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.

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

1 1 ½ 1 ½

u	dv
x +	$\sec^2 x$
1 −	$\tan x$
0	$-\ln|\cos x|$

$\int_{-2}^{2} x\sqrt{x+2}\, dx$

SEE OTHER KEY ALSO

$u = x+2$ $\quad x = 2 \to u = 4$, $\quad x = -2 \to u = 0$

$du = dx$

$x = u - 2$

$\int_0^4 (u-2)\sqrt{u}\, du$ 1

$= \int_0^4 (u^{\frac{3}{2}} - 2u^{\frac{1}{2}})\, du$ 1

$= \frac{2}{5}u^{\frac{5}{2}} - \frac{4}{3}u^{\frac{3}{2}} \Big|_0^4$ 1 ½

$= \frac{2}{5}(4)^{\frac{5}{2}} - \frac{4}{3}(4)^{\frac{3}{2}}$ ½

$= \frac{2}{5}(32) - \frac{4}{3}(8)$

$= \frac{64}{5} - \frac{32}{3}$

$= \frac{192-160}{15}$

$= \frac{32}{15}$ 1

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

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

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

$\frac{5}{9}\int \cos 2x \cos 3x \, dx = \frac{1}{3}\cos 2x \sin 3x - \frac{2}{9}\sin 2x \cos 3x$ ½

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

½ ½ ½

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 $\int \sin^5 x\,dx$. **YOU MUST USE THE REDUCTION FORMULA TO GET CREDIT.**

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

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

$\frac{1}{2}$ POINT EACH

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

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

OR

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

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

$\int_1^2 e^{3\ln x}\,dx =$ $\int_1^2 x^3\,dx$

[A] 4 [B] $e^2 - e$ [C] $\frac{15}{4}$

[D] $e^{\frac{3}{2}} - 1$ [E] $\frac{11}{3}$ [F] $4\sqrt[3]{2} - 1$

LETTER OF CORRECT ANSWER: C

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