

MATH 141

NAME \_\_\_\_\_

EXAM I

STUDENT NUMBER \_\_\_\_\_

OCTOBER 04, 2004

INSTRUCTOR \_\_\_\_\_

FORM A

SECTION NUMBER \_\_\_\_\_

This examination will be machine processed by the University Testing Service. Use only a number 2 pencil on your scantron. On your scantron identify your name, this course (Math 141) and the date. Code and blacken the corresponding circles on your scantron for your student I.D. number and class section number. Code in your test form.

There are 12 multiple choice questions worth a total of 60 points. For each problem **five** possible answers are given, only one of which is correct. You should solve the problem, circle the letter of your answer in the exam form and **blacken** the corresponding space on the **scantron**. Mark only one choice; darken the circle completely (you should not be able to see the letter after you have darkened the circle). Check frequently to be sure the problem number on the test is the same as the problem number of the scantron. There are **4** partial credit questions. **In order to obtain full credit for these problems, all work must be shown. Credit will not be given for an answer not supported by work.** The point value for each partial credit question is given in parentheses to the right of the question number.

**THE USE OF CALCULATORS IS NOT PERMITTED IN THIS EXAMINATION.**

13.(6 pts.) _____
14.(10 pts.) _____
15.(10 pts.) _____
16.(14 pts.) _____
<b>Total</b> _____

**Do not  
write in  
the box to  
the left.**

1. Let  $f(x) = e^{(x+\tan^{-1}x)}$ . Find  $(f^{-1})'(1)$ .

- a)  $\frac{1}{2}$
- b) 2
- c)  $\frac{1}{4}$
- d) 4
- e) Undefined

2. Find  $\frac{d}{dx} 6xe^{(x^2-1)}$ .

- a)  $6e^{(x^2-1)}$
- b)  $6e^{(x^2-1)}(2x^2 + 1)$
- c)  $6e^{2x}$
- d)  $3e^{(x^2-1)}$
- e)  $6x$

3. Find  $\int \sin(2x)e^{\cos(2x)} dx$ .

a)  $-\frac{1}{2} e^{\cos(2x)} + C$

b)  $2e^{\cos(2x)} + C$

c)  $e^{(-\frac{1}{2}\sin(2x))} + C$

d)  $\frac{1}{2} e^{\cos(2x)} + C$

e)  $-\frac{1}{2} e^{\sin(2x)} + C$

4. Find  $\int_1^2 \frac{2x+1}{3x^2+3x-5} dx$ .

a)  $3 \ln 13$

b)  $3 \ln \left(\frac{5}{3}\right)$

c)  $0$

d)  $\frac{1}{3} \ln \left(\frac{5}{3}\right)$

e)  $\frac{1}{3} \ln 13$

5. Find  $\frac{d}{dx} \ln(\cos x - x^3)$ .

a)  $-\tan x - \frac{3}{x}$

b)  $\cos x - x^3$

c)  $\frac{1}{\ln(\cos x - x^3)}$

d)  $\ln(-\sin x - 3x^2)$

e)  $\frac{\sin x + 3x^2}{x^3 - \cos x}$

6. Let  $f(x) = \cos^{-1}(2x - 1)$ . Find  $f'(x)$ .

a)  $2 \sin^{-1}(2x - 1)$

b)  $\frac{2}{\sqrt{x - x^2}}$

c)  $-\frac{2}{\sqrt{x - x^2}}$

d)  $-\frac{1}{\sqrt{x - x^2}}$

e)  $\sin^{-1}(2x - 1)$

7. Integrate  $\int_0^{\ln(\frac{1}{2})} \frac{e^x}{\sqrt{1-e^{2x}}} dx$ .

a)  $\frac{\pi}{6}$

b)  $-\frac{\pi}{3}$

c)  $-\frac{\pi}{6}$

d)  $-\frac{\pi}{2}$

e)  $\frac{\pi}{3}$

8. Evaluate  $\int t \sin 3t dt$ .

a)  $\frac{1}{3} \left[ t \cos 3t - \frac{\sin 3t}{3} \right] + C$

b)  $\frac{1}{3} \left[ \frac{\cos 3t}{3} - t \sin 3t \right] + C$

c)  $\frac{1}{3} \left[ \frac{\sin 3t}{3} - t \cos 3t \right] + C$

d)  $\frac{1}{3} \left[ \frac{\sin 3t}{3} + t \cos 3t \right] + C$

e)  $\frac{1}{3} \left[ \frac{\cos 3t}{3} + t \sin 3t \right] + C$

9. Find  $\int_0^1 e^{\sqrt{y}} dy$ .

- a)  $e - 1$
- b)  $e + 1$
- c)  $2e - 1$
- d)  $2e + 1$
- e)  $2$

10. Evaluate  $\int \sin 4x \cos 5x dx$ .

- a)  $\frac{1}{2} \cos x - \frac{1}{18} \cos 9x + C$
- b)  $\frac{1}{2} \cos x + \frac{1}{18} \cos 9x + C$
- c)  $\cos x - \cos 9x + C$
- d)  $\frac{1}{2} \sin x + \frac{1}{18} \sin 9x + C$
- e) None of the above.

11. Find  $\int \sec^5 x \tan^3 x \, dx$ .

a)  $\frac{1}{7} \tan^7 x + \frac{2}{5} \tan^5 x + \frac{1}{3} \tan^3 x + C$

b)  $\frac{1}{6} \sec^6 x + \frac{1}{4} \sec^4 x + C$

c)  $\frac{1}{7} \sec^7 x - \frac{1}{5} \sec^5 x + C$

d)  $\frac{1}{24} \sec^6 x \tan^4 x + C$

e) None of the above.

12. Find  $\int \frac{dx}{\sqrt{4x^2 + 9}}$ .

a)  $\frac{1}{2} \ln \left| \left( \frac{4}{9}x^2 + 1 \right)^{\frac{1}{2}} + \frac{2}{3}x \right| + C$

b)  $\frac{1}{2} \ln |\sec x + \tan x| + C$

c)  $\frac{1}{9} \ln \left( \frac{4}{9}x^2 + 1 \right) + C$

d)  $\frac{1}{2} \left( \frac{4}{9}x^2 + 1 \right) + C$

e)  $2\sqrt{4x^2 + 9} + C$

6 pts 13. Use logarithmic differentiation to find  $\frac{dy}{dx}$  for

$$y = \frac{x^2 e^x \sqrt{x-1}}{x^3 - 2}.$$

10 pts 14. Evaluate  $\int_1^e \frac{\ln x}{x^2} dx$ .

15. Evaluate  $\int_{\frac{1}{4}}^1 \sqrt{8 + 8x - 16x^2} dx$ .

14 pts 16. Evaluate  $\int \frac{2x^2 - 1}{(x + 1)(x^2 + 1)} dx$ .