MATH 140A
EXAMINATION I
SEPTEMBER 23, 2002

NAME _____
STUDENT NUMBER _____
INSTRUCTOR _____
SECTION NUMBER _____

The examination consists of **15** problems: **11** multiple choice questions followed by **4** partial credit problems. For the partial credit problems you **must present your work clearly and understandably; no credit will be given for unsupported answers. For this exam calculators are not allowed and are not needed. For multiple choice problems, please circle the correct answer in each question.**

The point value for each question is shown next to each question in the left margin. At the end of the examination, the booklet will be collected.

THE USE OF CALCULATORS IS NOT PERMITTED IN THIS EXAMINATION.

CHECK THE EXAMINATION BOOKLET BEFORE YOU START. THERE SHOULD BE **15** PROBLEMS ON **9** PAGES (INCLUDING THIS ONE).

M.C. _____

12. _____

13. _____

14. _____

15. _____

TOTAL _____

5 pts 1. Find the center and radius of the circle given by the equation

$$2x^2 + 2y^2 + 8x - 12y + 8 = 0$$

a) Center: $(-2, 3)$; Radius: 3
b) Center: $(2, 3)$; Radius: 3
c) Center: $(2, -3)$; Radius: 9
d) Center: $(4, -6)$; Radius: 3
e) Center: $(-4, 6)$; Radius: 9

5 pts 2. The average rate of change of $f(x) = 3x^2 + x + 2$ on the interval $(1, 2)$ is

a) $-\frac{6}{3}$
b) $-\frac{16}{3}$
c) 6
d) 10
e) 16

5 pts 3. For $f(x) = x^4$, the difference quotient $\frac{f(x+h) - f(x)}{h}$ is

a) $\frac{x^4}{h}$
b) $\frac{x^4 + h}{h}$
c) $\frac{x^4 + 4hx^3 + 6h^2x^2 + 4h^3x + h^4}{h}$
d) $4x^3 + 6hx^2 + 4h^2x + h^3$
e) 1

5 pts 4. Evaluate $\lim_{x \to 2} \dfrac{x^2}{(x+1)^2(x-2)}$

a) $\dfrac{4}{9}$

b) 1

c) ∞

d) $-\infty$

e) Does not exist.

5 pts 5. Evaluate $\lim_{x \to 3} \dfrac{x+3}{(x-3)^2}$

a) 0

b) $\dfrac{1}{3}$

c) 1

d) ∞

e) Does not exist.

5 pts 6. Evaluate $\lim_{x \to 0} \dfrac{\sqrt{x^2+25}-5}{x^2}$

a) $\dfrac{1}{10}$

b) $\dfrac{1}{5}$

c) 1

d) 15

e) Does not exist.