Name_____

Date_____

Advanced Algebra

Unit 6 Linear Programming Assignment #11

Matrix Applications

Learning Target: I can use matricies to solve problems

1) Tickets to the Senior Class Play cost $2.00 for students, $5.00 for adults, and $4.00 for senior citizens. At Friday night's performance, there were 121 students, 164 adults and 32 senior citizens. At Saturday night's performance, there were 183 students, 140 adults, and 25 citizens. Display this information in matrix form. Then use matrix multiplication to find the ticket sales income for Friday and Saturday nights performances.

$$\underset{[A]}{\begin{bmatrix} 2 & 5 & 4 \end{bmatrix}} \underset{[B]}{\begin{bmatrix} 121 & 183 \\ 164 & 140 \\ 32 & 25 \end{bmatrix}} = \begin{matrix} \text{Friday} & \text{Saturday} \\ \$1,190 & \$1,166 \end{matrix}$$

(1×3) (3×2)

It does Not work the other way

$$\begin{bmatrix} 121 & 183 \\ 164 & 140 \\ 32 & 25 \end{bmatrix} \begin{bmatrix} 2 & 5 & 4 \end{bmatrix} \not\exists$$

2)

a) A Chicago company wants to send some of its key personnel to a convention in London. In the company's Research and Development Division, five people plan to fly first class, three people plan to fly business class, and two people plan to fly coach. In the Sales Division, four people plan to fly business class, and eight people coach class. Display this information in a 2 by 3 travel matrix T.

b) Round trip prices for four different airlines are as follows: Airline A charges $1,280 for first class, $922 for business class, and $676 for coach. Airline B charges $1400 for first class, $1024 for business class and $728 for coach. Airline C charges $1320 for first class, $905 for business class and $654 for coach. Finally Airline D charges $1450 for first class, $1050 for business class, and $734 for coach. Display this information in a price matrix P that can be multiplied with matrix T to give the travel cost for each company per airline.

c) Find the product of your above 2 matrices.

c) How much will it cost to fly the Sales Division on Airline D?

d) Which airline will cost the Research and Development Division the least?

1	b	coach
5	3	2

1	b	c
0	4	8

A	B	C
1280	1400	1320
922	1024	905
676	728	654

Class

$$\begin{bmatrix} 5 & 3 & 2 \\ 0 & 4 & 8 \end{bmatrix}$$

Total Cost

	A	B	C	D
Rec	10518	11528	10623	11868
Sales	9096	9920	8852	10074

$2\times3 \quad 3\times4 = 2\times4$

$3\times3 \quad 2\times3$

$$\begin{bmatrix} 5 & 3 & 2 \\ 0 & 4 & 8 \end{bmatrix}$$

A	B	C	D
1280	1400	1320	1450
922	1024	905	1050
676	728	654	734