Math 150 Quiz 10 Fall 2010

Name: _____

NO CALCULATORS
5 points each

1. $\int x \sin x^2 \, dx$

Let $u = x^2$. Then $du = 2xdx$. Hence we get

$\frac{1}{2}\int \sin u \, du = -\frac{1}{2}\cos u + C = -\frac{1}{2}\cos x^2 + C.$

2. $\int \frac{e^{2x}}{e^{2x}+3} \, dx$

Let $u = e^{2x} + 3$. Then $du = 2e^{2x}dx$.

Hence we get $\frac{1}{2}\int \frac{du}{u} = \frac{1}{2}\ln|u| + C$

$= \frac{1}{2}\ln(e^{2x}+3) + C.$

3. $\int \frac{x}{x^2+1} \, dx$

Let $u = x^2 + 1$. Then $du = 2xdx$. Hence we get

$\frac{1}{2}\int \frac{du}{u} = \frac{1}{2}\ln|u| + C = \frac{1}{2}\ln(x^2+1) + C.$

4. $\int \sin^2 x + \cos^2 x \, dx$

Since, $\sin^2 x + \cos^2 x = 1$, we get

$\int 1 \, dx = x + C.$

5. $\int \frac{x^2}{x^2+1} \, dx$ Hint: Use division first.

First $\frac{x^2}{x^2+1} = 1 - \frac{1}{x^2+1}$. (Check this.)

Hence we get $\int 1 - \frac{1}{x^2+1} \, dx = x - \arctan x + C.$