Math 33A – Week 3

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Name: _____

1. Let $(r \times s)$ denote a matrix with size $r \times s$. State whether each product is defined. If it is defined, state the size of the resulting matrix.

   (a) $(2 \times 3)(3 \times 5)$

   (b) $(2 \times 2)(2 \times 3)$

   (c) $(3 \times 4)(3 \times 4)$

   (d) $(4 \times 1)(1 \times 3)$

   (e) $(1 \times 2)(4 \times 1)$

   (f) $(5 \times 2)(2 \times 2)$

2. Let $A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{pmatrix}, B = \begin{pmatrix} 0 & 1 \\ 7 & -1 \\ 2 & 4 \end{pmatrix}$

   (a) Compute AB and BA.

   (b) Does $AB = BA$?

3. (a) Using the formula

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix}^{-1} = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix},$$

calculate A^{-1} if $A = \begin{pmatrix} 3 & -5 \\ -1 & 2 \end{pmatrix}$.

(b) Verify your matrix in (a) is the inverse of A by computing AA^{-1} and $A^{-1}A$.