

Matrix assignment

July 27, 2023

Questions

1. The pair of linear equations $2x=5y+6$ and $15y=6x-18$ represents two lines which are :
 - (a) intersecting
 - (b) parallel
 - (c) coincident
 - (d) either intersecting or parallel
2. Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey ₹ x per student and cricket ₹ y per student. School 'P' decided to award a total of ₹9,500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award ₹7,370 for the two games to 4 and 3 students respectively.
Based on the given information, answer the following questions :



Figure 1:

(i) Represent the following information algebraically (in terms of x and y).

(ii) (a) what is the prize amount for hockey ?

OR

(b) Prize amount on which game is more and by how much ?

(iii) what will be the total prize amount if there are 2 students each from two games ?

3. If the pair of equations $3x - y + 8 = 0$ and $6x - ry + 16 = 0$ represents coincident lines, then the values of ' r ' is :

(a) $-\frac{1}{2}$

(b) $\frac{1}{2}$

(c) 2

(d) -2

4. The pair of equations $x=a$ and $y=b$ graphically represents lines which are :

(a) parallel

(b) intersecting at (b,a)

(c) coincident

(d) intersecting at (a,b)

5. (a) If the system of linear equations $2x + 3y = 7$ and $2ax + (a + b)y = 28$ have infinite number of solutions, then find the values of ' a ' and ' b '.

OR

(b) If $217x + 131y = 913$ and $131x + 217y = 827$, then solve the equations for the values of x and y .

6. Half of the difference between two numbers is 2. The sum of the greater number and twice the smaller number is 3. Find the numbers.

7. If $(a, b), (c, d)$ and (e, f) are the vertices of ΔABC and Δ denotes the area of ΔABC , then $\begin{vmatrix} a & c & e \\ b & d & f \\ 1 & 1 & 1 \end{vmatrix}^2$ is equal to
- (a) $2\Delta^2$
 - (b) $4\Delta^2$
 - (c) 2Δ
 - (d) 2Δ
8. If $\begin{bmatrix} 2 & 0 \\ 5 & 4 \end{bmatrix} = P + Q$ is a symmetric and Q is a skew symmetric matrix, then Q is equal to
- (a) $\begin{bmatrix} 2 & \frac{5}{2} \\ \frac{5}{2} & 4 \end{bmatrix}$
 - (b) $\begin{bmatrix} 0 & -\frac{5}{2} \\ \frac{5}{2} & 0 \end{bmatrix}$
 - (c) $\begin{bmatrix} 0 & \frac{5}{2} \\ -\frac{5}{2} & 0 \end{bmatrix}$
 - (d) $\begin{bmatrix} 2 & -\frac{5}{2} \\ \frac{5}{2} & 4 \end{bmatrix}$
9. If $\begin{bmatrix} 1 & 2 & 1 \\ 2 & 3 & 1 \\ 3 & a & 1 \end{bmatrix}$ is non-singular matrix and $a \in A$, then the set A is
- (a) \mathbb{R}
 - (b) $\{0\}$
 - (c) $\{4\}$
 - (d) $\mathbb{R} - \{4\}$

10. If $|A| = |kA|$, where A is a square matrix of order 2, then sum of all possible values of k is

- (a) 1
- (b) -1
- (c) 2
- (d) 0

11. (a) If $A = \begin{bmatrix} -3 & -2 & -4 \\ 2 & 1 & 2 \\ 2 & 1 & 3 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 0 \\ -2 & -1 & -2 \\ 0 & -1 & 1 \end{bmatrix}$, then find AB and use it to solve the following system of equations :

$$\begin{aligned} x - 2y &= 3 \\ 2x - y - z &= 2 \\ -2y + z &= 3 \end{aligned}$$

OR

(b) If $f(\alpha) = \begin{bmatrix} \cos \alpha & -\sin \alpha & 0 \\ \sin \alpha & \cos \alpha & 0 \\ 0 & 0 & 1 \end{bmatrix}$, then prove that $f(\alpha) \cdot f(-\beta) = f(\alpha - \beta)$.