Report on Exam 2

Ron Buckmire
Alan Knoerr

Point Distribution (N=40)

Range	92+	90+	86+	83+	80+	76+	73+	70+	66+	63+	60+	60-
Grade	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
Frequency	16	1	3	3	0	1	2	3	3	4	0	5

Comments

Overall

#1 Techniques of Integration Part (a) should be just read off of your Blue Notes, the antiderivative of $\frac{1}{1+t^2}$ is $\arctan(t)$. Part (b) must be either parts or substitution. The integrand is a product and does not contain a composite function, which implies integration by parts. So part (c) is integration by substitution. It is also a product of two functions, one of which is clearly a composite function ($\cos(t^3)$).

#2 Integration By Subsitution and Integration By Parts In order to evaluate I and J accurately using the information given about the mystery function $g(x)$ it is imperative to use impeccable notation and precision in evaluation. Clearly part (a) is integration by parts since the integrand CONTAINS a derivative. And thus part (b) will likely be integration by substitution, which is confirmed when you see the integrand contains $g(x^2)$. In part (b) yu must be careful to change the limits of integration also, so the final integrand is $J = \frac{1}{2}\int_1^4 g(u)du = 5/2$.

#3 Inverse Functions. It is easier to prove something is FALSE than to prove it is TRUE in all cases. So, to show that the pair of functions are NOT inverses of each other you just have to show that they do NOT obey any one of the four statements given. To prove that a Pair IS an collection of inverse functions you have to show that the Pair obeys any ONE of the definitions. Only Pair A, $f(x) = 1/x^2$ and $g(x) = 1/\sqrt{x}$ satisfies any and all of the definitions. Just from looking at their graphs one could see that Pairs B and C fail to be inverses.

#4 Average Value of a Function This was a trigonometric integral where the integrand $\sin^3(x)$ can be written as $\sin(x) \cdot \sin^2(x) = \sin(x)(1 - \cos^2(x))$. However, once you try to evaluate the integral using integration by substitution if u look at the limits of the integral, $x = -\pi/2$ and $x = \pi/2$, you see that when $u = \cos(x)$ that in the new variable the limits of integration become $u = 0$ and $u = 0$, so the value of the integral must be zero. Another way to show that $\bar{f} = 0$ was to graph the integrand and indicate that the function had equal positive areas and negative areas on the interval of interest.

#5 Table Of Derivatives and Anti-Derivatives. Almost everyone got this problem completely correct. It is reminiscent of Lab 5, where putting sequences of similar anti-derivatives and derivatives allows you to see the pattern inherent in using Chain Rule to differentiate and Integration by Substitution to integrate, functions of functions.