MATH 166 Section C
June 3, 2013

Quiz #2

Name: Key

Please work alone, and keep your eyes on your own paper. Show *all* work to receive full credit (including the appropriate antiderivatives).

1. Evaluate the following integrals using u-substitution. Show your choice of u explicitly.

   (a) (6 points)

$$\int e^{\sin x} \cos x \, dx$$

Let $u = \sin x$
$du = \cos x \, dx$

For (a) and (b)
+1 chose u (any choice gets credit)
+1 correct du for chosen u
+1 for correctly substituting u, du
+2 for boxed antiderivative
+1 for $+C$

$$= \int e^u \, du = e^u + C$$

$$= \boxed{e^{\sin x} + C}$$

   (b) (6 points)

$$\int \frac{\sin(\ln 4x^2)}{x} \, dx$$

Let $u = \ln(4x^2)$
$du = \frac{1}{4x^2} \cdot 8x \cdot dx$
$du = 2x^{-1} dx$
$\frac{1}{2} du = x^{-1} dx$

$$= \frac{1}{2} \int \sin u \, du$$

$$= -\frac{1}{2} \cos u + C$$

$$= \boxed{-\frac{1}{2} \cos(\ln 4x^2) + C}$$

(c) (8 points)

$$\int_0^2 x(x^2+1)^5\,dx$$

Let $u = x^2+1$
$du = 2x\,dx$
$\frac{1}{2}du = x\,dx$
$0 \le x \le 2$ means
$1 \le u \le 5$

$= \frac{1}{2}\int_1^5 u^5\,du$

$= \frac{1}{2}\left[\frac{1}{6}u^6\right]_1^5$

$= \boxed{\frac{1}{12}\left[5^6 - 1^6\right]}$ OK if like this

$= \frac{1}{12}\left[15625-1\right] = \frac{15624}{12} = \frac{7812}{6} = \frac{3906}{3} = 1302$

Rubric

+1 for choosing u
+1 for correct du for that u
+1 for substituting u, du correctly
+1 for changing limits appropriately ($1 \le u \le 5$ in my case)
+2 for correct antiderivative
+2 for boxed final answer (or any equivalent answer)