Show all work. Circle your answer.

No books, no notes, no calculator, no cell phones, no pagers, no electronic devices at all.

Solutions will be posted shortly after the exam: www.math.wisc.edu/∼miller/m213

Name_____

Circle your DIScussion section (column one):

TA: Youngsuk Lee

DIS 301	8:50 T	6322 SOC SCI
DIS 302	8:50 R	215 INGRAHAM
DIS 303	9:55 T	225 INGRAHAM
DIS 304	9:55 R	495 VAN HISE

Problem	Points	Score
1	8	
2	7	
3	7	
4	7	
5	7	
6	7	
7	7	
Total	50	

1. (8 pts) Find the particular solution for the following equation and explicitly solve for y.

$$\frac{dy}{dx} = (x+2)^2 e^y; \quad y = 0 \text{ when } x = 1$$

Circle your answer.

2. (7 pts) When Michael was born his grandfather deposited \$5000 into an account for him earning 10% annual interest compounded continuously. His grandfather also plans to deposit continuously an additional \$1000 per year. How much will Michael have in his account when he is 20?

Circle your answer.

3. (7 pts) Evaluate the double integral below. If the function seems too difficult to integrate, try interchanging the limits of integration.

$$\int_0^2 \int_{y/2}^1 e^{x^2}\, dx\, dy$$

Circle your answer.

4. (7 pts) An oil well produced \$1,000,000 of income its first year. Each year thereafter, the well produced half as much income as the previous year. What is the total amount of income produced by the well in 20 years?

Circle your answer.

5. (7 pts) Use the total differential to approximate the quantity

$$\sqrt{(3.01)^2 + (4.02)^2}$$

Circle your answer.

6. (7 pts) A rectangular box with a square bottom and no top is to be built from 1200 square inches of material. Find the dimensions that will enclose the maximum volume.

Circle your answer.

7. (7 pts) Find the all solutions of the differential equation:

$$x\frac{dy}{dx} = 2xy + x^2e^{3x}$$

Circle your answer.

Answers

1. $y = -\ln(10 - \frac{(x+2)^3}{3})$
2. $15000e^2 - 10000$
3. $\int_0^1 \int_0^{2x} e^{x^2} dy dx = \int_0^1 2xe^{x^2} dx = e - 1$
4. $\$2{,}000{,}000(1 - \frac{1}{2^{20}})$
5. 5.022
6. $20 \times 20 \times 10$
7. $y = e^{2x}((x-1)e^x + C)$