Test 1 - Calculus II (Fall 2015)

INSTRUCTIONS: Complete each of the following problems in your Bluebook. Each problem is worth a maximum of 12 points. Points will be awarded for both completeness and clarity of solutions. Partial credit will be awarded for partial solutions. Please recall that **cell phones and graphing calculators are not allowed on this exam.**

1. Compute $\int \dfrac{1}{x^2\sqrt{x^2-16}}dx$.

2. Compute $\int_0^{\pi/4} 32\sin^2 x \cos^2 x\,dx$.

3. Compute $\int \dfrac{2x^2-9x}{(x+2)(x^2+9)}dx$.

4. Compute $\int x\sec^2 x\,dx$.

5. Compute $\displaystyle\int_0^\infty e^{-5x+1}dx$, or show that the integral diverges.

BONUS. (+8 points) Show that

$$\int \sec^3 x\,dx = \tfrac{1}{2}(\sec x \tan x + \ln|\sec x + \tan x|).$$

(*Hint:* Use integration by parts. Also use the Pythagorean identity.)