Name: _____ Date: _____ Period: _____

Sec 1H Unit 7 Day 4 – Multiplying Matrices Classwork

Sarah has a summer job at a lakeside store that rents equipment and cabins to tourists. Several large groups of campers are interested in renting and they often ask for estimates on what the cost will be. It is Sarah's job to send itemized estimates to the interested people. Prices are higher on weekends because of the high demand, so she gives a low estimate (weekdays) as well as a high estimate (weekends) for the people to choose from.

The fees to rent each item are shown in this table:

Item	Weekday	Weekend
Lifejacket	$5	$6
Fishing Pole	$5.5	$7
Kayak	$8	$10
Canoe	$10	$12
Cabin	$80	$125

1. What would be the total price for a family to rent 6 lifejackets, 3 fishing poles, 2 kayaks, 1 canoe and 1 cabin on a Monday? Show how you found your answer.

2. This table shows the items requested by three different families. Find the weekday estimate and the weekend estimate for each family. Show how you found your answers.

Family	Lifejacket	Fishing Pole	Kayak	Canoe	Cabin
Williams	24	6	7	9	6
Smith	5	0	1	2	1
Graham	39	15	3	5	10

3. It gets complicated for Sarah to keep track of all the requested estimates that come in to the store. She started using matrices to stay organized. The tables from questions 1 and 2 can be rewritten using matrices:

$$\begin{bmatrix} 24 & 6 & 7 & 9 & 6 \\ 5 & 0 & 1 & 2 & 1 \\ 39 & 15 & 3 & 5 & 10 \end{bmatrix} \quad \begin{bmatrix} 5 & 6 \\ 5.5 & 7 \\ 8 & 10 \\ 10 & 12 \\ 80 & 125 \end{bmatrix} \quad \begin{bmatrix} 779 & 1114 \\ 133 & 189 \\ 1151.50 & 1679 \end{bmatrix}$$

The process you used to calculate the estimates in #2 can be used to multiply these two matrices. You found two estimates for three families. Multiplying a 3x5 matrix by a 5x2 matrix resulted in a 3x2 matrix.

4. Practice multiplying matrix A by matrix B: Check the dimensions:

$$A = \begin{bmatrix} -2 & 4 & -7 & 8 \\ -10 & 16 & 4 & 9 \end{bmatrix} \qquad B = \begin{bmatrix} -8 & 5 \\ 14 & -8 \\ -7 & 3 \\ -2 & -5 \end{bmatrix}$$

5. Is matrix multiplication commutative? Multiply B*A:

Perform the following multiplications. If the operation cannot be performed, state "undefined".

6. $\begin{bmatrix} -1 & -5 & 3 \\ 3 & 2 & 0 \end{bmatrix} \cdot \begin{bmatrix} -2 \\ 6 \\ -2 \end{bmatrix}$

7. $\begin{bmatrix} 2 & -5 \\ 3 & 2 \end{bmatrix} \cdot \begin{bmatrix} -5 & 0 \\ 3 & -1 \end{bmatrix}$

8. $\begin{bmatrix} 5 & -4 \\ 6 & -4 \\ -6 & 0 \end{bmatrix} \cdot \begin{bmatrix} -3 & -4 \\ 2 & 3 \end{bmatrix}$

9. $\begin{bmatrix} 0 & 2 \end{bmatrix} \cdot \begin{bmatrix} 5 & -4 & 5 \\ 3 & 1 & 6 \end{bmatrix}$

10. $\begin{bmatrix} -1 \\ 1 \\ -1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -5 \\ 1 & 2 \end{bmatrix}$

11. $\begin{bmatrix} -6 \\ 0 \\ 0 \end{bmatrix} \cdot \begin{bmatrix} -1 & -1 \end{bmatrix}$