

Matrices and Determinants
12th Grade

Place all answers in the blank space provided. Reduce all fractions to lowest terms. You are not expected to answer all the questions.

Note: $| \quad |$ denotes a determinant, $[\quad]$ denotes a matrix.

_____ Q1. Solve $AX = \begin{bmatrix} 1 \\ -2 \\ 3 \end{bmatrix}$ for X if $A^{-1} = \begin{bmatrix} 1 & 3 & 0 \\ 0 & 2 & -1 \\ -1 & 4 & -5 \end{bmatrix}$.

_____ Q2. Find A^{-1} if $A = \begin{bmatrix} 3 & -2 \\ 5 & -4 \end{bmatrix}$.

_____ Q3. Find x such that $\left| \begin{bmatrix} 2x-1 & 3 \\ 6 & x+1 \end{bmatrix} \right| = 2$.

_____ Q4. Solve the system of equations:

$$\begin{aligned} 2x - 3y &= 4 \\ -7x + 6y &= 3 \end{aligned}$$

_____ Q5. Find $\begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}^{2012}$.

_____ Q6. Given $A = \begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix}$ and the determinant of A is 6. What is the determinant of $-3A$?

_____ Q7. Find all solutions of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix} X = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$.

_____ Q8. For what values of x is $A = \begin{bmatrix} x & 1 & 0 \\ x^2 & 2 & 1 \\ 2 & 3 & 1 \end{bmatrix}$ a singular matrix?

_____ Q9. If A is an $m \times n$ matrix and B is a $p \times q$ matrix, what conditions on m , n , p and q ensure that $A \times B$ is a 4×1 matrix?

_____ Q10. Find $|A|$ if $A = \begin{bmatrix} 5 & 0 & 0 & 0 & 0 \\ 5 & 4 & 0 & 0 & 0 \\ 5 & 4 & 3 & 0 & 0 \\ 5 & 4 & 3 & 2 & 0 \\ 5 & 4 & 3 & 2 & 1 \end{bmatrix}$.