

Writing Assignment for LAB 8

WRITING ASSIGNMENT: Cooling a Cup of Coffee

RECALL OUR PROBLEM: In this assignment, you will analyze a data set that has been obtained from monitoring the temperature of a cooling cup of coffee. The temperature of Mr. Santowski's coffee has been measured as a function of the time since the coffee was made on a day when the room temperature was 26.8°C . **YOUR MISSION: Determine an equation that can be used to model the cooling of a cup of coffee.**

In this assignment, you are required to:

- (1) Prepare a scatterplot graph of the data using technology.
- (2) Provide an algebraic analysis of the data in order to generate an exponential equation that models the data set and fits the context of the data. Show/explain the analysis that leads to your conclusion. How can you confirm/verify that your equation is "correct"?
- (3) Rewrite your equation using the natural base e . Show the algebraic analysis that leads to your answer.
- (4) Graph the equation you just developed and show the function as well as the data set. Explain how well the equation does/doesn't fit the data. Offer explanations as to why/why not.
- (5) Use your model to predict the temperature of the coffee at a time of 30 minutes, 60 minutes, 180 minutes.
- (6) At what time will the temperature of the coffee be 50°C ? 26°C ? Show an algebraic solution.
- (7) How well does the function fit the data?
- (8) At what rate ($^{\circ}\text{C}$ per minute) is the coffee cooling? Show/explain the analysis that leads to your conclusion.
- (9) EXTENSION OPTION: Analysis Method #2 - Semilog Graphing → Graph the data on semi-log paper. Determine the equation of the line of best fit. Rearrange this equation to an exponential equation in base 10 and then base e . Show work.

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YOUR WRITING ASSIGNMENT ⇒ Prepare and discuss your analysis of the data as you move toward developing a model for the data set and then subsequently, analyze the model and the process of creating the model.

For your WRITING ASSIGNMENT (or Math ESSAY if you wish), you are required to prepare an ESSAY that encompasses the following three components:

PART 1 ⇒ You will write an Intro Paragraph, wherein you introduce the problem, discuss some of the parameters/constraints on the problem and outline a brief strategy for how you plan on addressing the problem. MAX LENGTH of this part: 1 - 2 paragraphs

PART 2 ⇒ Through the use of explanations as well as showing some mathematical calculations, outline your solution to the problem: i.e. how did you come up with the model and how do you know it will "work" within the parameters given. This section **MUST** include:

(a) Showing your math & algebra

(b) text/explanations wherein you describe/explain what was done and how it was done

MAX LENGTH of this part: 3 - 4 paragraphs

PART 3 ⇒ You will write a concluding paragraph, wherein you summarize your solution to the problem and acknowledge any problems/issues/constraints/extensions of the method you used to solve the problem. MAX LENGTH of this part: 1 - 2 paragraphs

By the end of this current BLOCK ⇒ Monday (F Block) and by Tuesday (A Block) you will share/email/print your solution and turn it in for grading.

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Here is a sample of the scoring "checklist" that I will use to score/grade/judge your finished product:

Criteria	Not yet meeting "standard"	Approaching "standard"	Meeting "standard"
<p><i><u>PART 1: Introduction:</u></i></p> <p>Includes reference to context and to problem</p> <p>Gives me an idea of what math and discussion I can expect in your work</p> <p>Introduces the problem solving method that will be used to address the problem</p> <p>Well written, clear, concise</p>			
<p><i><u>PART 2: The Method & the Math</u></i></p> <p>The method(s) and strategies used are addressed and are clear</p> <p>There are textual explanations in your work as you explain the what and the why of what you are doing</p> <p>When and where appropriate, you show the critical steps and results of your mathematical processes</p> <p>When and where appropriate, your results & data are presented on a properly presented data table</p> <p>When and where appropriate, graphs are included to illustrate/show your workings and results</p>			
<p><i><u>PART 3: Conclusion:</u></i></p> <p>Relates the final answer(s) back to the problem</p> <p>Discusses the merits of the problem solving strategy that was used</p> <p>Addresses one or two extensions of the problem/strategy/context/concepts</p> <p>Well written, clear, concise</p>			