MATRICES

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dec 2023

1. The pair of linear equations $\frac{3x}{2} + \frac{5y}{3} = 7$ and $9x + 10y = 14$ is

   (a) consistent

   (b) inconsistent

   (c) consistent with one solution

   (d) consistent with many solutions

2. A fraction becomes $\frac{1}{3}$ when 1 is subtracted from the numerator and it becomes $\frac{1}{4}$ when 8 is added to its denominator. Find the fraction.

3. The present age of a father is three years more than three times the age of his son. Three years hence the father's age will be 10 years more than twice the age of the son. Determine their present ages.

4. If A is an non-singular square matrix of order 3 such that $A^2 = 3A$, then value of $\left|A\right|$ is

   (a) -3

   (b) 3

   (c) 9

   (d) 27

5. If $\begin{vmatrix} 2x & -9 \\ -2 & x \end{vmatrix} = \begin{vmatrix} -4 & 8 \\ 1 & -2 \end{vmatrix}$, then value of x is.

6. If $A = \begin{vmatrix} -3 & 2 \\ 1 & -1 \end{vmatrix}$ and $I = \begin{vmatrix} 1 & 0 \\ 0 & 1 \end{vmatrix}$, find scalar k so that $A^2 + I = kA$.

7. If $A = \begin{bmatrix} 5 & -1 & 4 \\ 2 & 3 & 5 \\ 5 & -2 & 6 \end{bmatrix}$, find A^{-1} and use it to solve the following system of equation:

$$5x - y + 4z = 5 \quad (1)$$
$$2x + 3y + 5z = 2 \quad (2)$$
$$5x - 2y + 6z = -1 \quad (3)$$

8. If x, y, z are different and $\begin{vmatrix} x & x^2 & 1 + x^3 \\ y & y^2 & 1 + y^3 \\ z & z^3 & 1 + z^3 \end{vmatrix} = 0$, then using properties of determinants show that $1 + xyz = 0$.