

AP Calculus AB Lesson Plan

Overview:	Students will do calculations on paper and check them using Wolfram Alpha for correctness as well as learning more about that particular derivative of the function or the integration of the function.
Objective:	Given a list of problems to either differentiate or integrate, students will calculate them by hand. They will then check, in another color, their answers with Wolfram Alpha as well as writing down the plot of the derivative or anti-derivative. This activity will be completed with a 90% accuracy rate.
Learning Environment	In a classroom setting to begin, and then move to a computer lab for the Wolfram Alpha portion. It will also be quiet unless the students have any questions.
Types of Students	12 th grade advanced placement students
Standards:	<p>C.2 Differential Calculus Students find derivatives of algebraic, trigonometric, logarithmic, and exponential functions. They find derivatives of sums, products, and quotients, and composite and inverse functions. They find derivatives of higher order, and use logarithmic differentiation and the Mean Value Theorem.</p> <p>C.4 Integral Calculus Students define integrals using Riemann Sums, use the Fundamental Theorem of Calculus to find integrals, and use basic properties of integrals. They integrate by substitution and find approximate integrals.</p>
Materials:	<ul style="list-style-type: none"> • Pen/pencil • Handout of problems • Computer with internet access
Procedure:	<ol style="list-style-type: none"> 1. Hand out assignment with 10 problems for students to differentiate/integrate. 2. Give students time to complete the assignment. (40 min) 3. Check that each student completed the assignment by hand. 4. Have students change colored ink and check their integration and differentiation with Wolfram Alpha. 5. Explain how they are to write down the plots from the website of the new function on their paper next to their work and corrected work. 6. Have students turn in handout. 7. Go over the benefits of double checking work with a trust-worthy site as well as how practice is important when it comes to learning. 8. Answer any questions about integration, differentiation, and Wolfram Alpha. 9. If time is left in class, allow them to ask more questions on Wolfram Alpha to feel more comfortable using it as a math, science, technology, or engineering resource.
Application	Students will be able to learn how to use Wolfram Alpha in the real world by learning how easy it is to use. They will be able to use the application in an

	educational setting and then being able to use it in another educational setting or a non-educational setting.
Evaluation:	This activity is worth 30 points – 1 point per correct integration/differentiation by hand, 1 point for correcting problem, 1 point for the plots per question (maximum of 3 points per question). Points will only be given for correctness.