MAT 114 – 008
Review for Test Two
Show all work.

1. Evaluate $3\begin{bmatrix} 1 & -2 \\ 2 & 3 \end{bmatrix} + 4\begin{bmatrix} 0 & 2 \\ -3 & -1 \end{bmatrix}$.

2. Compute the product $\begin{bmatrix} 1 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 1 \end{bmatrix}\begin{bmatrix} 2 & -6 & 3 \\ 4 & 2 & 9 \\ 8 & -7 & 2 \end{bmatrix}$.

3. Compute the product $\begin{bmatrix} 2 & -3 & 1 \\ 4 & 0 & -6 \end{bmatrix}\begin{bmatrix} -1 & 3 & 2 & 4 \\ 4 & 0 & 5 & 1 \\ 1 & -2 & -7 & 0 \end{bmatrix}$.

4. Translate the given system of linear equations into matrix form.

$$\begin{array}{rrrcl} x & +2y & -z & = & 5 \\ -x & & +3z & = & 6 \\ 2x & -y & & = & 7 \end{array}.$$

5. Find the inverse of $\begin{bmatrix} 1 & 1 & -2 \\ 1 & 2 & -1 \\ -1 & 1 & 3 \end{bmatrix}$.

6. $\begin{bmatrix} -1 & 2 & 1 \\ -5 & 8 & 2 \\ 7 & -11 & -3 \end{bmatrix}$ is the inverse of the coefficient matrix of the following system of linear equations.

$$\begin{aligned} 2x &+5y &+4z &= 2 \\ x &+4y &+3z &= -1 \\ x &-3y &-2z &= 3 \end{aligned}$$

Translate the system of linear equations into matrix form and solve the system using the inverse of the coefficient matrix.

7. $n(A)=10$, $n(B)=8$, and $n(A\cup B)=15$. What is $n(A\cap B)$?

8. The universal set $S=\{1,2,3,4,5,6,7\}$. $A=\{3,4,5,6\}$ and $B=\{2,3,4\}$.

8a. Find $n(A')$.

8b. Find $n(A\cup B)$.

8c. Find $n(A\cap B)$.

8d. Find $n(A\times B)$.

9. An employer offers 10 basic health plans, 3 dental plans, and 2 vision care plans. How many health-care plans are possible if an employee selects one of each of the categories?

10. A firm has 5 vacancies to fill in its executive training program. In how many ways can the company select 5 trainees from a group of 10 female and 10 male applicants if the vacancies must be filled by 2 men and 3 women?

11. How many 3-digit numbers can be formed using the numerals in the set $\{2,3,7,9\}$ if repetition is not allowed?

12. In a television game show, the winner is asked to select 3 prizes from 5 different prizes, A, B, C, D, and E. Describe the sample space of possible outcomes. Order is not important.

13. A university cafeteria surveyed the students who ate breakfast there for their coffee preferences. The findings are summarized in the following table:

	Do not drink coffee	Prefer Regular coffee	Prefer Decaffeinated Coffee	Total
Female	23	145	69	237
Male	18	196	46	260
Total	41	341	115	497

A student is selected at random from this group. Find the probability that the student:

13a. Does not drink coffee.

13b. Is a male.

13c. Is a female who prefers regular coffee.

13d. Prefers decaffeinated coffee given that the student is a male.

13e. Is male given that the student prefers decaffeinated coffee.

13 Is female given that the student prefers regular coffee or does not drink coffee.