The Calculus Wars Assignment

Honors Calculus 1, Fall 2011

The class will be partitioned into four groups of two students each. **You** can talk with each other (through the D2L site, say) and **choose which group** you wish to work with. You should choose a group based on mutual interest in the topic of your presentation. Each group will give a written report and a presentation on the chosen topic. The written report may include websites but *must* include at least two written works (books or journal articles) and should be at least 2000 words. The presentation should be given in PowerPoint, may include videos to illustrate your topic (but keep videos brief—no more than 2 minutes), should involve each member of the group, and should be about 15 minutes long. When giving your presentation, actually *present* your material, do not simply read from your group's written report. The written reports are due December 7 and the presentations will be given December 9. A group grade will be given with each member of the group getting the same grade, so work together and do your part!

Possible Topics

The following topics would be appropriate and closely related to the *Calculus Wars* book: Biography of Newton (concentrate on math), biography of Leibniz (concentrate on math), Newton's work of 1665–66, Newton's ideas of fluxions and fluents, Leibniz papers of 1684 and 1686, Newton's *Opticks* (1704), Newton's *Principia*, Calculus before Newton (Kepler, Archimedes, Cavalieri, Wallis), early ideas of "quadrature," and Leibniz's work in mechanics and the vortex theory. If you would like to explore calculus itself more deeply, then that would be appropriate (such as a proof and history of the Chain Rule; sequences, series, and infinity; improper integrals and their applications; the definition and properties of the real numbers; the Continuum Hypothesis and different levels of infinity, limits and derivatives in the complex setting). An application which uses calculus is also a possibility (rate equations in physical chemistry; dynamics problems related to physics or engineering [and the use of vectors]; population dynamics models; fitness models and applications to population genetics). If you would like to do another topic, then let me know so that I can approve it. Each group will cover a different topic.

Possible Sources

1. *The History of the Calculus and its Conceptual Development*, Carl Boyer, New York: Dover, 1959. Sherrod Library has this one (call number QA303.B69.1959).

2. *The Mathematical Papers of Isaac Newton*, edited by D. T. Whiteside with the assistance in publication of M. A. Hoskin. Cambridge: Cambridge University Press, 1967-1981. Sherrod Library has this one (call number QA35.N5647).

3. *Opticks: A Treatise of the Reflections, Refractions, Inflections & Colours of Light*, based on the 4th ed., London, 1730, Isaac Newton, 1642–1727, New York: Dover Publications, 1952. Sherrod Library has this one (call number QC353.N57.1952). This is the book in which Newton first published his calculus results. You can also find a copy on GoogleBooks.

4. *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and his System of the World*, translated into English by Andrew Motte in 1729 and supplied with an historical and explanatory appendix, by Florian Cajore, Berkeley: University of California Press, 1960. Sherrod Library has this one (call number 531.N484).

5. *A Source Book in Mathematics* by David Eugene Smith, New York: McGraw Hill, 1929. Sherrod Library has this one (call number 510.Sm54). This includes excerpts for Leibniz's 1684 and 1686 papers.

6. Any History of Math book.