Name: **ID number:**

Time: 1 hour   Math 204   1/11/06
                              Quiz I
                    Fall Semester 05/06

Instructor: Mrs. Muna Jurdak

Section 9:   Thurs 3:30 p.m.   Section 10: Tues. 2:00 p.m.

Section 11   Tues. 12:30 p.m.   Section 12: Tues. 11:00 a.m.

Instructions:

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.

4. Write your name on the colored scratch sheet also.

5. Calculate the nCr's and the nPr's. You may leave probabilities as fractions.

6. **Show your work** in all the problems.

7. If you fail to write your name; ID number, or to circle your section number, **you will lose grades**

1	2	3	4	5	6	7	Total
/10	/10	/12	/18	/14	/16	/20	/100

(10%) 1. Using Cramer's Rule, **find x_2** for the following system of equations:
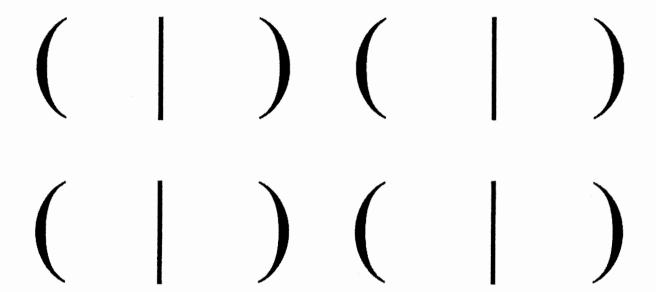
$$2x_1 + x_2 + 3x_3 = 3$$
$$3x_2 + 8x_3 = -4$$
$$4x_1 - x_2 = 12$$

(10%) 2. For which value(s) of **p** does the matrix equation

$$\begin{pmatrix} 5 & p \\ 6 & 4 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 15 \\ 25 \end{pmatrix}$$ **fail to have a unique solution?** Justify your answer.

(12%) 3. Use the **Gaussian procedure** to find the inverse of the following matrix, if an inverse exists.

$$A = \begin{pmatrix} 3 & -4 \\ 1 & -2 \end{pmatrix}$$

$$\left(\quad \middle| \quad \right) \left(\quad \middle| \quad \right)$$

$$\left(\quad \middle| \quad \right) \left(\quad \middle| \quad \right)$$

(18%) 4. Given the system of equations

$$x_1 + x_2 + x_3 = 1$$
$$-2x_1 - x_2 + 3x_3 = -5$$
$$2x_2 - 4x_3 = 9$$

Write this system as a **matrix equation AX = B**, and solve this system, <u>using matrices</u>.

(14%) 5. In how many ways can a committee of 8 people be selected from a group of 7 men and 9 women:

(a) If there are no restrictions?

(b) If there are to be exactly 5 men on the committee?

(16%) 6. In how many ways can 7 girls and 9 boys be lined up in a row:

(a) If all the girls must to be next to each other, and all the boys must be next to each other?

(b) If all the girls must be next to each other and any boy can be in any place in the row.

(20%) 7. In a group of 70 students, 35 are studying art, 22 are studying music, and 10 are studying both art and music.
Hint: Draw a Venn diagram

(a). If a student is chosen at random from the group, find the probability that the student is studying:

(i) Art or music or both.

(ii) Neither art nor music.

(b). Consider the events:
  E = the student is studying art.
  F = the student is studying music.
  G = the student is studying neither art nor music.
  (i) Are the events E, F, G mutually exclusive? Give a reason.

(ii) Are the events E, F, G collectively exhaustive? Give a reason?