MATH 2414.001 Fall 2002 Skills Assessment 4.1 Name: Key

Instructions: You may not use notes, books or calculators on this assessment. You should refer to the Table of Integrals provided. Please do not write on the table. Please turn it in when done. No partial credit. **Don't simplify answers**. Successful completion of this assessment is 8 of 10 completely correct. Good Luck!

1. Find $\int \cos(2x)\sin(3x)dx$ = $\frac{1}{4-9}\left[2\sin(3x)\sin(2x) + 3\cos(2x)\cos(3x)\right] + C$

   # 12 $a=3, b=2$

2. Find $\int (3t^3 - 2t + 1)\cdot e^t dt$ = $(3t^3-2t+1)e^t - (9t^2-2)e^t + 18te^t - 18e^t + C$

   # 14, $a=1$

3. Find $\int \sin^3(x)dx$ $-\frac{1}{3}\sin^2 x\cos x + \frac{2}{3}\int \sin x\,dx = -\frac{1}{3}\sin^2\cos x - \frac{2}{3}\cos x + C$

   # 17, $n=3$

4. Find $\int \cos^{-1}(x)dx$ = $\frac{1}{2}\ln\left|\frac{(\sin x)+1}{(\sin x)-1}\right| + C$

5. Find $\int \frac{1}{2x^2+8}dx$ = $\frac{1}{2}\int \frac{1}{x^2+2^2}dx = \frac{1}{4}\arctan\left(\frac{x}{2}\right) + C$

6. Find $\int \frac{1}{z^2-2z}dz$ = $\int \frac{1}{(z-0)(z-2)}dz = -\frac{1}{2}\left(\ln|z| - \ln|z-2|\right) + 2$

   # 26 $a=0, b=2$

7. Find $\int_0^4 \frac{1}{\sqrt{16-x^2}}dx$ = $\left(\frac{1}{4}\arctan\frac{x}{4}\right)\Big|_{x=0}^{4} = \frac{1}{4}\arctan 1 - \frac{1}{4}\arctan 0 = \frac{1}{4}\cdot\frac{\pi}{4} - 0 = \frac{\pi}{16}$.

   #28, $a=4$ $= \arcsin\frac{x}{4}\Big|_{x=0} = \arcsin 1 - \arcsin 0 = \pi/2 - 0 = \pi/2$

8. Find $r(y)$ if $r'(y) = ye^{-5y}$ $r(y) = -\frac{1}{5}ye^{-5y} - \frac{1}{25}e^{-5y} + C$

   #14, $a=-5$

9. Find $\int (t+2)\ln t\,dt$ = $\int (t\ln t + 2\ln t)dt$

   # 13, $n=1$
   # 4 $= \frac{1}{2}t^2\ln t - \frac{1}{4}t^2 + 2t\ln t - 2t + C$

10. Find $\int \frac{1}{\sin 2x}dx$ $= \frac{1}{2}\int \frac{1}{\sin u}du = \frac{1}{2}\left[\frac{1}{2}\ln\left|\frac{\cos u - 1}{\cos u + 1}\right|\right] + C = \frac{1}{4}\ln\left|\frac{\cos(2x)-1}{\cos(2x)+1}\right| + C$

    Let $u = 2x$

    $\frac{1}{2}du = \frac{1}{2}dx$