Multiple Choice

1.(6 pts.) Find $\int_0^{\frac{\pi}{4}} \tan^2 x \, \sec^4 x \, dx$.

(a) $\frac{2}{5}$ (b) $\frac{8}{15}$ (c) $\frac{2}{3}$ (d) 1 (e) $\frac{2}{15}$

2.(6 pts.) Find $\int_0^1 \sqrt{2x - x^2} \, dx$.

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

3.(6 pts.) Evaluate $\int_{\frac{2}{\pi}}^{\infty} \frac{\cos(\frac{1}{x})}{x^2} \, dx$.

(a) $\frac{1}{2}$ (b) Divergent (c) $-\frac{1}{2}$ (d) 1 (e) $\frac{2}{\pi}$

4.(6 pts.) Find the length of arc of the curve $y = \ln(\cos x), 0 \leq x \leq \frac{\pi}{3}$.

(a) $\ln(\sqrt{2}) - 1$ (b) $\ln(2 - \sqrt{3})$ (c) $-\frac{1}{2}\ln 2$ (d) $\ln(2 + \sqrt{3})$ (e) $\ln(1 + \sqrt{2})$

5.(6 pts.) Find the surface area if the region above the x-axis and below the curve $y = x^3$, $0 \leq x \leq 1$, is rotated about the x-axis.

(a) $\frac{\pi}{9}(3^{\frac{3}{2}} - 1)$ (b) $\frac{\pi}{27}(10^{\frac{3}{2}} - 1)$ (c) $\frac{\pi}{3}(2^{\frac{3}{2}} - 1)$

(d) $\frac{\pi}{27}(3^{\frac{3}{2}} - 1)$ (e) $\frac{\pi}{9}(10^{\frac{3}{2}} - 1)$

6.(6 pts.) Find the solution of $x\, y\, y' = \ln x$ which satisfies $y(1) = 2$.

(a) $y = 2 + 2\ln x$ (b) $y = x + \sqrt{1 + \ln x}$ (c) $y = \sqrt{4 + (\ln x)^2}$

(d) $y = x \ln x + 2x$ (e) $y = \frac{1 + x}{1 + \ln x}$

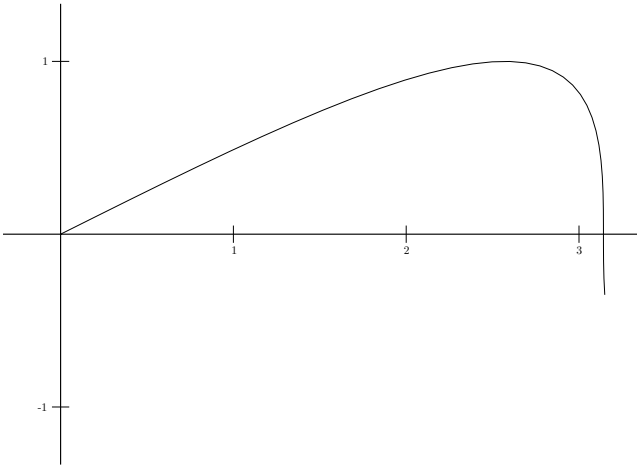
7.(6 pts.) A bacteria culture starts with 200 bacteria, and in one hour contains 400 bacteria. How many hours will it take to go from 200 to 2000 bacteria?

(a) $\frac{\ln 10}{\ln 2}$ (b) $\ln 10$ (c) $\ln 5$ (d) $\ln\ 400$ (e) 10

8.(6 pts.) Find the slope of the tangent to the curve $x = t + t^2,\ y = t + e^t$ at the point $(x, y) = (0, 1)$.

(a) 3 (b) 0 (c) 2 (d) 4 (e) 1

9.(6 pts.) Find the area bounded by the curve $x = t + \sin t,\ y = \sin t,\ 0 \le t \le \pi$, and the x-axis.



(a) $\sqrt{2\pi}$ (b) $\dfrac{2\pi}{3}$ (c) $\dfrac{3}{2}$ (d) $1 + \dfrac{\pi}{2}$ (e) 2

10.(6 pts.) If $x = e^t$ and $y = \sin t$, find $\dfrac{d^2y}{dx^2}$ when $x = 1$.

(a) -1 (b) -2 (c) 1 (d) 2 (e) 0

11.(6 pts.) Find the length of the curve $x = 2t^2 - 1,\ y = 4t^2 + 3,\ 0 \le t \le 2$.

(a) $8\sqrt{3}$ (b) $4\sqrt{3}$ (c) $4\sqrt{5}$ (d) 3 (e) $8\sqrt{5}$

Partial Credit

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

12.(7 pts.) Give the FORM of the partial fraction. Do NOT solve for the coefficients.

$$\frac{3x^2 - 9x}{x(x-1)^2(x^2+1)^2} =$$

13.(7 pts.) If Simpson's Rule with $n = 8$ is used to approximate $\int_0^4 f(x)\ dx$, give an expression for the result in terms of f evaluated at the appropriate numbers.

14.(10 pts.) Evaluate $\displaystyle\int_0^1 \frac{2x^2}{(x+1)(x^2+1)}\,dx$

15.(10 pts.) Solve the differential equation $x\dfrac{dy}{dx} + xy = x - y$.

Name: ANSWERS

Instructor: ANSWERS

Exam II
March 18, 2003

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for 70 minutes.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 5 pages of the test.

Good Luck!

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

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

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

12. _____

13. _____

14. _____

15. _____

Total: _____