Fall 2013 **Exam #2** Math 202

Name: _____

Write all of your responses on these exam pages. If you need more space please use the backs. Make sure that you show all of your work, answers without supporting work will receive no credit.

1. (*20 Points*) Do one and only one of the following integrals.

   (a) $\displaystyle\int \frac{1}{x\sqrt{4-x^2}}\,dx$

   (b) $\displaystyle\int \frac{\sqrt{9+x^2}}{x}\,dx$

2. (*20 Points*) Do one and only one of the following integrals.

(a) $\int \sin^2(3x)\cos^3(3x)\,dx$

(b) $\int 7\tan(x)\sec^3(x)\,dx$

3. (*20 Points*) Do one and only one of the following integrals.

(a) $\int 9x\cos(8x)\,dx$

(b) $\int x^2\ln(x)\,dx$

4. (*20 Points*) Do one and only one of the following integrals.

(a) $\displaystyle\int \frac{x-1}{(x+2)(x-3)^2}\,dx$

(b) $\displaystyle\int \frac{x^2+x}{(x+5)(x^2+1)}\,dx$

5. (*20 Points*) Do one and only one of the following integrals. Determine whether the integral is convergent or divergent. If it is convergent, evaluate it.

   (a) $\displaystyle\int_{-\infty}^{\infty} xe^{-x^2}\,dx$

   (b) $\displaystyle\int_{2}^{\infty} e^{-7x}\,dx$

6. (*10 Points*) This set of exercises all deal with the integral,

$$\int_0^4 \sin(x\cos(x))\,dx$$

(a) Use Simpson's Rule with $n = 4$ to approximate the integral. Your answer must be correct to at least 5 decimal places.

(b) Find the error bound for this approximation. Your answer must be correct to at least 5 decimal places. The graphs of the second and fourth derivatives of $f(x) = \sin(x\cos(x))$ respectively are below.