

Show all work.

1. **(10 points)** Either calculate the result of each arithmetic operation, or explain why it cannot be performed.

(a) $\begin{bmatrix} -3 & 1 \\ 2 & 5 \end{bmatrix}^2$

(b) $\begin{bmatrix} 2 & -1 & 3 \\ 0 & 4 & -2 \end{bmatrix} \begin{bmatrix} 3 & -2 \\ 0 & -1 \\ 1 & 2 \end{bmatrix} - 2 \begin{bmatrix} -3 & 1 \\ 2 & 5 \end{bmatrix}$

2. **(3 points)** Test to see if $\begin{bmatrix} 5 & -7 \\ -2 & 3 \end{bmatrix}$ and $\begin{bmatrix} 3 & 7 \\ 2 & 5 \end{bmatrix}$ are inverses. **Explicitly state that they are or are not each other's inverses.**

3. **(7 points)** Find the inverse, if it exists, of the matrix $\begin{bmatrix} 1 & -3 & 0 \\ 0 & 1 & 1 \\ 2 & -1 & 4 \end{bmatrix}$.