Multiple Choice

1.(5 pts.) If $f(2) = 5$, $f(3) = 2$, $f(4) = 5$, $g(2) = 6$, $g(3) = 2$ and $g(4) = 0$, find $(fg)(2) + (f \circ g)(3)$.

(a) 35   (b) 20   (c) 15   (d) 25   (e) 30

2.(5 pts.) Let a function $f(x)$ be given by $f(x) = \begin{cases} 2x + 2 & x > 0 \\ -x + c & x \leq 0 \end{cases}$. For what value of c is f continuous?

(a) There is no such c.   (b) $c = 2$ (c) $c = 3$

(d) $c = 0$ (e) $c = 1$

3.(5 pts.) Compute $\lim\limits_{x \to 5} \dfrac{x - 6}{x - 5}$.

(a) 1.1   (b) $-\infty$

(c) $+\infty$ (d) Does not exist and is not ∞ or $-\infty$.

(e) 0

4.(5 pts.) Compute $\lim\limits_{x \to 5^+} \dfrac{x^2 - 25}{x - 5}$.

(a) $+\infty$ (b) 10   (c) Does not exist and is not $+\infty$.

(d) 0   (e) 5

5.(5 pts.) Find $f'(4)$ if $f(x) = 4\sqrt{x} - \dfrac{16}{\sqrt{x}}$.

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

6.(5 pts.) Find $\dfrac{d\,f}{dx}$ if $f(x) = (x^2 + 1)(x^3 + 1)$.

(a) $5x^4 + 8x + 1$ (b) $3x^4(x^3 + 1) + (x^2 + 1)(4x^5)$

(c) $6x^3$ (d) $(x^2 + 1)(x^3 + 1) + (2x)(3x^2)$

(e) $2x(x^3 + 1) + (x^2 + 1)(3x^2)$

7.(5 pts.)   Find $f'(3)$ if $f(x) = \dfrac{x^2 - x}{x + 2}$.

(a) $\dfrac{19}{25}$ (b) $\dfrac{41}{25}$ (c) $\dfrac{25}{19}$ (d) $\dfrac{25}{41}$ (e) $\dfrac{29}{25}$

8.(5 pts.)   Which line below is the tangent line to the graph of $y = (x^2 - 3x + 1)(x - 3)$ when $x = 3$.

(a)   The tangent line at $x = 3$ is vertical.   (b) $y = 2x - 3$

(c) $y = \left((2x-3)(x-3) + (x^2 - 3x + 1)\right)x - 3$ (d) $y = x - 3$

(e) $y = x + 3$

9.(5 pts.)   Given that f and g are differentiable at $x = 3$ and that $f(3) = -1$, $g(3) = 2$, $f'(3) = 3$ and $g'(3) = -4$, what is $\left(\dfrac{g}{f}\right)'(3)$?

(a) $-\dfrac{1}{2}$ (b) -2 (c) $-\dfrac{2}{9}$ (d) $\dfrac{1}{2}$ (e) 2

3

10.(5 pts.)   For which graph below is $y = 2x + 1$ a tangent line?

:graphs:AnsE.eps   :graphs:AnsC.eps   :graphs:AnsA.eps

(a)   =900   (b)   =900   (c)   =900

:graphs:AnsD.eps   :graphs:AnsB.eps

(d)   =900   (e)   =900

4

Partial Credit

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

11.(10 pts.) Let $f(x) = \dfrac{1}{x+1}$.

(a)Using the limit definition of the derivative, find f'.

(b) Determine the domain of f'.

12.(10 pts.) Let

$$f(x) = \frac{x}{1+x^2}.$$

(a) Compute $f'(x)$.

(b) Determine where $f'(x) = 0$.

13.(10 pts.) How and why can the Intermediate Value Theorem be used to show that

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

has a root between $x = 1$ and $x = 2$?

14.(10 pts.) Draw the graph of a continuous function $y = f(x)$ with $f(0) = 3$, $f'(0) = -1$, $f'(2) = 0$, and $f'(-2) = 2$.

:graphs:BlankGraph.eps

=2400

15.(10 pts.) A ball thrown in the air at 4 m/sec on planet X has height $s(t) = 4t - 3t^2 - t^3$ meters above the surface t seconds after it is thrown.
(a) Find the velocity at time t.
(b) Find the velocity when the ball hits the ground.

Name: ___ANSWERS_____

Instructor: ___ANSWERS_____

Exam I
September 24, 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 6 pages of the test.

Good Luck!

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

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

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

11. _____

12. _____

13. _____

14. _____

15. _____

Total: _____

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3.	(a)	(b)	(c)	(d)	(e)
4.	(a)	(b)	(c)	(d)	(e)
5.	(a)	(b)	(c)	(d)	(e)
6.	(a)	(b)	(c)	(d)	(e)
7.	(a)	(b)	(c)	(d)	(e)
8.	(a)	(b)	(c)	(d)	(e)
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