1. A
2. A
3. C
4. E
5. C
6. B
7. D
8. (1) \[
\begin{bmatrix}
1 & 1 & a & 1 \\
0 & 1 & a^2 - 2 & a \\
0 & 0 & a^2 - 3a & a
\end{bmatrix}
\] (Answer may vary)

(2) \( a = 0 \)  (3) \( a = 3 \)  (4) \( a \) is not 0 or 3.

9. (1) The REDUCED row echelon form for the matrix \( A \) is \[
\begin{bmatrix}
1 & 0 & 0 & -2 & 4 \\
0 & 0 & 1 & 0 & 1 \\
0 & 0 & 0 & 0 & 0
\end{bmatrix}
\]

(2) A basis for the null space of \( A \) is \[
\left\{ \begin{bmatrix} 0 \\ 1 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} , \begin{bmatrix} 2 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 1 \end{bmatrix} , \begin{bmatrix} -4 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ -1 \\ 1 \end{bmatrix} \right\} . \quad \text{Answer may vary!}
\]

10. (1) The determinant is 12.

(2) \( b_{32} = \frac{1}{3} \).