Name: **Recitation Section:** J

Math 1553 J1-J3 Quiz : Sections 2.1-2.3

Solutions

The quiz has a total of 10 points and you have 10 minutes. Read carefully and clearly show your work.

1. [4 points] If A is a 2×3 matrix and B is a 3×2 matrix. Which of the following are defined? (no justification is needed):

(1) AB
(2) BA^T
(3) $A+B^T$
(4) A^2

Solution.

(1) Yes. AB will be a 2×2 matrix
(2) No. The number of columns of B (2 col.) doesn't match the number of rows of A^T (3 col.)
(3) Yes. Both matrices A and B^T have same number of rows and columns.
(4) No. Only square matrices can be raised to a power.

2. [6 points] Compute the inverse of $A=\begin{pmatrix}1&0&2\\0&0&1\\-1&1&-2\end{pmatrix}$.

(*If there is time, check your answers: e.g.* $AA^{-1}=I$)

Solution.

$A^{-1}=\begin{pmatrix}1&-2&0\\1&0&1\\0&1&0\end{pmatrix}$. Using the algorithm

$$\left(\begin{array}{ccc|ccc}1&0&2&1&0&0\\0&0&1&0&1&0\\-1&1&-2&0&0&1\end{array}\right)$$

$$\xrightarrow{R_2\leftrightarrow R_3}\left(\begin{array}{ccc|ccc}1&0&2&1&0&0\\-1&1&-2&0&0&1\\0&0&1&0&1&0\end{array}\right)$$

$$\xrightarrow{R_2=R_2+R_1}\left(\begin{array}{ccc|ccc}1&0&2&1&0&0\\0&1&0&1&0&1\\0&0&1&0&1&0\end{array}\right)$$

$$\xrightarrow{R_1=R_1-2R_3}\left(\begin{array}{ccc|ccc}1&0&0&1&-2&0\\0&1&0&1&0&1\\0&0&1&0&1&0\end{array}\right)$$