Multiple Choice

1.(5 pts.) Evaluate $\displaystyle\int_1^2 x^3 \ln x \, dx$.

(a) $4\ln 2 - \frac{15}{16}$ (b) $\frac{15}{16}$ (c) $4\ln 2 - \frac{1}{16}$ (d) $4\ln 2$ (e) $2\ln 2 - \frac{15}{16}$

2.(5 pts.) Compute $\displaystyle\int_0^{\pi/2} \sin(7x)\ \sin(3x)\, dx$

(a) 0 (b) $\frac{1}{8}$ (c) $\frac{1}{7}$ (d) $\frac{1}{10}$ (e) $\frac{\pi}{2}$

3.(5 pts.) Evaluate $\displaystyle\int_0^{\pi/2} \cos^3 x \, dx$

(a) 0 (b) 1 (c) $\frac{\pi}{2}$ (d) $\frac{1}{3}$ (e) $\frac{2}{3}$

4.(5 pts.) Evaluate $\displaystyle\int_0^1 \frac{x}{(x^2+1)^{3/2}}\, dx$.

(a) $1-\sqrt{2}$ (b) $\sqrt{2}-1$ (c) $1-\frac{\sqrt{2}}{2}$ (d) π

(e) The integral diverges.

5.(5 pts.) Evaluate $\displaystyle\int_0^1 x\sqrt{1-x^2}\, dx$.

(a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) $\frac{3}{4}$ (e) 0

6.(5 pts.) Compute $\displaystyle\int_0^1 \frac{1}{(x+1)(x+2)}\,dx$.

(a) $\ln\frac{3}{2}$ (b) $\ln 2$ (c) 0 (d) $\ln\frac{4}{3}$

(e) The integral diverges.

7.(5 pts.) Suppose that $\left|f''(x)\right| \le 1$ for $0 \le x \le 2$. If E_M is the error in the Midpoint Rule using n subintervals, then $|E_M|$ is less than

(a) $\frac{2}{3n^2}$ (b) 0 (c) $\frac{1}{3n^2}$ (d) $\frac{1}{12n^2}$ (e) $\frac{1}{24n^2}$

8.(5 pts.) Evaluate the following integral $\displaystyle\int_0^{+\infty} xe^{-x^2}\,dx$.

(a) 1 (b) $\frac{1}{2}$

(c) Diverges and the limit is not ∞ (d) Diverges and the limit is ∞

(e) $2e$

9.(5 pts.) You begin an experiment at 9am with a sample of 1000 bacteria. An hour later your population has doubled. Assuming exponential growth, what is the population at noon?

(a) $1000e^{-3}$ (b) 8000 (c) $1000e^{3}$ (d) 4000 (e) 32000

10.(5 pts.) Compute the length of the curve $y = \frac{x^2}{2} - \frac{\ln x}{4}$, $1 \le x \le 2$.

(a) $6 + \frac{3\ln 2}{4}$ (b) $\frac{\ln 2}{2}$ (c) $2 + \frac{3\ln 2}{4}$ (d) $\frac{3}{2} + \frac{\ln 2}{4}$ (e) $+\infty$

11.(5 pts.) Find the area of the surface of revolution obtained by rotating the curve $y = 2\sqrt{x+1}$, $2 \le x \le 7$ about the x–axis.

(a) $\frac{152\pi}{3}$ (b) $\frac{8\pi}{3}$ (c) $+\infty$ (d) $\frac{3\pi}{2}$ (e) 0

12.(5 pts.) Solve the initial value problem

$$\begin{cases} \dfrac{dy}{dx} = y^2 \\ y(0) = -1 \end{cases}$$

(a) $y = -x^2$ (b) $y = 0$ (c) $y = \dfrac{1}{x+1}$ (d) $y = \dfrac{-1}{x}$ (e) $y = \dfrac{-1}{x+1}$

Partial Credit

You must show your work on the partial credit problems to receive credit!

13.(13 pts.) Find the center of mass (centroid) of the region bounded by the curves $y = \cos x$, $y = 0$, $x = -\dfrac{\pi}{2}$ and $x = \dfrac{\pi}{2}$.
You may use symmetry as part of the justification for your answer.

14.(13 pts.) Solve the initial value problem

$$\begin{cases} xy' + xy + y = e^{-x} \\ y(1) = \dfrac{2}{e} \end{cases}$$

15.(14 pts.) Determine whether or not the improper integral $\displaystyle\int_1^{+\infty} \frac{2\cos(x^2) + 100}{x^{5/4}}\, dx$ is convergent. To receive credit for this problem you must justify your answer.

Name: ANSWERS

Instructor: ANSWERS

Exam II
March 19, 2002

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for one hour.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 10 pages of the test.

Good Luck!

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!

1.	(•)	(b)	(c)	(d)	(e)
2.	(•)	(b)	(c)	(d)	(e)
3.	(a)	(b)	(c)	(d)	(•)
4.	(a)	(b)	(•)	(d)	(e)
5.	(a)	(b)	(•)	(d)	(e)
6.	(a)	(b)	(c)	(•)	(e)
7.	(a)	(b)	(•)	(d)	(e)
8.	(a)	(•)	(c)	(d)	(e)
9.	(a)	(•)	(c)	(d)	(e)
10.	(a)	(b)	(c)	(•)	(e)
11.	(•)	(b)	(c)	(d)	(e)
12.	(a)	(b)	(c)	(d)	(•)

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

13. _____

14. _____

15. _____

Total: _____