Multiple Choice

1.(5pts) The solution to the initial value problem

$$\frac{dy}{dx} = \frac{x}{y} \quad \text{is}$$

(a) $y = x + C$ (b) $y = C + \sqrt{x}$ (c) $y = x^2 + C$ (d) $y = \sqrt{x^2 + C}$ (e) $y = C$

2.(5pts)

$$\int_0^{\pi/2} \sin^7 t \ \cos t \ dt$$

(a) $\frac{1}{8}$ (b) $\frac{1}{7}$ (c) $\frac{1}{6}$ (d) 1 (e) 2

3.(5pts) The improper integral $\int_1^\infty \frac{1}{x^{3/2}}\, dx$

(a) converges to $\frac{3}{2}$ (b) converges to 2 (c) converges to $\frac{2}{5}$

(d) converges to $\frac{5}{2}$ (e) diverges

4.(5pts) The partial fraction expansion of $\frac{5x+11}{x^2+4x+3}$ is

(a) $\frac{2}{x-1} + \frac{3}{x-3}$ (b) $\frac{3}{x+1} + \frac{2}{x+3}$ (c) $\frac{5}{x+1} + \frac{4}{x+3}$

(d) $\frac{4}{x+1} - \frac{3}{x+3}$ (e) $\frac{5x+11}{x^2+4x+3}$

5.(5pts) A sequence is defined by $a_1 = 1$, $a_n = \frac{a_{n-1}}{n}$ for $n > 1$. Then $a_5 =$

(a) $\frac{1}{80}$ (b) $\frac{1}{32}$ (c) $\frac{1}{120}$ (d) $\frac{1}{24}$ (e) 1

6.(5pts) $(\sinh x \ + \ \cosh x)^3 =$

(a) $(\sinh x)^3$ (b) $\frac{e^{3x}}{8}$ (c) $\frac{1}{64}e^{3x}$ (d) $\frac{1}{2}e^{3x}$ (e) e^{3x}

7.(5pts) The improper integral $\int_0^3 \frac{dx}{\sqrt{9-x^2}}$

(a) converges to $\arcsin\frac{1}{3}$ (b) converges to 1 (c) converges to $\arcsin 3$

(d) converges to $\frac{\pi}{2}$ (e) diverges

8.(5pts) $\displaystyle\int_1^2 x \ln x \, dx =$

(a) $\ln 8$ (b) $4\ln 2 + \dfrac{5}{4}$ (c) $4\ln 2 + \dfrac{3}{4}$ (d) $2\ln 2 - \dfrac{3}{4}$ (e) $2\ln 4 + 1$

9.(5pts) $\displaystyle\int xe^{2x} \, dx =$

(a) $e^{2x}(2x+1) + C$ (b) $\dfrac{1}{2}e^{2x}(2x+1) + C$ (c) $e^{2x}(x+1) + C$

(d) $\dfrac{1}{2}e^{2x}(x-2) + C$ (e) $\dfrac{1}{4}e^{2x}(2x-1) + C$

10.(5pts) $\displaystyle\int_1^2 \frac{dx}{x^2 - 2x + 2} =$

(a) $\dfrac{\pi}{4}$ (b) $\dfrac{\pi}{3}$ (c) $\dfrac{\pi}{2}$ (d) $\arctan\dfrac{1}{2}$ (e) $\arctan 2$

Partial Credit

11.(10pts) Evaluate $\displaystyle\int \frac{dx}{\left(\sqrt{1+x^2}\right)^3}$.

12.(10pts) Solve the initial value problem

$$x\frac{dy}{dx} + y = \sqrt{x} \quad , \quad x > 0$$
$$y(1) = 1$$

13.(10pts) Evaluate $\displaystyle\int_1^\infty \frac{dx}{x^2 + 3x + 2}$.

14.(10pts) Use integration by parts to evaluate $\displaystyle\int \arctan x \, dx$.

15.(10pts) Let $a_n = 1 - (\frac{2}{3})^n$.

a) Show that $a_n \le a_{n+1}$.

b) Show that the sequence a_n has an upper bound.

c) Explain why $\lim_{n\to\infty} a_n$ exists.

d) What number is $\lim_{n\to\infty} a_n$?

Name: _____

Instructor-section: _____

Math126, Test II

March 18, 1999

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for two hours.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 13 pages of the test.

Good Luck!

Please mark your answers with an X.

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