Name: _____ Date: _____ Pd: _____

**AP Calculus**
*Post Exam Project Ideas*

## 1 How do I love Calculus? Let me count the ways.

Write four original poems about math. You must choose four *different* types of poems. Refer to Shadow Poetry: A Poet's Writing Resource[1] for examples of different types of poems. Include a title for each poem. Your poems must be typed and labeled according to the type of poem used.

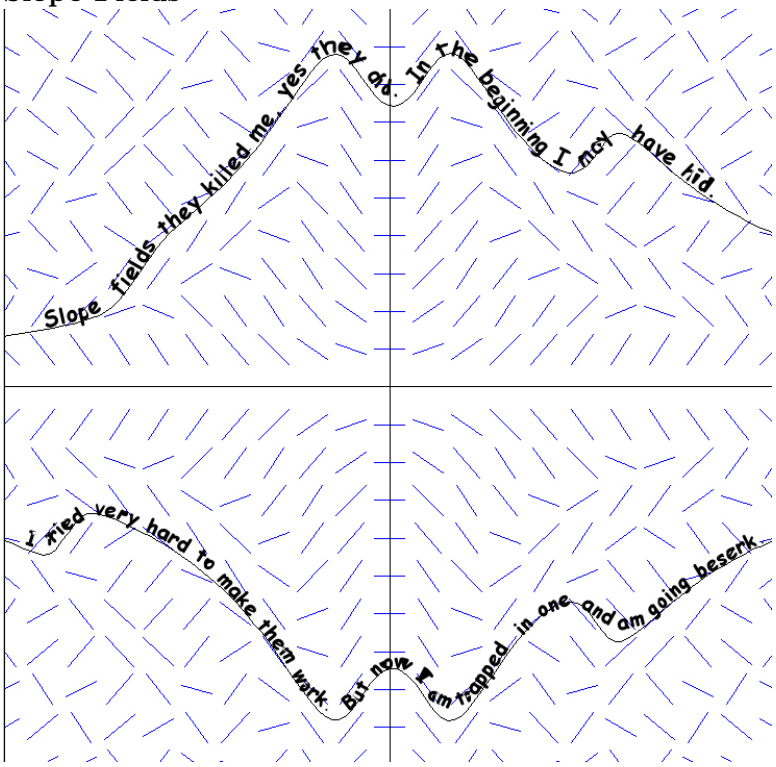
Display your poems on a box of tissues. Decorate the box of tissues, covering all of the lateral faces and the top with your design. Incorporate a different poem on each of the exposed faces of the tissue box (excluding the bottom). Be creative with your design!

Sample Poem: **If I Had a Dollar**

If I had a dollar for every time
Calc made me stay up past nine
I'd feed the needy;
No need to be greedy
When that kinda money's on the line.

~*Jonathan Miller, class of 2006*

Sample Poem: (Epitaph) **Slope Fields**




~*Jonathan Najmi, class of 2006*

[1] http://www.shadowpoetry.com/resources/wip/types.html

## 2 The Tissue Box Problem

Design a tissue box based on a chosen theme. The content displayed on each face of your tissue box (excluding the bottom) as well as your overall design must relate to your theme. Start by finding or creating a calculus problem (related to your theme) that requires the use of integration.

- On one face, define your problem. Find a way to incorporate your name into the problem.
- On another face, explain why this problem is personally interesting to you.
- On another face, solve the problem.
- On the final lateral face, illustrate your problem.

Be creative! You will be graded on the complexity and creativity of your problem, the thoughtfulness of your personal reflection, the accuracy of your solution, and the visual appeal of your overall design as it relates to your theme.

Sample Problem: The rate of change of the number of ducks, $N(t)$, living in a large pond in Mrs. Krummels back yard is directly proportional to $450 - N(t)$, where $t$ is the time in years. When $t = 0$, the duck population is 120. Mrs. Krummel, whose favorite childhood fairy tale is *The Ugly Duckling*, spends many evenings by the pond, feeding bread crumbs to the ducks. As a result, when $t = 2$, the population has increased to 180. If her duck feeding habits continue, what will the duck population be when $t = 3$?

## 3 Book Report

Read a math-related book and write a report on it. Follow the guidelines for Writing a Book Report[2] given by Purdue Unviersity's Online Writing Lab. For a list of recommended fiction (with links to synopses and reviews), visit Mathematical Fiction: Alex Recommends[3]. Or, see below for some nonfiction recommendations.

1. Zero: The Biography of a Dangerous Idea, Charles Seife
2. The Language of Mathematics: Making the Invisible Visible, Keith Devlin
3. Math and the Mona Lisa, Bulent Atalay
4. The Universe and the Teacup, K.C. Cole
5. $e$: The Story of a Number, Eli Maor
6. Pi in the Sky: Counting, Thinking, and Being, John D. Barrow
7. Uncle Petros and Goldbach's Conjecture, Apostolos Doxiadis

[2] https://owl.english.purdue.edu/owl/resource/703/1/
[3] http://kasmana.people.cofc.edu/MATHFICT/readinglists.php

## 4 Calculus Video (maximum of four participants per project)

Create a calculus music video/skit to help students remember an important concept or theme from calculus. An explanation of the concept(s) MUST be part of the script. Simply mentioning the concept(s) is NOT sufficient.

Write a script for the video that includes the calculus concept(s) and appropriate supporting material to help students learn and remember the concept(s).

## 5 Storytelling

Write a short story or a children's story about calculus. Your story should be well-structured[4] and contain the main elements of fiction[5] (plot, conflict, character, setting, point of view, symbols, theme).

A young adult story should be at least 2,000 words in length. A children's story should be at least 1,000 words in length and must include illustrations. Illustrations should be done in ink.

## 6 Cross Section Project

Make a physical model of a solid with a known cross section according to the following guidelines:

1. The base function(s) can be any non-linear function except a parabola, square root, or absolute value. (If using two functions, the second can be any of your choice.)
2. The cross section can be any shape except a square.
3. The materials can be no thicker than 0.25". Your model must be at least 6 inches long and have at least 24 laminations.

Your written work must include:

1. A description of the functions used.
2. An explanation of the what the cross section looks like.
3. The computed volume for each slice using a Riemann Sum.
4. The total volume of the slices in your model.
5. The theoretical volume as defined by a definite integral. If your problem is not integrable, you may use the Numerical Integration feature of your calculator.

Visit Citrus Hill High's Volume Project[6] to see pictures of sample projects.

## 7 All other creative ideas involving Calculus are welcome! Discuss with me for approval.

[4] http://blog.karenwoodward.org/2012/12/short-story-structures-several-ways-of.html
[5] http://www.unm.edu/~hookster/Elements%20of%20Fiction.pdf
[6] http://avenamath.pbworks.com/w/page/24221089/Volume%20Project