Math 1271 Midterm Exam I (4/2/2015)

Version I

Name: _____

Student ID: _____

Discussion Section: _____

#	Score
1	
2	
3	
4	
5	
Total	

The exam consists of 5 problems out of 50 total points. Read the directions of each problem carefully. Please show your work when necessary, unless stated otherwise. Clearly indicate your final answers.

1. (5 points) Find y' if $y = \ln(x^4 + y^2)$.

2. (5 points) Evaluate $\lim\limits_{x \to 0} (1 + 3x)^{\frac{1}{x}}$.

3. (10 points) A man starts walking north at 4 ft/s from a point P. Five minutes later a woman starts walking south at 5 ft/s from a point 100 ft due east of P. At what rate are the people moving apart 20 min after the woman starts walking?

4. (10 points) If 1200 cm^2 of material is available to make a box with a square base and an open top, find the largest possible volume of the box.

5. (5 points each)Multiple choices.

(1). Let $f(x) = (x+2)e^x$. Then using the Mean Value Theorem, we can conclude that there is at least one number c between 1 and 4 such that $f'(c)$ is equal to
   (A) $2e^4 - e$
   (B) $3e^4 - 3e/2$
   (C) $3e^4 + 3e/2$
   (D) $6e^4 - 3e$
   (E) $6e^4$

(2). Where is the function $f(x) = x^4 - 6x^2 + 3$ concave down?
   (A) $(-\infty, \infty)$
   (B) $(-\infty, -1)$ and $(1, \infty)$
   (C) $(-1, 1)$
   (D) $(-1, \infty)$
   (E) $(-\infty, 1)$

(3). If we estimate $\sqrt[3]{8.3}$ by linear approximation or differentials, we get
- (A) 2.25
- (B) 2.3
- (C) 2.03
- (D) 2.025
- (E) 2.0247

(4). If we use Newton's method to solve equation $e^x = x^2$ with initial approximation $x_1 = 0$, what is the value of x_3 ?
- (A) -1
- (B) $-\frac{e^{-1}-1}{e^{-1}+2}$
- (C) $-1 - \frac{e^{-1}+2}{e^{-1}-1}$
- (D) e^{-1}
- (E) $-1 - \frac{e^{-1}-1}{e^{-1}+2}$