1. (1 pt)
Find the determinant of the matrix
\[ A = \begin{bmatrix} -2 & -2 \\ 7 & -3 \end{bmatrix} \]
\[ \text{det}(A) = \quad \]

2. (1 pt)
Find the determinant of the matrix
\[ B = \begin{bmatrix} 2 & -3 & 1 \\ 4 & 4 & 5 \\ -3 & 4 & -5 \end{bmatrix} \]
\[ \text{det}(B) = \quad \]

3. (1 pt)
Find the determinant of the matrix
\[ C = \begin{bmatrix} 0 & 1 & 1 & 0 \\ 0 & -3 & -3 & 0 \\ 1 & 1 & -1 & -2 \\ 2 & 1 & -2 & 1 \end{bmatrix} \]
\[ \text{det}(C) = \quad \]

4. (1 pt) You’ll need to use formatted text mode in order to do this problem: click the ”formatted text” radio button at the bottom of the page and then click ”submit answer”.
If
\[ A = \begin{pmatrix} -2 & -2 \\ 3 & 2 \end{pmatrix} \]
Then
\[ \text{det}(A) = \quad \text{and} \quad A^{-1} = \begin{pmatrix} \quad \quad \\ \quad \quad \end{pmatrix} \]

5. (1 pt) You’ll need to use formatted text mode in order to do this problem: click the ”formatted text” radio button at the bottom of the page and then click ”submit answer”.
If
\[ A = \begin{pmatrix} 0 & 2 \\ 1 & -4 \end{pmatrix} \]
Then
\[ \text{det}(A) = \quad \text{and} \quad A^{-1} = \begin{pmatrix} \quad \quad \\ \quad \quad \end{pmatrix} \]

Find \( k \) such that the matrix
\[ M = \begin{bmatrix} -3 & 5 & -1 \\ -6 & 6 & -6 \\ 1+k & -1 & 5 \end{bmatrix} \]
is singular.
\[ k = \quad \]

9. (1 pt)
If \( A \) and \( B \) are \( 4 \times 4 \) matrices, \( \text{det}(A) = 2 \), and \( \text{det}(B) = 4 \), then
\[ \text{det}(AB) = \quad \]
\[ \text{det}(-2A) = \quad \]
\[ \text{det}(B^{-1}) = \quad \]
\[ \text{det}(B^3) = \quad \]

10. (1 pt)
Consider the following general matrix equation:
\[ \begin{pmatrix} a_1 \\ a_2 \end{pmatrix} = \begin{pmatrix} m_{11} & m_{12} \\ m_{21} & m_{22} \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} \]
which can also be abbreviated as:
\[ A = MX \]
By definition, the determinant of \( M \) is given by
\[ \text{det}(M) = m_{11}m_{22} - m_{12}m_{21} \]
The following questions are about the relationship between the determinant of \( M \) and the ability to solve the equation above for \( A \) in terms of \( X \) or for \( X \) in terms of \( A \).
Check the boxes which make the statement correct:
If the \( \text{det}(M) \neq 0 \) then
- A. given any \( A \) there is one and only one \( X \) which will satisfy the equation.
- B. some values of \( X \) will have more than one value of \( A \) which satisfy the equation.
- C. given any \( A \) there is one and only one \( X \) which will satisfy the equation.
- D. some values of \( X \) will have no values of \( A \) which satisfy the equation.
- E. some values of \( X \) will have no values of \( A \) which satisfy the equation.
- F. some values of \( A \) (such as \( A = 0 \)) will allow more than one \( X \) to satisfy the equation.

Check the boxes which make the statement correct:
If the \( \text{det}(M) = 0 \) then
- A. there is no value of \( X \) which satisfies the equation when \( A = 0 \).
- B. some values of \( A \) (such as \( A = 0 \)) will allow more than one \( X \) to satisfy the equation.
- C. given any \( A \) the is one and only one \( X \) which will satisfy the equation.
• D. given any $X$ there is one and only one $A$ which will satisfy the equation.
• E. some values of $A$ will have no values of $X$ which will satisfy the equation.

Check the conditions that guarantee that $\det(M) = 0$:
• A. Given any $A$ the is one and only one $X$ which will satisfy the equation.
• B. There is some value of $A$ for which no value of $X$ satisfies the equation.
• C. When $A = 0$ there is more than one $X$ which satisfies the equation.
• D. Given any $X$ there is one and only one $A$ which will satisfy the equation.