1 Math 323 Homework 5 Question 1

Given:

$$ad - bc \neq 0 \tag{1}$$

Show

$$A^{-1}A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \tag{2}$$

Consider:

$$A^{-1}A = \frac{1}{ad - bc} \begin{pmatrix} d & -b \\ -c & a \end{pmatrix} \begin{pmatrix} a & b \\ c & d \end{pmatrix} \tag{3}$$

$$= \frac{1}{ad - bc} \begin{pmatrix} ad - bc & bd - bd \\ ac - ac & ad - bc \end{pmatrix} \tag{4}$$

Then distributing the coefficient

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix} \tag{5}$$

Q.E.D.