

16. For what value(s) of a does the following linear system have a unique solution?

$$\begin{aligned}x + y - z &= 2 \\x + 2y + z &= 3 \\x + y + (a^2 - 5)z &= a\end{aligned}$$

- a) $a = 2$ b) $a = -2$ c) $a = \pm 2$ d) $a \neq \pm 2$
e) There is no such a .

18. If $\begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix} = 4$, which of the following is equal to $\begin{vmatrix} a_1 & a_2 & 4a_3 - 2a_2 \\ b_1 & b_2 & 4b_3 - 4b_2 \\ \frac{1}{2}c_1 & \frac{1}{2}c_2 & 2c_3 - c_2 \end{vmatrix}$?

a) 8 b) 6 c) 4 d) 2 e) 1

19. If $A = \begin{bmatrix} 3 & 4 \\ 1 & 1 \end{bmatrix}$ and $AB = \begin{bmatrix} 1 & 0 & -2 & 5 \\ 4 & -1 & 0 & 3 \end{bmatrix}$, which of the following is the $(2, 4)$ -entry (b_{24}) of B ?

a) -2 b) 3 c) 8 d) -4 e) 11

ANSWER KEY

17. Let A be a nonsingular matrix whose inverse is $A^{-1} = \begin{bmatrix} 4 & 1 \\ 1 & 0 \end{bmatrix}$ and let $b = \begin{bmatrix} 1 \\ -2 \end{bmatrix}$. Which of the following is a solution of the linear system $A^T x = b$?

- a) $x = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ b) $x = \begin{bmatrix} 2 \\ -1 \end{bmatrix}$ c) $x = \begin{bmatrix} 2 \\ 1 \end{bmatrix}$
d) $x = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$ e) $x = \begin{bmatrix} -2 \\ -1 \end{bmatrix}$

20. Determine the value of $a_{11}A_{12} + a_{21}A_{22} + a_{31}A_{32}$ for the matrix $A = \begin{bmatrix} -2 & 3 & 0 \\ 4 & 1 & -3 \\ 2 & 0 & 1 \end{bmatrix}$, where A_{ij} is the cofactor of each a_{ij} ?

a) 0 b) -32 c) 32 d) 16 e) -16