

Summative Assessment for Challenging Math Poetically

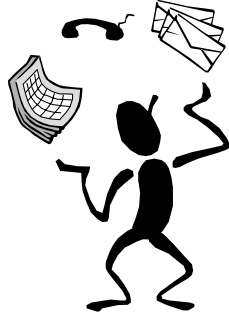


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Summative Assessment Instructions

Challenging Math Poetically

Summative

Constructed Response & Performance /Day 8

Duration:

One 90-minute period

Standard (s) Assessed:

MA.A.1.4.1, MA.D.1.4.1, MA.E.1.4.1, MA.E. 1.4.2, CT.B.1.4.1, CT.B.1.4.14

Description of Assessment Activity: The summative assessment is administered in two parts. Students complete Part 1: Mathematical Problem-Solving focusing on problem solving techniques set in a real-world context as well as interpreting data displayed in charts/graphs. Students solve problems in the Think, Solve, Explain format designed similar to those given on the FCAT. Additional problems are included to check students' proficiency in reading and interpreting charts/graphs and calculating measures of central tendency. Students are required to generalize, describe, and analyze relationships. Students complete Part 2: Performance Analysis demonstrating computer skills and the ability to use a spreadsheet program. Students are required to produce a spreadsheet and generate three graphs selecting the one that best represents the data collected.

Materials list:

Computers with Internet access

Printer with paper or disk for each student

Stapler

Teacher Directions:

Part 1 – Mathematical Problem-Solving Skills:

1. Go over Steps 1 – 7 of the Student Checklist for Final Evaluation (see page 13 in this file) again with students describing the criteria to be used in assessing their mathematical problem-solving skills.
2. Distribute Part 1: Mathematical Problem-Solving with answer sheet*, one per student. Instruct students to print their names and the date in the spaces provided on the Part 1: Mathematical Problem-Solving summative assessments and the answer sheets. Encourage students to work in pencil since mathematical computations are subject to areas of error and correction along the way.
*Students may use their own paper in lieu of copying the answer sheets.
3. Go over directions with students to ensure understanding of their responsibilities.
4. Inform students of the importance of working quietly and conscientiously since the assessment is designed to check their levels of achievement in mathematical problem-solving skills.
5. Allow 45-50 minutes for students to complete Part 1: Mathematical Problem-Solving.
6. Call "time" or "stop" and collect Part 1: Mathematical Problem-Solving. It is up to the discretion of the teacher to allow additional time as deemed necessary.

Part 2 - Performance:

7. Instruct students to report to computers. If these are assigned, guide students accordingly.
8. Go over Steps 8 – 10 of the Student Checklist for Final Evaluation (see page 13 in this file) again with students describing the criteria to be used in assessing their computer skills.

9. Distribute copies of the Data Collection Work Sheets from the lesson Statistically Lyrical, one per student.
10. Distribute copies of Part 2: Performance Analysis, one per student. Alternate distribution using Form A and Form B. (Note: This is to assist in the collection and distribution of printed documents as students complete the required Internet searches and computer projects.) Instruct students to print their names and the date in the space provided on the Part 2: Performance Analysis.
11. Go over directions with students to ensure understanding of the requirements. Inform students of the procedures for submitting generated documents – send to the printer or save to a disk.
For Printing: Collect computer generated documents from the Internet searches as they are printed and distribute accordingly. (Option: Students may bookmark the site found via the Internet search in lieu of printing the page.) The generated spreadsheets and graphs can be collected at the end of the assessment since students are required to type their name on the spreadsheets/graphs. It is up to the discretion of the teacher whether to distribute the spreadsheets/graphs for students to attach to their assessments or for the teacher to complete this task at the end of class.
For Saving: Distribute a disk to each student. Tell students to print their names on the front of their disks. Instruct students to save spreadsheets/graphs to the disk.
12. Remind students that this is an individual assessment and to work independently at the computers very quietly. Inform students to remain in their seats at all times during this part of the assessment. This part is designed to analyze performance at the computer and check usage of a spreadsheet program.
13. Allow 30 minutes for students to complete Part 2: Performance Analysis.
14. Monitor students' progress and answer questions carefully as they arise. Be cautious not to provide too much information since this is a final evaluation of their progress to determine levels of achievement.
15. Collect Part 2: Performance Analysis (assessments and/or disks). It is the decision of the teacher to allow additional time if deemed necessary.

At the completion of the mini-unit:

1. Return the summative assessments to the students at the completion of the project once the **final evaluation** has been completed, scored, and recorded for grading purposes.
2. Engage students in discussion reflecting on their accomplishments throughout the project while reviewing the summative assessment.

Student Directions:

Part 1:

1. Listen CAREFULLY as I go over Steps 1 – 7 of the Student Checklist for Final Evaluation (see page 13 of this file) again describing the criteria to be used in assessing your mathematical problem-solving skills.
2. Print your name and date in the space provided on the Part 1: Mathematical Problem-Solving and the answer sheet. Work in pencil since mathematical computations are subject to areas of error and correction along the way.
3. Listen CAREFULLY as I go over the directions to ensure understanding of responsibilities.
4. This is an individual assessment. Therefore, you must work independently at the computers.
5. You have approximately 45 minutes to complete Part 1: Mathematical Problem-Solving.
6. When “time” or “stop” is called, put your pencils down and wait for instructions.

Part 2:

7. Report to (assigned) computers.
8. Listen CAREFULLY as I go over Steps 8 – 10 of the Student Checklist for Final Evaluation (see page 13 of this file) again describing the criteria to be used in assessing their computer skills.
9. You will use the data from the Data Collection Work Sheets (see Associated File of Lesson Plan: Statistically Lyrical) as a result of The Math Poet activity to complete this part of the assessment.
10. Print your name and date in the space provided on the Part 2: Performance Analysis.
11. Listen CAREFULLY as I go over the directions to ensure understanding of the requirements.

For Printing: Put computer generated documents from the Internet searches as they are printed and distributed with your assessment. (Option: You may bookmark the site found via the Internet search in lieu of printing the page.) The generated spreadsheets and graphs will be collected at the end of the assessment. Remember to type your name on the spreadsheets/graphs.

For Saving: Distribute a disk to each student. Tell students to print their names on the front of their disks. Instruct students to save spreadsheets/graphs to the disk.

12. Work quietly and independently since this assessment is designed to analyze your performance at the computer and check your ability to use a spreadsheet program. Remain in your seats at all times during this part of the assessment. Do not leave your seats to retrieve documents from the printer. The teacher will complete this task.
13. You have approximately 30 minutes to complete Part 2: Performance Analysis.
14. Ask questions if you have difficulty reading or understanding the directions. Refrain from asking questions on “how” to perform a task.
15. When “time” or “stop” is called, remain at the computers for teacher directions.

Scoring Method and Criteria:

Use the Student Checklist for Final Evaluation throughout the mini-unit for students to monitor their comfort zone with each element as they progress through the activity. Students seek additional assistance with those areas in which they feel are deficient prior to the final evaluation. Revisit the requirements on the day of the summative assessment. Use the Answer Key for Part 1: Mathematical Problem-Solving to check students’ proficiency in solving problems set in real-world context. Use the Answer Key for generated spreadsheets/graphs to check Part 2: Performance Analysis. Use the Teacher Evaluation Rubric to rate students’ levels of achievement in mathematical problem- solving and computer skills. The assessment documents are found in the Mini-Unit Plan Assessment Associated File.

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Summative Assessment

Part 1: Mathematical Problem-Solving

Sunshine State Standard: MA.D.1.4.1, MA.E.1.4.1, MA.E.1.4.2

Goal 3 Standard 1: Information Managers

Goal 3 Standard 3: Numeric Problem Solvers

Name _____

Date _____

Directions: Write answers to all problems on the answer sheet in the spaces provided. Where indicated, show all necessary work in Think, Solve, Explain format.

I. Generalize the following relationships by translating from words into algebraic notation using variables and symbols. Use the variable n .

1. A deposit of \$500 to your checking account brings the balance to \$1235.
2. Double the value and you make \$1000.
3. The total cost of 4 items of equal value is \$5.56.
4. \$1500 plus 6.5% of the total ticket sales is \$1552, which represents the total fee being charged to a local community theater.
5. A discount of $\frac{1}{3}$ off the original price is \$15.

II. Solve the following problems using the Think, Solve, Explain format. Remember to write in the space provided on the answer sheet. Be sure to refer back to the criteria to be used for assessment purposes.

6. Lights out! Lights out! Electricity is gone!
That's \$125 just to get it back on!
Then there is the electrician's fee,
\$80 per hour is as reasonable as can be!
2 hours is the time for the repair,
Plus cost of the materials adds to my despair.
With materials totaling forty dollars and a dime,
Find the total in the quickest of time.
7. Once there was a boy named Kent
Who one day discovered he had spent
\$150 each on two new suits
\$80 on a pair of boots
When he started to pay, the cashier did say
"By the way, there's a 20% off sale today."
To Kent, this offered quite a thrill
So how much did he actually pay for the bill?
(Note: Excluding tax, of course!)

8. I baked 15 pies for my Christmas party
 Four to be taken home by Marty
 Hardy spoke for half as many
 And said that was plenty
 Carly, after everyone was through,
 Took Marty's number less two
 If five were eaten right away
 How many were left for the next day?

III. Interpret the following chart by answering the questions located at the right and display the data by producing the required graph. Remember to record all answers on the answer sheet!

9.

Daily High & Low Temperatures (°F)		
	High	Low
January	29	10
February	34	13
March	40	17
April	50	26
May	60	34
June	70	41
July	80	47
August	78	45
September	68	37
October	56	29
November	40	19
December	31	12

a. What is the range of the daily high and low temperatures?

b. What is the ratio of the highest daily temperature to the lowest?

c. Identify and calculate the measures of central tendency for the daily high temperatures.

d. Which is the most meaningful measure to describe the data?

10. Make a line graph on the grid provided (see Answer Sheet #10) that displays the daily high and low temperatures using the information displayed in the table from Problem #9. Be sure to include:

- A title for the graph
- Labels for the axes
- Appropriate and consistent scales
- Accurately graphed data

11. Which geographical location would be best represented by the data displayed in Problem #9 – Florida or Idaho? Explain how you determined your answer.

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Summative Assessment PART 1: Mathematical Problem-Solving

ANSWER SHEET

Directions: Write answers to all problems in the spaces provided. Where indicated, show all necessary work in Think, Solve, Explain format.

1. _____

2. _____

3. _____

4. _____

5. _____

6. **Think:** *What is the problem asking you to find?*

Solve:

Explain:

7. **Think:** *What is the problem asking you to find?*

Solve:

Explain:

8.

Think: *What is the problem asking you to find?*

Solve:

Explain:

9.

a. Highs: _____ Lows: _____

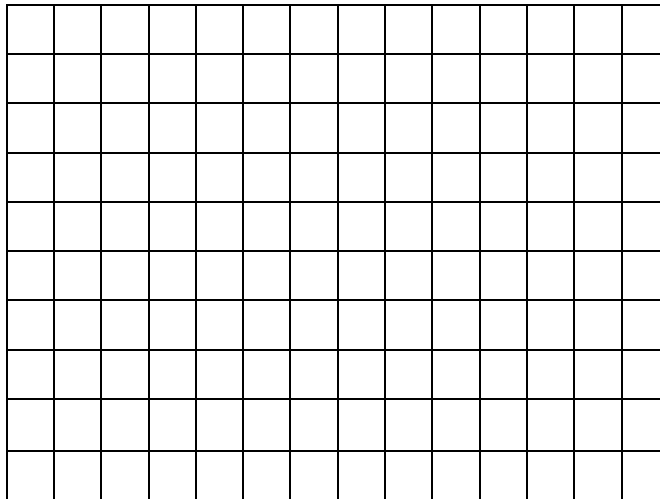
b. _____

c. _____

d. _____

Work Space:

10.



11. *Choice:* _____

Explanation:

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Summative Assessment

Part 2: Performance Analysis (Form A)

Sunshine State Standard: CT.B.1.4.1, CT.B.1.4.14

Goal 3 Standard 7: Systems Managers

Name _____

Date _____

Directions: Respond to the four sections as described below. As soon as you send a request for a document to be printed, raise your hand. The teacher, or assistant, will collect and hand you the document that is to be attached to this page. All other printed documents must have your name typed at the top for collection and distribution purposes. Remain in your seat at all times!

I. Use an appropriate search engine to search for, find, and print a copy of (or bookmark) an example of bar graphs including text that defines or explains why bar graphs are used.

Follow teacher directions to either attach the printed document to this assessment or bookmark on your computer.

II. Using an appropriate spreadsheet program, produce a spreadsheet from the information displayed on the Data Collection Work Sheets from from the lesson Statistically Lyrical demonstrating:

- a. Organization: Logical structure
- b. Content: Subject matter thoroughly and easily understood without the need for extraneous elements

NOTE: Be sure to type your name on the page. Follow teacher directions as to whether these will be collected from the printer and later attached to your assessment or saved to a disk.

III. Generate three graphs – line, bar, and circle, using the spreadsheet produced in Problem #1 and embed the graphs in the “workbook” page containing the spreadsheet.

NOTE: Remember to type your name on the page. Follow teacher directions as to whether these will be collected from the printer and later attached to your assessment or saved to a disk.

IV. Select the type of graph – line, bar, or circle, which best represents the data and explain your choice.

Selection:

Explanation:

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Summative Assessment

Part 2: Performance Analysis (Form B)

Sunshine State Standard: CT.B.1.4.1, CT.B.1.4.14

Goal 3 Standard 7: Systems Managers

Name _____

Date _____

Directions: Respond to the four sections as described below. As soon as you send a request for a document to be printed, raise your hand. The teacher, or assistant, will collect and hand you the document that is to be attached to this page. All other printed documents must have your name typed at the top for collection and distribution purposes. Remain in your seat at all times!

I. Using an appropriate spreadsheet program, produce a spreadsheet from the information displayed on the Data Collection Work Sheet from the lesson Statistically Lyrical demonstrating:

- a. Organization: Logical structure
- b. Content: Subject matter thoroughly and easily understood without the need for extraneous elements

NOTE: Be sure to type your name on the page. Follow teacher directions as to whether these will be collected from the printer and later attached to your assessment or saved to a disk.

II. Generate three graphs – line, bar, and circle, using the spreadsheet produced in Problem #1 and embed the graphs in the “workbook” page containing the spreadsheet.

NOTE: Remember to type your name on the page. Follow teacher directions as to whether these will be collected from the printer and later attached to your assessment or saved to a disk.

III. Select the type of graph – line, bar, or circle, which best represents the data and explain your choice.

Selection:

Explanation:

IV. Use an appropriate search engine to search for, find, and print a copy of (or bookmark) an example of bar graphs including text that defines or explains why bar graphs are used.

Follow teacher directions to either attach the printed document to this assessment or bookmark on your computer.

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Summative Assessment – PART 1: Mathematical Problem-Solving

ANSWER KEY

Directions: Write answers to all problems in the spaces provided. Where indicated, show all necessary work in Think, Solve, Explain format.

1. $500 + x = 1235$
2. $2x = 1000$ or $x + x = 1000$
3. $4x = 5.56$ or $x + x + x + x = 5.56$
4. $1500 + .065x = 1552$
5. $1/3 x = 15$

6. **Think:** *What is the problem asking you to find?*
The total cost to resume electricity

Solve: $125 + 80(2) + 40.10 = x$
 $125 + 160 + 40.10 = 325.10$

Total cost to resume electricity: $\$325.10$

Explain: Electrician's fee must be calculated for the number of hours worked since he is paid per hour. (80×2). Total cost then requires finding the sum – fee to turn electricity on, electrician's fee, and materials cost.

7. **Think:** *What is the problem asking you to find?*
The amount of the bill for the clothing

Solve: $2(150) + 80 - .20[2(150) + 80] = x$
 $380 - 76 = x$
 $304 = x$

Cost after discount, excluding tax: $\$304$

Explain: Calculate the cost of two suits @\$150 each. Add this amount to the cost of the boots then multiply by .20, which represents the 20% discount. Discount of \$76 is then subtracted from the original cost.

8.

Think: *What is the problem asking you to find?*

Determine the number of pies left over after the party

Solve: $15 - (4 + 2 + 2 + 5) = x$
 $15 - 13 = x$
 $2 = x$

There were 2 pies left over after the party.

Explain: Determine the number of pies taken or eaten. Marty = 4, Hardy = 2, Carly = 2, eaten = 5, which totals 13. Subtract this number from the number baked.

9.

a. Highs: 29 – 80 Lows: 10 - 47

b. 80:10 or 80/10 or 80 to 10

c. Mean: 53
Median: 53
Mode: 40

d. In this case, either the mean or median

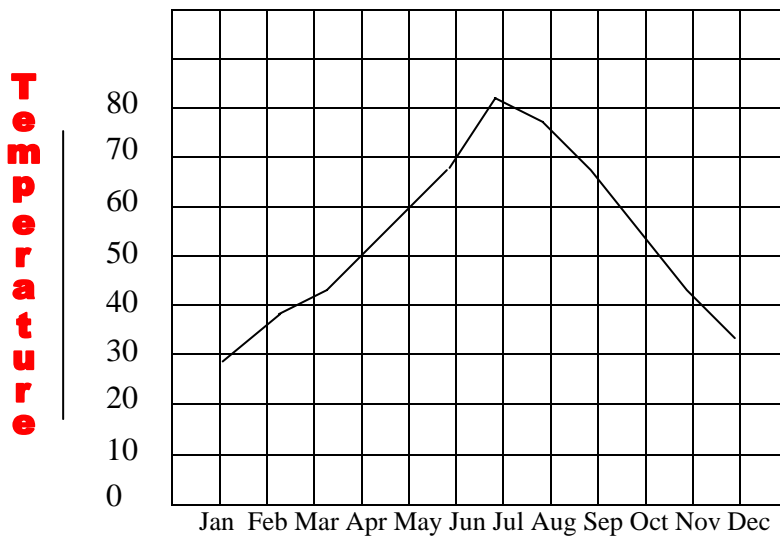
Work Space:

Mean: Sum of highs

Median: Arrange in order from lowest to highest and average the two middle temperatures

10.

Daily High and Low Temperatures



Month

11. Choice: Idaho

Explanation: Florida's temperatures range from upper teens to upper 100's.

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Summative Assessment – Part 2: Performance Analysis

Sunshine State Standard: CT.B.1.4.1, CT.B.1.4.14

Goal 3 Standard 7: Systems Managers

ANSWER KEY (Form A or B)

Section I Form A or Section IV Form B:

Using an appropriate search engine, students generate an example of bar graphs including text that defines or explains why bar graphs are used.

These sites are found through Google using keywords *bar graphs* and clicking “Bar Graphs.”

1) <http://pittsford.monroe.edu/jefferson/calfieri/graphs/BarGraph.html> (Two-page document)

2) <http://www.mste.uiuc.edu/courses/ci330ms/youtsey/barinfo.html> (One-page document)

All other sections:

Spreadsheets within these sections and graphs generated are dependent on the data collected as a result of The Math Poet activity. Check students’ spreadsheets for the following:

1. Organization: Logical structure

- a) A title for the graph
- b) Labels for the axes
- c) Appropriate and consistent scales
- d) Accurately graphed data

2. Content: Subject matter thoroughly and easily understood without any extraneous elements



3. Three graphs (line, bar, and circle) are generated from the produced spreadsheet. The three graphs are embedded in the “workbook” page containing the spreadsheet. A copy is printed and attached to the assessment or saved to a disk.

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Student Checklist for Final Evaluation

Name: _____ Date: _____

The summative assessment is based on the following criteria. Indicate with a check (✓) your comfort zone with each element as you progress through the activity. Seek additional assistance with those areas that you feel are deficient prior to the final evaluation.

Criteria		
Mathematical Problem-Solving Skills		
The student demonstrates the ability to:		
1. Generalize: Translate a problem correctly		
2. Describe: Provide clear and precise explanations		
3. Analyze: Yield the correct evaluative solution		
4. Analyze: Check the solution by inspection		
5. Interpret data displayed in charts, tables, and plots		
6. Calculate measures of central tendency for complex sets of data		
7. Determine the most meaningful measure to describe data collected		
Computer Skills		
The student demonstrates the ability to:		
8. Use efficient search methods to locate information		
Spreadsheets/Graphs		
The student demonstrates the ability to:		
9. Use spreadsheet programs to create graphs		
10. Select the graph which best represents data needed for analysis		

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Teacher Evaluation Rubric

Check each appropriate box and calculate the average rating. Use this as feedback for establishing level of student achievement.

Student's Name _____ Average Rating _____

CRITERIA	Excellent 4	Good 3	Fair 2	Poor 1
Generalizes MA.A.1.4.1	Demonstrates complete knowledge of the translation process <input type="checkbox"/>	Demonstrates sufficient knowledge of the translation process <input type="checkbox"/>	Demonstrates some knowledge of the translation process <input type="checkbox"/>	Demonstrates little knowledge of the translation process <input type="checkbox"/>
Describes MA.A.1.4.1	Offers clear & precise explanations for all problems <input type="checkbox"/>	Offers clear & precise explanations for most problems <input type="checkbox"/>	Offers understandable explanations for most problems <input type="checkbox"/>	Offers few explanations for some of the problems <input type="checkbox"/>
Analyzes MA.A.1.4.1 Goal 3 Standard #3	Yields correct evaluative solutions with no errors <input type="checkbox"/>	Yields most of the correct evaluative solutions with minimal errors <input type="checkbox"/>	Yields some correct evaluative solutions with minimal errors <input type="checkbox"/>	Yields a few correct evaluative solutions with a lot of errors <input type="checkbox"/>
Reasoning/ Understanding Goal 3 Standard #3	Demonstrates clarity/reasonableness in all explanations <input type="checkbox"/>	Demonstrates clarity/reasonableness in most explanations <input type="checkbox"/>	Demonstrates clarity/reasonableness in half of the explanations <input type="checkbox"/>	Demonstrates clarity/reasonableness in only a few explanations <input type="checkbox"/>
Interpretations MA.E.1.4.1	Interprets all data accurately that is displayed in tables & graphs <input type="checkbox"/>	Interprets most data accurately that is displayed in tables & graphs <input type="checkbox"/>	Interprets some data accurately that is displayed in tables & graphs <input type="checkbox"/>	Interprets none of the data accurately that is displayed in tables & graphs <input type="checkbox"/>
Calculations MA.E.1.4.2	Calculates all measures of central tendency accurately <input type="checkbox"/>	Calculates two measures of central tendency accurately <input type="checkbox"/>	Calculates one measure of central tendency accurately <input type="checkbox"/>	Calculates none of the measures of central tendency accurately <input type="checkbox"/>
Conclusion MA.E.1.4.2	Determines the most meaningful measure to describe the data <input type="checkbox"/>	Determines a meaningful measure to describe the data <input type="checkbox"/>	Determines a measure to describe the data <input type="checkbox"/>	Does not determine a meaningful measure to describe the data <input type="checkbox"/>
Search Methods CT.B.1.4.1	Uses efficient search methods to locate information without assistance <input type="checkbox"/>	Uses efficient search methods to locate information with minimal assistance <input type="checkbox"/>	Uses efficient search methods to locate information with assistance most of the time <input type="checkbox"/>	Cannot use efficient search methods to locate information without maximum assistance <input type="checkbox"/>
Spreadsheet/Graphs CT.B.1.4.14	Uses spreadsheet program & generates three graphs <input type="checkbox"/>	Uses spreadsheet program & generates two graphs <input type="checkbox"/>	Uses spreadsheet program & generates one graph <input type="checkbox"/>	Uses spreadsheet program & generates zero graphs <input type="checkbox"/>
Spreadsheet/Graphs CT.B.1.4.14	Selects the graph of best fit with explanation <input type="checkbox"/>	Selects the graph of best fit without explanation <input type="checkbox"/>	Selects a graph, not the best fit, with explanation <input type="checkbox"/>	Selects a graph, not the best, fit without explanation <input type="checkbox"/>