Name: **ID number:**

Time: 2 hours **MATH 204** **21/01/06**

FINAL EXAM

First Semester 05/06

Instructor: Mrs. Muna Jurdak

Section 9	**Tues. 3:30**	**Section 10**	**Tues**	**2:00**
Section 11	**Tues. 12:30**	**Section 12**	**Tues**	**11:00**

1. Write your name and ID number clearly where indicated.
2. Circle your section number above, according to the time of the problem-solving session in which you are enrolled.
3. Solve the problems on this, the white question sheet. Use the colored sheets for scratch work only. You may use the back of a white sheet to complete the solution of a problem.

1	2	3	4	5	6	Total
/6	/6	/6	/17	/8	/9	
7	8	9	10	11	12	/100
/6	/9	/7	/7	/8	/11	

(6%) **1.**Find the determinant of the matrix A, if

$$A=\begin{pmatrix} 5 & 1 & 0 & 6 \\ 1 & -2 & -3 & 2 \\ 2 & 3 & 0 & 1 \\ 3 & 2 & 0 & 1 \end{pmatrix}$$

(6%) **2.** The value of the determinant $\begin{vmatrix} a & -2 & 6 \\ b & 4 & -1 \\ c & 1 & 3 \end{vmatrix} = 7$. Find the value of the determinant $\begin{vmatrix} 5a & 0 & -2 \\ 5b & 11 & 4 \\ 5c & 6 & 1 \end{vmatrix}$. Give reasons for your answer.

(6%) **3.** The solution to a system of equations, written in the matrix form AX=B, can be changed to the form

$$X = \begin{pmatrix} -1 & 3 \\ 2 & -4 \end{pmatrix} \begin{pmatrix} 6 \\ -4 \end{pmatrix}.$$

a) What was the original system of equations?

b) What is the solution set for this system?

(16%) **4**. Perform the following operations:

a) Find y = f(x) if $\frac{dy}{dx} = (x^2 + 3)e^{(x^3+9x)}$ and f(0) = 2

b) $\int_0^1 \frac{4x}{(1+15x^2)^{3/4}}\,dx$

c) $\int \frac{\ln x}{x^3}\,dx$

d) $\int \frac{3x+4}{x^2(x+2)}\,dx$

(8%) **5.** Find all second order partial derivatives (all 4 of them) for f(x,y) =. $\frac{xy^2}{x+1}$

(9%) **6.**Given the function $f(x,y) = x^2 - 4x - 3 + y^4 - 2y^2$. Locate and determine the nature of all critical points of this function.

(6%) **7.** Approximate the integral $\int_0^4 \sqrt{x^3+1}dx$, using:

a) The rectangle rule
b) Simpson's rule
Use n = 4 in both (a) and (b).

(9%) **8.** A graduating class consists of 60% females and 40%males. Of the females, 25% are business majors. Of the males 30% are business majors. If a graduate is selected at random from this class, what is the probability that:

a) The student is a male business major.
b) The student is a female who isn't a business major.

(7%) **9.** A box contains 5 blue socks and 6 white socks. Find the number of ways that two socks can be drawn from the box in the following cases:

a) There are no restrictions.
b) The 2 socks are of different colors.
c) The 2 socks are of the same color.

(7%) **10.** A normally distributed set of values has mean $\mu = 200$ and standard deviation $\sigma = 20$. Find the values x_1, x_2, and x_3, that will divide this set into 4 equal parts. Show your work.

(8%) **11.** The scores on a quiz for a class of 50 students have a mean of 70 and standard deviation of 10. If the teacher decides to raise each student's grade by 3 grades,

a) What will be the mean of the new raised grades? Justify your answer.

b) What will be the new standard deviation? Justify your answer.

(11%) **12.** Determine the combination of integrals that give the value of each area:
Do not evaluate the integrals..

a) The area bounded by $f(x) = x^3$ and $g(x) = - x^2 + 6x$. .

b) The area bounded by $f(x) = 81 - x^2$, $g(x) = 8x^2$ and the x-axis , for $x \geq 0$.
Note: For this part, it is advisable to draw a sketch.