

Not To Be Taken Out
Reading Room

Name:

ID number:

Time: 1 hour

Math 204
Quiz 1

Date: October

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.

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.

Problem 1 /10

Problem 2 /20

Problem 3 /10

Problem 4 /15

Problem 5 /10

Problem 6 /20

Problem 7 /15

Total /100

(10%) 1. Given the matrices,

$$A = \begin{pmatrix} -1 & 4 \\ 1 & 5 \end{pmatrix}, \quad B = \begin{pmatrix} 2 & 1 \\ -3 & 1 \end{pmatrix}, \quad C = \begin{pmatrix} 1 & 6 \\ 0 & 2 \\ 3 & 1 \end{pmatrix}, \quad D = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}.$$

Perform the following operations, if possible.

(a) $A+2B$ (b) AC (c) CB (d) $C^T D$.

20%) 2. (a) Using the cofactor method, find the inverse of the matrix A,

$$A = \begin{pmatrix} 4 & 1 & 2 \\ 2 & 5 & 0 \\ 1 & 2 & 3 \end{pmatrix}.$$

(b) Write the following system of equations in matrix form. Then solve the system using matrices.

$$\begin{aligned} 4x_1 + x_2 + 2x_3 &= 0 \\ 2x_1 + 5x_2 &= 12 \\ x_1 + 2x_2 + 3x_3 &= -4 \end{aligned}$$

(10%) 3. Using the Gaussian procedure, find the inverse of the following matrix A, if the inverse exists.

$$\begin{pmatrix} 2 & -3 \\ -7 & 11 \end{pmatrix}$$

(15%) 4. A game consists of flipping a coin followed by rolling a die.

Let A = the event of getting a head and then an even number on the die.

B = the event of getting a head and then an odd number on the die.

C = the event of getting a tail and then a number 4 or more on the die.

D = the event of getting a tail and then a number 5 or less on the die.

(a) Find the following probabilities:

$p(A')$, $p(C)$, $p(D)$, and $p(C \cup D)$.

(b) Are the events A, B, C, D

(i) Mutually exclusive?

(ii) Collectively exhaustive? Give reasons for your answers for part (b).

(10%) 5. A box contains 7 red marbles and 4 white marbles. Three marbles are drawn from the box one after the other (without replacement). Find the probability that the first 2 are red and the third is white.

(20%) 6. Seven squares, 4 red, 3 green, are to be arranged in a row. Find the number of ways that this can be done:

- (a) if there are no restrictions
- (b) if squares of the same color must be next to each other.
- (c) If the green squares only must be next to each other.

- (15%)7. (a) A woman has 12 close friends. Find the number of ways that she can invite 5 of them to dinner.
- (b) If two of the woman's friends are married and will not attend separately, find the number of ways that the woman can invite 5 of her 12 friends.