

2) For the system of linear equations:

$$x - 2y = 1, \quad x - y + kz = -2, \quad ky + 4z = 6, \quad k \in \mathbb{R}$$

consider the following statements:

[Main Feb 24, 2021 (I)]

- (A) The system has unique solution if $k \neq 2, k \neq -2$.
- (B) The system has unique solution if $k = -2$.
- (C) The system has no solution if $k = 2$.
- (D) The system has no solution if $k = 2$.
- (E) The system has infinite number of solutions if $k \neq -2$.

which of the following statements are correct?

- (a) (C) and (D) only.
- (b) (B) and (E) only
- (c) (A) and (E) only
- (d) (A) and (D) only

Solution:

$$(d) \quad D = \begin{vmatrix} 1 & -2 & 0 \\ 1 & -1 & k \\ 0 & k & 4 \end{vmatrix} = 4 - k^2$$

so, A is correct and B, C, E are incorrect.

If $k = 2$

$$D_1 = \begin{vmatrix} 1 & -2 & 0 \\ -2 & -1 & 2 \\ 6 & 2 & 4 \end{vmatrix} = -48 \neq 0$$

So, no solution.

D is correct.