9 Sample Test Questions With Solutions

Problem 1. True or false? Let A and B be square matrices.

(a) $(A+B)^2 = (B+A)^2$

(b) If columns 1 and 3 of B are the same, then so are the columns 1 and 3 of BA.

(c) If rows 1 and 3 of A are the same, so are rows 1 and 3 of AB.

Problem 2. Find the products EFG and GFE if (upper triangular entries are all zeros)

$$E = \begin{bmatrix} 1 & & & \\ 2 & 1 & & \\ 0 & 0 & 1 & \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad F = \begin{bmatrix} 1 & & & \\ 0 & 1 & & \\ 0 & 2 & 1 & \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad G = \begin{bmatrix} 1 & & & \\ 0 & 1 & & \\ 0 & 0 & 1 & \\ 0 & 0 & 2 & 1 \end{bmatrix}.$$

Problem 3. There are 16 2-by-2 matrices $\begin{bmatrix} * & * \\ * & * \end{bmatrix}$ whose $*$ entries are 0s or 1s. How many of them are invertible?