

## Extra Credit Assignment for Math 2

This Extra Credit assignment is worth one written homework assignment. In other words, successful completion of the Extra Credit assignment means we will change your lowest homework score to a 100%. For more details about what constitutes “successful completion,” please see the attached grading rubric.

**Assignment:** Find an application of calculus in a real-world setting. This “real-world setting” can be another class, or a textbook from another subject, or a newspaper article. It should not be a problem or example from our textbook, or any other calculus or math textbook.

You should write up this application in a 2- to 3-page paper. The paper should:

- Explain the real-world setting;
- Explain what aspects of calculus are involved, and where; and
- Solve the real-world problem using calculus.

Alternatively, you can choose to do a research project on the history of calculus. Perhaps you’d like to know where the notation we use originated. Perhaps you’d like to look at the connection between Newton’s discovery of calculus and some of his other inventions. Perhaps you want to explore some of the criticisms that people voiced about calculus in the 17th century, like the statement that  $dx$  is “the ghost of a departed quantity.” Or maybe you have another idea . . .

In this case as well, you should write up your findings in an (approximately) 3-page paper. The paper should:

- Present your historical question in context: Why is/was this topic interesting or important?
- Explain one or two historical response(s) to the question;
- Connect the historical response(s) to our modern understanding of calculus.

Whichever topic you choose, you must get your instructor’s approval on your topic by FRIDAY, FEBRUARY 25. Your instructor can also help you find resources in the library that will help you with your project. Then, you may turn in your extra credit assignment at any time before the final exam – March 12, 2011.

	4 (Excellent)	3 (Acceptable)	2 (Marginal)	1 (Unacceptable)
<b>Introduction</b> 10%	Presents the context for the real-world problem or historical dilemma so that a non-specialist will understand the question being asked, and why it's important	Either the question itself or its importance is not presented clearly enough for a non-specialist to fully understand	Neither the problem nor its importance is explained clearly	No context or introduction provided
<b>Main Content</b> 30%	Correctly identifies all the concepts from calculus that occur in the real-world problem, OR Explains the historical approach(es) to the question so that a non-specialist will understand	Fails to identify (or identifies incorrectly) one or two instances where calculus concepts occur in the real-world problem, OR The explanation either lacks details or is difficult to follow.	Fails to identify (or identifies incorrectly) multiple instances where calculus concepts occur in the real-world problem, OR The explanation both lacks details and is difficult to follow.	The connections between calculus and the real-life problem are almost all missing or incorrect, OR The historical approach(es) to the question are barely mentioned.
<b>Conclusion</b> 30%	Correctly applies techniques from calculus to resolve the real-world problem, OR Clearly explains the relationship between the historical and modern approaches	Makes several minor mistakes in applying calculus to the problem, OR Demonstrates understanding of the modern approach but doesn't connect it to the historical approach	Makes some major mistakes in applying calculus to the problem, OR Demonstrates a faulty understanding of the modern approach to the material.	The attempt to solve the problem using calculus is almost completely wrong, or absent, OR Demonstrates no comprehension of the modern approach to the question.
<b>Writing</b> 30%	<ul style="list-style-type: none"> <li>Moves comfortably between equations and English</li> <li>Uses an appropriate amount of both equations and English</li> <li>Explanations are clear enough that someone who hasn't taken calculus in 10 years will understand them</li> <li>Writing is concise</li> <li>Exciting, engaging language</li> </ul>	<ul style="list-style-type: none"> <li>A fellow student would understand explanations</li> <li>Transitions between equations and English are obvious, but not jarring</li> <li>Too much English, not enough equations</li> <li>Moderately engaging</li> </ul>	<ul style="list-style-type: none"> <li>Professor would understand explanations</li> <li>Transitions detract from understanding</li> <li>Too many equations, not enough English</li> <li>Boring to read</li> </ul>	<ul style="list-style-type: none"> <li>Incomprehensible</li> <li>Equations either not contextualized or nonexistent</li> <li>Painful to read</li> </ul>