Problem 1: [1 point] Let \( M = (\vec{v}_1 \ \vec{v}_2 \ \vec{v}_3) \) be a 2 \times 3 matrix with columns \( \vec{v}_1, \vec{v}_2, \vec{v}_3 \). Suppose \( \vec{v}_3 = \vec{v}_1 - 2\vec{v}_2 \). Under what condition, if any, can we be sure that the equation \( M\vec{x} = \vec{b} \) is consistent?

A: Never consistent.  
B: \( \vec{b} \in \text{span}(\vec{v}_1, \vec{v}_2) \).  
C: \( \vec{b} = \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix} \).  
D: \( \vec{b} = \begin{pmatrix} 2 \\ -1 \\ 0 \end{pmatrix} \).  
E: Always consistent.

Problem 2: [1 point] Let \( N = (\vec{v}_1 \ \vec{v}_2) \) be a 3 \times 2 matrix with columns \( \vec{v}_1, \vec{v}_2 \). Under what condition, if any, can we be sure that the equation \( N\vec{x} = \vec{b} \) is consistent?

A: Never consistent.  
B: \( \vec{b} = \vec{v}_1 + 2\vec{v}_2 \).  
C: \( \vec{b} \neq \vec{0} \).  
D: \( \vec{b} = \vec{v}_1 \times \vec{v}_2 \).  
E: Always consistent.

Problem 3: [1 point] Let \( R \) be the reduced row echelon form of an invertible \( n \times n \) matrix \( A \). Then:

A: \( R \) is the identity matrix.  
B: \( R \) has at least one row of all zeros.  
C: We cannot tell without seeing \( A \).  
D: \( R = A^{-1} \).  
E: \( R \) is proportional to \( A^{-1} \).

Problem 4: [1 point] Which of the following matrices could you get from \( \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix} \) through elementary row operations?

A: All of these.  
B: None of these.  
C: \( \begin{pmatrix} 2 & 5 & 7 \\ 0 & 1 & 3 \\ 4 & 8 & 1 \end{pmatrix} \)  
D: \( \begin{pmatrix} 3 & 1 & 5 \\ 2 & 0 & 3 \\ 3 & 3 & 1 \end{pmatrix} \)  
E: \( \begin{pmatrix} -3 & 1 & 3 \\ -2 & 1 & 0 \\ 3 & 9 & 2 \end{pmatrix} \)

Problem 5: [1 point] Suppose we want to find the equation of the parabola that passes through the points (-1, 9), (1, 5), and (2, 12). What augmented matrix corresponding to a matrix-vector problem could we use to find the parabola?

A: \( \begin{pmatrix} -1 & 1 & 2 \\ 9 & 5 & 12 \end{pmatrix} \)  
B: \( \begin{pmatrix} 1 & 1 & 1 & 9 \\ -1 & 1 & 2 & 5 \\ 1 & 1 & 4 & 12 \end{pmatrix} \)  
C: \( \begin{pmatrix} 1 & -1 & 1 & 9 \\ 1 & 1 & 1 & 5 \\ 1 & 2 & 4 & 12 \end{pmatrix} \)  
D: \( \begin{pmatrix} 1 & -1 & 1 \\ 1 & 1 & 1 \\ 1 & 2 & 4 \\ 9 & 5 & 12 \end{pmatrix} \)  
E: \( \begin{pmatrix} 1 & 0 & 0 & 9 \\ 0 & 1 & 0 & 5 \\ 0 & 0 & 1 & 12 \end{pmatrix} \)