

NAME: \_\_\_\_\_

Math 103L: Matrix Operations (Section 4.4)

**These problems are a sample of the kinds of problems that may appear on the final exam. Some answers are included to indicate what is expected. Problems that require a summary statement are marked with Sum. The summary statements should be written in complete sentences and they should include the units of measurement for all quantities mentioned in the summary.**

1. (Worked Example: READ IT!) Both of the Mathematics Departments at CSU Northridge and Fullerton give final exams in College Algebra (CA) and the Mathematical Methods for Business (BM). This uses resources from the department faculty (F) to make the exams, the staff (S) to copy the exams and the teaching assistants (T) to proctor the exams. Here are the labor-hour and wage requirements for administering each exam:

	Faculty	Staff	Teaching Assistants
Business Math Exam	5.0 hrs work	0.5 hrs work	2.0 hrs work
College Algebra Exam	7.0 hrs work	1.0 hrs work	2.0 hrs work

	CSUN	CSU, Fullerton
Faculty	\$40 per hour	\$50 per hour
Staff	\$14 per hour	\$16 per hour
Teaching Assistants	\$8 per hour	\$10 per hour

The labor-hours and wage information is given in the following matrices:

$$M = \begin{bmatrix} 5.0 & 0.5 & 2.0 \\ 7.0 & 1.0 & 2.0 \end{bmatrix}, \quad N = \begin{bmatrix} 40 & 50 \\ 14 & 16 \\ 8 & 10 \end{bmatrix}$$

- (a) Compute the product  $MN$

**Answer:**

$$MN = \begin{bmatrix} 223 & 278 \\ 310 & 386 \end{bmatrix}$$

- (b) What is the (1, 2)-entry (also known as R1C2) of matrix  $MN$  and what does it mean?

**Summary:** The (1, 2)-entry of  $MN$  is 278. \$278 are spent on labor to make up the Business Math Exam at CSU Fullerton.

2. Delta Duplex Properties builds two-family dwellings. They have two models: Economy Model, Deluxe Model. The cost to build depends on the square footage of the building and the size of the lot. Of course, the Deluxe Model building and lot are larger than the Economy Model. Square footage and costs per square foot are given in the tables below:

	Size of building	Size of lot
Economy Model	2300	7000
Deluxe Model	3000	9000

Sizes are given in square feet.

Building cost	Lot cost
\$300	\$100

Costs are given in dollars per square foot.

The size and cost information is given in the following matrices:

$$S = \begin{bmatrix} 2300 & 7000 \\ 3000 & 9000 \end{bmatrix}, \quad C = \begin{bmatrix} 300 \\ 100 \end{bmatrix}.$$

- (a) Compute the product  $SC$ .
- (b) Sum Explain what each of the entries in the product  $SC$  means.