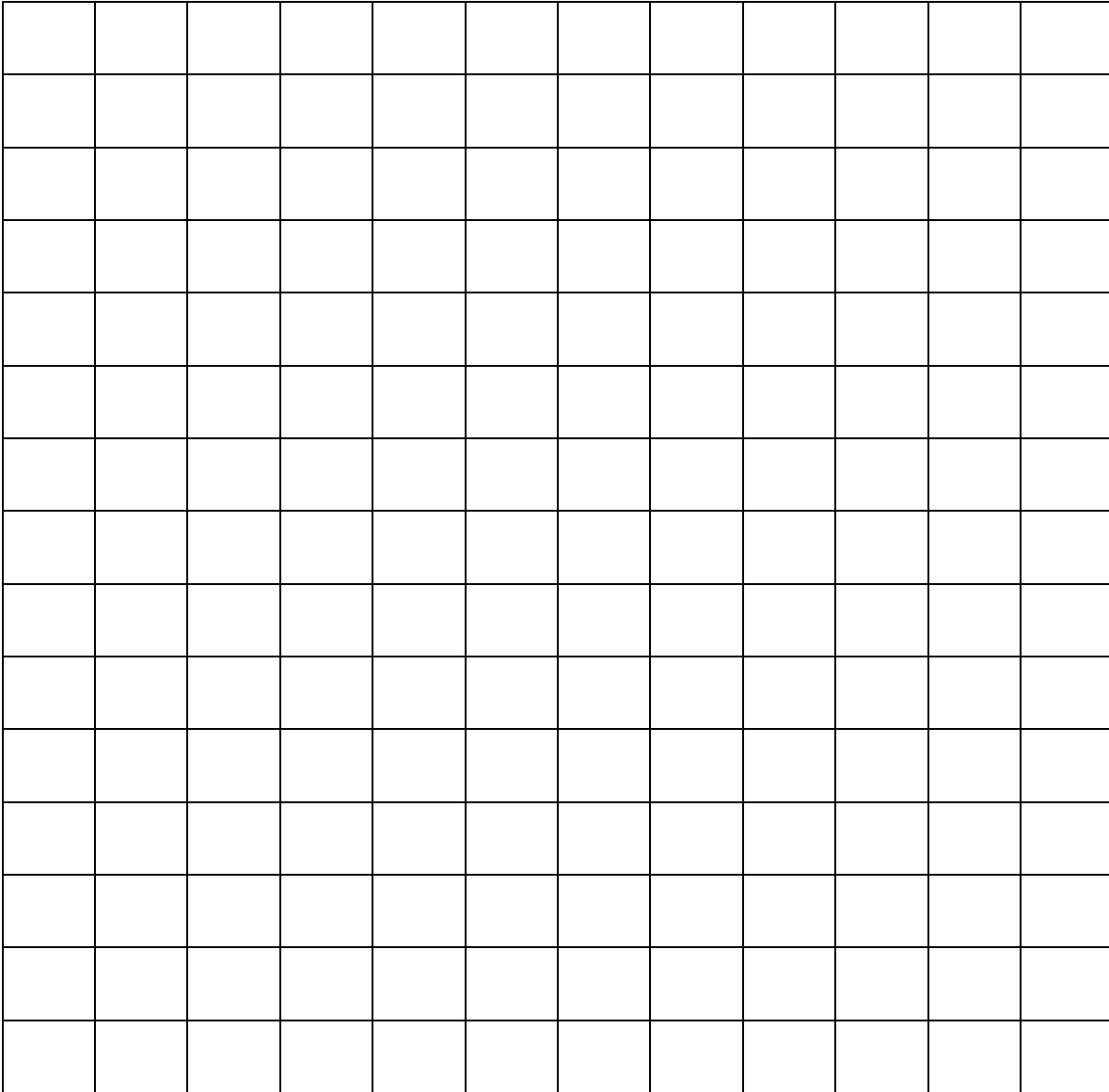
Student	Advice
Carol	Ask for help
Cynthia	Ask for help
Elizabeth	Copy someone else
Fred	Ask for help
Jack	Check your work
Jean	Follow directions
John	Ask for help
Julie	Check your work
Mackenzie	Ask for help
Mark	Ask for help
Michelle	Ask for help
Peggy	Follow directions
Sally	Ask for help
Spencer	Check your work
Susan	Copy someone else

Student	Advice
Ben	Ask for help
Dan	Check your work
Eddie	Ask for help
Ethan	Check your work
George	Ask for help
Kathy	Check your work
Ken	Ask for help
Marie	Check your work
Mary	Ask for help
Pat	Follow directions
Paul	Copy someone else
Sam	Ask for help
Tim	Ask for help
Tom	Check your work
Zane	Check your work

**Table 1**

Organize the results of the survey in a table.

**Part A:** Complete a bar graph that shows the number of students who gave each type of advice.



**Part B:** On the lines below, write two statements that compare the students' advice to Mike.

1)

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2)

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Mike then graphed the survey results of his 30 classmates another way.

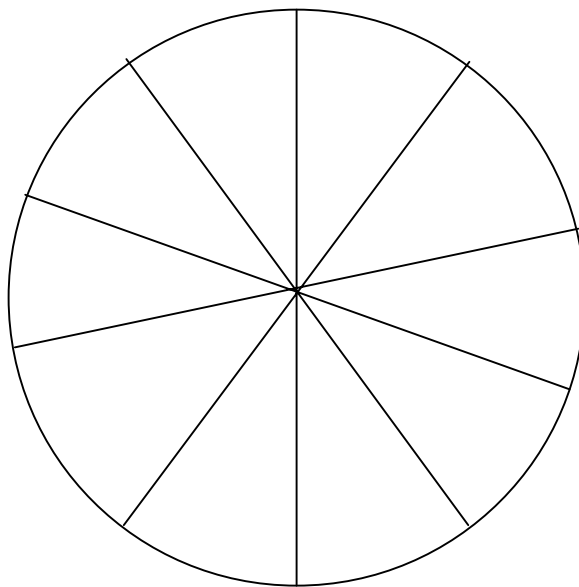
**Table 2**

Use the data from Table 1 to complete Table 2.

**Homework Hints and Helps**

Advice Given	Number of Students	Fraction of the Class
Check your work		
Ask for help		
Copy someone else		
Follow directions		

**Part C:** Represent the data displayed in the table above on a circle graph.



**Part D:** Use the graph to write two statements that compare the advice given by Mike's classmates.

1)

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2)

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**ANALYZING ANSWERS**

1. The survey results were not displayed on a **line graph**. Why not?

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2. What is the purpose of organizing the survey results in a **bar graph**?

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3. Why did Mike choose to organize the results again in a **circle graph**?

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4. Mike planned to use the **range** and measures of central tendency (**mean**, **median**, and **mode**) to help him interpret the survey results. Which one(s) could he use with this data, and why?

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5. After looking at the data, Mike wrote a list of conclusions for his problem: “How can I make a good grade on my homework?”

Which of the following conclusions is supported by the data?

- I need to study hard and pay attention during class.
- I should ask for help when I need it, and check my work.
- Copying someone else’s paper is “okay” if I miss an assignment.
- Following directions really isn’t that important.

6. In order to have a more representative sample, Mike decided to gather data from six (6) other classrooms as well. He planned to use the **range** and measures of central tendency (**mean, median, and mode**) to help him interpret the survey results.

**Part A**

Review the combined survey results from class A, B, C, D, E, F and G (shown below).

**Homework Hints and Helps (Survey #2)**

	<b>Class A (Survey #1)</b>	<b>Class B</b>	<b>Class C</b>	<b>Class D</b>	<b>Class E</b>	<b>Class F</b>	<b>Class G</b>
<b>Check Your Work</b>	9	10	14	13	12	12	11
<b>Ask For Help</b>	12	14	10	9	12	13	14
<b>Copy Someone Else</b>	3	4	3	2	2	1	3
<b>Follow Directions</b>	6	6	2	6	5	4	4

**Part B**

First, design a stem-and-leaf plot for each type of answer given and draw it under its title.

Second, determine the **range, mean, median, and mode** for each stem-and-leaf plot.

Finally, write these measures in *each* of the tables provided below.

**Check Your Work**

**Copy Someone Else**

Range= \_\_\_\_\_  
 Mean= \_\_\_\_\_ (Round to the nearest hundredth)  
 Median= \_\_\_\_\_  
 Mode= \_\_\_\_\_

Range= \_\_\_\_\_  
 Mean= \_\_\_\_\_ (Round to the nearest hundredth)  
 Median= \_\_\_\_\_  
 Mode= \_\_\_\_\_

**Ask For Help**

**Follow Directions**

Range= \_\_\_\_\_  
 Mean= \_\_\_\_\_ (Round to the nearest hundredth)  
 Median= \_\_\_\_\_  
 Mode= \_\_\_\_\_

Range= \_\_\_\_\_  
 Mean= \_\_\_\_\_ (Round to the nearest hundredth)  
 Median= \_\_\_\_\_  
 Mode= \_\_\_\_\_