Multiple Choice

1.(5 pts.) 1. Find $\frac{d}{dx}(\frac{\tan x}{x})$.

(a) $\dfrac{-x\csc^2 x - \tan x}{x^2}$ (b) $\dfrac{x\sec^2 x - \tan x}{x^2}$ (c) $\dfrac{x\sec^2 x + \tan x}{x^2}$

(d) $\dfrac{\sec^2 x + x\cot x}{x^2}$ (e) $\dfrac{\csc^2 x - x\cot x}{x^2}$

2.(5 pts.) Find $\frac{d}{dx}(\sqrt{x\cos x + 3x^2})$.

(a) $\dfrac{\cos x + 6x}{2\sqrt{\cos x - x\sin x + 6x}}$ (b) $\dfrac{1}{2\sqrt{x\cos x + 3x^2}}$

(c) $\dfrac{\cos x - x\sin x + 6x}{2\sqrt{x\cos x + 3x^2}}$ (d) $\dfrac{1}{2\sqrt{\cos x - x\sin x + 6x}}$

(e) $\dfrac{\cos x + 6x}{2\sqrt{x\cos x + 3x^2}}$

3.(5 pts.) If $g(t) = (t^3+1)^2(2t-3)^4$, find $g'(1)$.

(a) -4 (b) 12 (c) 36 (d) -28 (e) -20

4.(5 pts.) Find $\frac{d}{dx}(\sin^2(2\cos 3x))$.

(a) $-12\big(\sin(2\cos 3x)\big)\sin(3x)$ (b) $-12\big(\cos(2\cos 3x)\big)\sin(3x)$

(c) $4\sin(2\cos 3x)\cos(2\cos 3x)\sin 3x$ (d) $-12\big(\sin(2\cos 3x)\big)\big(\cos(2\cos 3x)\big)\sin(3x)$

(e) $-12\cos(2\cos 3x)\sin 3x$

5.(5 pts.) If $y^5 + x^2y^3 = -11 + x^4y$, what is y' at the point $(2,1)$?

(a) 28 (b) $\dfrac{-23}{4}$ (c) $\dfrac{-16}{11}$ (d) $\dfrac{44}{7}$ (e) 24

6.(5 pts.) If $x^2 + y^2 = 4$, what is y'' when $y \neq 0$?

(a) $\dfrac{-1}{y} + \dfrac{x^2}{y^3}$ (b) $\dfrac{-x}{y}$ (c) $\dfrac{-x}{y} + \dfrac{x^2}{y^3}$

(d) $\dfrac{-x}{2y} - \dfrac{x^2}{y^3}$ (e) $\dfrac{-1}{y} - \dfrac{x^2}{y^3}$

7.(5 pts.) If $f(x) = \sin 2x$, find $f''(\dfrac{\pi}{4})$.

(a) -2 (b) 4 (c) 2 (d) -4 (e) 0

8.(5 pts.) If $y = \cot x$, $x = \dfrac{\pi}{4}$, and $dx = 0.04$, then the differential dy is given by

(a) $\sqrt{2}(0.02)$ (b) 0.04 (c) -0.04 (d) -0.08 (e) 0.08

9.(5 pts.) The function $f(x) = x^4 + \dfrac{16}{3}x^3 - 10x^2 - 12$ has critical numbers at

(a) $x = -2,\ 0,\ 2$ (b) $x = -5,\ 0,\ 1$ (c) $x = 5,\ 0,\ -1$ (d) $x = -2,\ 0$

(e) $x = -5,\ 1$

10.(5 pts.) Suppose $f'(x) = g'(x)$ for all x, and $f(0) = 3$ and $g(0) = 2$. If $f(3) = 5$, find $g(3)$.

(a) 6 (b) 4 (c) -4 (d) 2 (e) 5

Partial Credit

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

11.(10 pts.) A 20 ft ladder is leaning against a house when its base starts to slide away. By the time the base is 10 ft from the house, the base is moving at a rate of 5 ft/sec. How fast is the top of the ladder sliding down the wall then? (You do not have to simplify your answer.)

12.(10 pts.) Use differentials (or, equivalently, a linear approximation) to estimate $\sqrt[3]{27.3}$. You may leave your answer as a fraction.

13.(10 pts.) Find an equation for the tangent line to the curve $15x^2y+10x-20 = (x^2+y^2)^2$ at the point $(1, 2)$.

14.(10 pts.) Find the absolute minimum and maximum of the function $f(x) = x^3 - 12x$ on the interval $[-3, 5]$.

15.(10 pts.) Let $f(x) = \dfrac{1}{x}$ on the interval $[1, 4]$. Check that the hypotheses of the Mean Value Theorem are satisfied for this function on this interval, and find all numbers c which satisfy the equation which is the conclusion of the Mean Value Theorem.

Name: ANSWERS

Instructor: ANSWERS

Exam II
October 29, 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 4 pages of the test.

Good Luck!

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

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

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

11. _____

12. _____

13. _____

14. _____

15. _____

Total: _____