Math 1B
Quiz 4
Fri May 9, 2008

What day of the month is your birthday ? ___ ___
What are the last 2 digits of your address ? ___ ___
What are the last 2 digits of your zip code ? ___ ___

THIS IS A NO CALCULATOR QUIZ

[14 POINTS] Evaluate the following integrals.

$\int x \sec^2 x \, dx = x \tan x + \ln|\cos x| + C$

u	dv
x	$+\ \sec^2 x$
1	$-\ \tan x$
0	$-\ln\lvert\cos x\rvert$

$\int_{-2}^{2} x\sqrt{x+2}\, dx$ SEE OTHER KEY ALSO

u	dv
x	$+\ (x+2)^{\frac{1}{2}}$
1	$-\ \frac{2}{3}(x+2)^{\frac{3}{2}}$
0	$\frac{4}{15}(x+2)^{\frac{5}{2}}$

$$\left.\frac{2}{3}x(x+2)^{\frac{3}{2}} - \frac{4}{15}(x+2)^{\frac{5}{2}}\right|_{-2}^{2}$$

$$= \frac{2}{3}(2)4^{\frac{3}{2}} - \frac{4}{15}(4)^{\frac{5}{2}} - 0$$

$$= \frac{4}{3}8 - \frac{4}{15}32$$

$$= \frac{32}{3} - \frac{128}{15}$$

$$= \frac{160-128}{15}$$

$$= \frac{32}{15}$$

$\int \cos 2x \cos 3x \, dx$ SEE OTHER KEY ALSO

u	dv
$\cos 3x$	$+\ \cos 2x$
$-3\sin 3x$	$-\ \frac{1}{2}\sin 2x$
$-9\cos 3x$	$\pm\ -\frac{1}{4}\cos 2x$

$$\int \cos 2x \cos 3x \, dx = \frac{1}{2}\cos 3x \sin 2x - \frac{3}{4}\sin 3x \cos 2x + \frac{9}{4}\int \cos 3x \cos 2x \, dx$$

$$-\frac{5}{4}\int \cos 2x \cos 3x \, dx = \frac{1}{2}\cos 3x \sin 2x - \frac{3}{4}\sin 3x \cos 2x$$

$$\int \cos 2x \cos 3x \, dx = -\frac{2}{5}\cos 3x \sin 2x + \frac{3}{5}\sin 3x \cos 2x + C$$

CONTINUED ON OTHER SIDE

[4 POINTS] Use the reduction formula

$$\int \sin^n x\,dx = -\frac{1}{n}\sin^{n-1} x\cos x + \frac{n-1}{n}\int \sin^{n-2} x\,dx$$

to evaluate $\int \sin^5 x\,dx$. **<u>YOU MUST USE THE REDUCTION FORMULA TO GET CREDIT.</u>**

$$\int \sin^5 x\,dx = \overset{\frac{1}{2}}{-\frac{1}{5}\sin^4 x\cos x} + \overset{\frac{1}{2}}{\frac{4}{5}\int \sin^3 x\,dx}$$

$$= -\frac{1}{5}\sin^4 x\cos x + \frac{4}{5}\left(\overset{\frac{1}{2}}{-\frac{1}{3}\sin^2 x\cos x} + \overset{\frac{1}{2}}{\frac{2}{3}\int \sin x\,dx}\right)$$

$$= -\frac{1}{5}\sin^4 x\cos x \underset{\frac{1}{2}}{-\frac{4}{15}\sin^2 x\cos x} \underset{1}{-\frac{8}{15}\cos x} + \underset{\frac{1}{2}}{C}$$

OR

$$-\frac{1}{15}\cos x\left(3\sin^4 x + 4\sin^2 x + 8\right) + C$$

[2 POINTS] **MULTIPLE CHOICE (NO PARTIAL CREDIT)**

$$\int_1^2 e^{4\ln x}\,dx = \int_1^2 x^4\,dx$$

[A]	$e^2 - 1$	[B]	$\frac{31}{5}$	[C]	$\frac{e^3 - e^2}{2}$	**LETTER OF**
[D]	$\frac{25}{4}$	[E]	$4\sqrt[4]{2} + 1$	[F]	6	**CORRECT ANSWER:** B

[2 BONUS POINTS] Evaluate $\int e^{ax}\cos bx\,dx$.