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Project Report

**Integration by Substitution Report**

This website is specially designed for helping college students who are having difficulty grasping the concept of integration by substitution. This is also known as U-Substitution, and is the counterpart to the chain rule of differentiation. Integration by Substitution is a crucial part of mathematics, as it is capable of transforming a once difficult integral into an easier one by using substitution. By implementing an active learning system, the user will gain a greater understanding and comprehension of integration by substitution.

This website integrates the fundamentals of website design that we encountered throughout the semester in CNA 436. It uses a combination of JavaScript, HTML, and CSS to implement a fluent website that effectively walks users through the basics of integration by substitution. This was accomplished by establishing a center segment for which the primary portion of the website would be displayed. I created a header in Adobe PhotoShop by using the rectangle tool and filling it with a pattern. I was not satisfied with the color combination, so I grayscaled the entire header and placed text and a graphic on layers on top of it. After my header was complete, my next step was creating what would become my navigation bar. Instead of placing the navigation vertically on one of the margins, I set it up horizontally so the buttons would be placed right below my header. The buttons were also created in PhotoShop, using the rectangle tool and a simple gradient fill. The fact that you can hide and show layers on PhotoShop made it extremely easy to create the buttons that would be needed for JavaScript effects. The JavaScript hover effect was used in the examples page; when a user hovers over an image hyperlink it goes from opaque to vibrant colors. A similar effect was used on the navigation buttons, but functions had to be created with JavaScript.

After my navigation bar was complete, I created a flawless background that would seem to flow directly behind everything else. This was only made possible by the ability of CSS to create opaque panes from a standard color. Thus, every page that loads appears to load in the “transparent pane” below the navigation bar.

Overall, the project contains 34,705 characters, and 1,058 lines of code. This is including one external JavaScript file, eight HTML files, and one external Cascading Style Sheet. I believe the website does a thorough job of explaining concepts, as well as being aesthetically pleasing to the user. The only error I really think needs improvement is the compatibility between web browsers. It works flawlessly in Mozilla Firefox and Google Chrome, however Internet Explorer does not interpret everything on the Cascading Style Sheets, and causes the website to not be centered, nor the navigation bar to be spaced properly. This lack of compatibility would be detrimental in a real world application; and there would potentially be a fair amount of users who would refuse to use the website if it does not display properly. Also, the Test page could implement more strict options which only allow the user one try per question, keeps a running total of their score, and displays that total after they complete the test. On the Theorems page, for a more in-depth explanation, the Indefinite Integral Formulas could be clicked to show a pop up that explains what each formula does. The overall organization of the websites internal folders could be reevaluated. There are a lot of floating images in the root folder, while some reside in their own folders.