

TOPIC: MATRICES

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Q. 1 If $\begin{bmatrix} 9 & -1 & 4 \\ -2 & 1 & 3 \end{bmatrix} = A + \begin{bmatrix} 1 & 2 & -1 \\ 0 & 4 & 9 \end{bmatrix}$, then find the matrix A.

Q. 2 If matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and $A^2 = kA$, then write the value of k.

Q. 3 If matrix $A = \begin{bmatrix} 2 & -2 \\ -2 & 2 \end{bmatrix}$ and $A^2 = pA$, then write the value of p.

Q. 4 If matrix $A = \begin{bmatrix} 3 & -3 \\ -3 & 3 \end{bmatrix}$ and $A^2 = \lambda A$, then write the value of λ .

Q. 5 Simplify

$$\cos \theta \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix} + \sin \theta \begin{bmatrix} \sin \theta & -\cos \theta \\ \cos \theta & \sin \theta \end{bmatrix}$$

Q. 6 If $2 \begin{bmatrix} 3 & 4 \\ 5 & x \end{bmatrix} + \begin{bmatrix} 1 & y \\ 0 & 1 \end{bmatrix} = \begin{bmatrix} 7 & 0 \\ 10 & 5 \end{bmatrix}$, then find $(x - y)$

Q. 7 Solve the following matrix equation for x

$$\begin{bmatrix} x & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ -2 & 0 \end{bmatrix} = 0$$

Q. 8 If A is a square matrix such that $A^2 = A$, then write the value of $7A - (I + A)^3$, Where I is an identity matrix.

Q. 9 If $\begin{bmatrix} x-y & z \\ 2x-y & w \end{bmatrix} = \begin{bmatrix} -1 & 4 \\ 0 & 5 \end{bmatrix}$, then find the value of $x + y$.

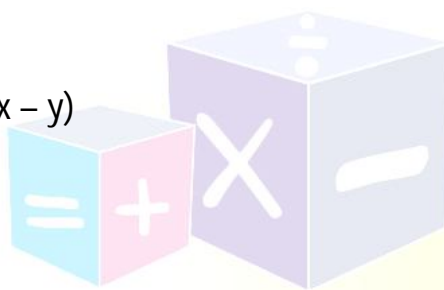
Q. 10 If $\begin{bmatrix} a+4 & 3b \\ 8 & -6 \end{bmatrix} = \begin{bmatrix} 2a+2 & b+2 \\ 8 & a-8b \end{bmatrix}$, write the value of $a - 2b$.

Q. 11 If $\begin{bmatrix} x.y & 4 \\ z+6 & x+y \end{bmatrix} = \begin{bmatrix} 8 & w \\ 0 & 6 \end{bmatrix}$, write the value of $(x + y + z)$.

Q. 12 The element a_{ij} of a 3×3 matrix are given by $a_{ij} = \frac{1}{2} |-3i + j|$. Write the value of element a_{32} .

Q. 13 If $\begin{bmatrix} 2x & 4 \\ x & -8 \end{bmatrix} = 0$, find the positive value of x.

Q. 14 If, $2 \begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$ then find the value of $(x + y)$.



Q. 15 If $\begin{bmatrix} x+y & 1 \\ 2y & 5 \end{bmatrix} = \begin{bmatrix} 7 & 1 \\ 4 & 5 \end{bmatrix}$, then find the value of x.

Q. 16 If $\begin{bmatrix} 2x+y & 3y \\ 0 & 4 \end{bmatrix} = \begin{bmatrix} 6 & 0 \\ 0 & 4 \end{bmatrix}$, then find the value of x.

Q. 17 If $\begin{bmatrix} 3y-x & -x \\ 3 & 7 \end{bmatrix} = \begin{bmatrix} 5 & -2 \\ 3 & 7 \end{bmatrix}$, then find the value of y.

Q. 18 If $\begin{bmatrix} 2x & 1 \\ 5 & x+2y \end{bmatrix} = \begin{bmatrix} 4 & 1 \\ 5 & 0 \end{bmatrix}$, then find the value of y.

Q. 19 If $\begin{bmatrix} y+2x & 5 \\ -x & 3 \end{bmatrix} = \begin{bmatrix} 7 & 5 \\ -2 & 3 \end{bmatrix}$, then find the value of y.

Q. 20 Find the value of x, if

$$\begin{bmatrix} 3x+y & -y \\ 2y-x & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ -5 & 3 \end{bmatrix}$$

Q. 21 Find the value of y,

$$\text{If } \begin{bmatrix} x-y & 2 \\ x & 5 \end{bmatrix} = \begin{bmatrix} 2 & 2 \\ 3 & 5 \end{bmatrix}$$

Q. 22 Find the value of x,

$$\text{If } \begin{bmatrix} 2x-y & 5 \\ 3 & y \end{bmatrix} = \begin{bmatrix} 6 & 5 \\ 3 & -2 \end{bmatrix}$$

Q. 23 If $\begin{bmatrix} 15 & x+y \\ 2 & y \end{bmatrix} = \begin{bmatrix} 15 & 8 \\ x-y & 3 \end{bmatrix}$ find the value of x.

Q. 24 Find the value of a, if

$$\begin{bmatrix} a-b & 2a+c \\ 2a-b & 3c+d \end{bmatrix} = \begin{bmatrix} -1 & 5 \\ 0 & 13 \end{bmatrix}$$

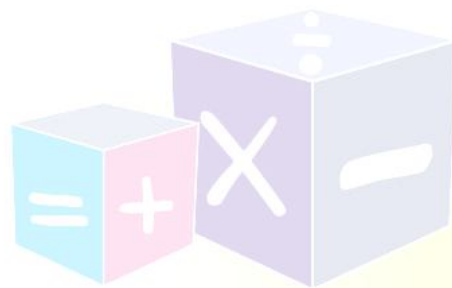
Q. 25 Find the value of y - x from following equation

$$2 \begin{bmatrix} x & 5 \\ 7 & y-3 \end{bmatrix} + \begin{bmatrix} 3 & -4 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 7 & 6 \\ 15 & 14 \end{bmatrix}$$

Q. 26 If $x \begin{bmatrix} 2 \\ 3 \end{bmatrix} + y \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 10 \\ 5 \end{bmatrix}$, then write the value of x.

Q. 27 If $3A - B = \begin{bmatrix} 5 & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$, then find the matrix A.

Q. 28 Write the value of x - y + z from following equation



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$$\begin{bmatrix} x+y+z \\ x+z \\ y+z \end{bmatrix} = \begin{bmatrix} 9 \\ 5 \\ 7 \end{bmatrix}.$$

Q. 29 Write the order of product matrix

$$\begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} [2 \ 3 \ 4]$$

Q. 30 If a matrix has 5 elements, then write all possible orders it can have.

Q. 31 For a 2 X 2 matrix, $A = [a_{ij}]$ whose elements are given by $a_{ij} = i / j$, write the value of a_{12} .

Q. 32 If $A = \begin{bmatrix} 2 & 4 \\ 3 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 3 \\ -2 & 5 \end{bmatrix}$, then find $A - B$.

Q. 33 If $\begin{bmatrix} x+2y & 3y \\ 4x & 2 \end{bmatrix} = \begin{bmatrix} 0 & -3 \\ 8 & 2 \end{bmatrix}$, then find x and y .

Q. 34 Find x and y , if $2 \begin{bmatrix} 1 & 3 \\ 0 & x \end{bmatrix} + \begin{bmatrix} y & 0 \\ 1 & 2 \end{bmatrix} = \begin{bmatrix} 5 & 6 \\ 1 & 8 \end{bmatrix}$

Q. 35 If, $A = \begin{bmatrix} 2 & 0 & 1 \\ 2 & 1 & 3 \\ 1 & -1 & 0 \end{bmatrix}$, then find value of $A^2 - 3A + 2I$.

Q. 36 If, $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, then find value of $A^2 - 4A - 5I = 0$.

Q. 37 If $\begin{bmatrix} x & x-y \\ 2x+y & 7 \end{bmatrix} = \begin{bmatrix} 3 & 1 \\ 8 & 7 \end{bmatrix}$, then find the value of y .

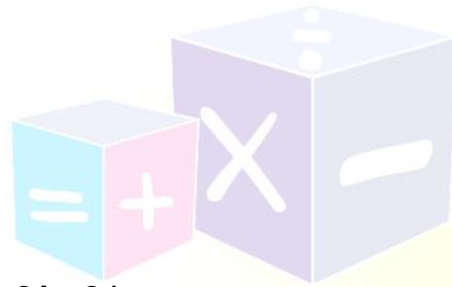
Q. 38 From the following matrix equation, find the value of x .

$$\begin{bmatrix} x+y & 4 \\ -5 & 3y \end{bmatrix} = \begin{bmatrix} 3 & 4 \\ -5 & 6 \end{bmatrix}$$

Q. 39 Find x from the matrix equation

$$\begin{bmatrix} 1 & 3 \\ 4 & 5 \end{bmatrix} \begin{bmatrix} x \\ 2 \end{bmatrix} = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$$

Q. 40 If $\begin{bmatrix} 3 & 4 \\ 2 & x \end{bmatrix} \begin{bmatrix} x \\ 1 \end{bmatrix} = \begin{bmatrix} 19 \\ 15 \end{bmatrix}$, then find the value of x .



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Q. 41 If $A = \begin{bmatrix} \cos \alpha & -\sin \alpha \\ \sin \alpha & \cos \alpha \end{bmatrix}$, then for what value of α , A is an identity matrix?

Q. 42 $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} \begin{bmatrix} 3 & 1 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} 7 & 11 \\ k & 23 \end{bmatrix}$, then write the value of k.

Q. 43 If A is a matrix of order 3 X 4 and B is a matrix of order 4 X 3, then find order of matrix (AB).

Q. 44 Find A^{-1} $\begin{bmatrix} -1 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$

Q. 45 Find A^{-1} $\begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$

Q. 46 Find A^{-1} $\begin{bmatrix} 1 & 3 & -2 \\ -3 & 0 & -1 \\ 2 & 1 & 0 \end{bmatrix}$

Q. 47 Find A^{-1} $\begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$

Q. 48 Find A^{-1} $\begin{bmatrix} 3 & 0 & -1 \\ 2 & 3 & 0 \\ 0 & 4 & 1 \end{bmatrix}$

Q. 49 Find A^{-1} $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$

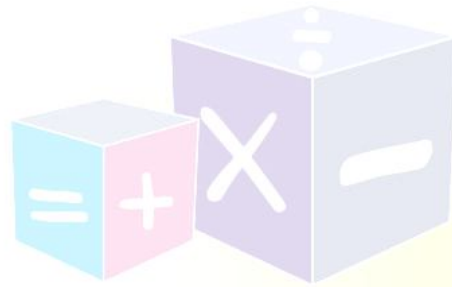
Q. 50 Use elementary column operations $C_2 \rightarrow C_2 - 2C_1$ in the matrix equation

$$\begin{bmatrix} 4 & 2 \\ 3 & 3 \end{bmatrix} = \begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix} \begin{bmatrix} 2 & 0 \\ 1 & 1 \end{bmatrix}$$

Q. 51 Using elementary row transformation (ERT),

find inverse of matrix $A = \begin{bmatrix} 6 & 5 \\ 5 & 4 \end{bmatrix}$

Q. 52 Find A^{-1} , by using elementary row transformation for matrix $A = \begin{bmatrix} 3 & 2 \\ 7 & 5 \end{bmatrix}$



Q. 53 Using elementary row transformation , find inverse of matrix $A = \begin{bmatrix} 2 & 5 \\ 1 & 3 \end{bmatrix}$

Q.54 Using matrices, solve the following system of equation.

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$$x - y + 2z = 7$$

$$3x + 4y - 5z = -5$$

$$\text{and } 2x - y + 3z = 12$$

Q.55 Using matrices, solve the following system of linear equations.

$$x + y - z = 3$$

$$2x + 3y + z = 10$$

$$\text{and } 3x - y - 7z = 1$$

Q.56. If $A = \begin{bmatrix} 1 & 2 & 1 \\ -1 & 1 & 1 \\ 1 & -3 & 1 \end{bmatrix}$, then find A^{-1} and hence solve the system of equations

$$x + 2y + z = 4$$

$$-x + y + z = 0$$

$$\text{and } x - 3y + z = 4$$

Q.57. Determination the product of $\begin{bmatrix} -4 & 4 & 4 \\ -7 & 1 & 3 \\ 5 & -3 & -1 \end{bmatrix} \begin{bmatrix} 1 & -1 & 1 \\ 1 & -2 & -2 \\ 2 & 1 & 3 \end{bmatrix}$ and then use tp

Q.58. solve the system of equations

$$x - y + z = 4$$

$$x - 2y - 2z = 9$$

$$\text{and } 2x + y + 3z = 1$$

Q.59. Using matrix method, solve the following system of equations.

$$\frac{2}{x} + \frac{3}{y} + \frac{10}{z} = 4$$

$$\frac{4}{x} - \frac{6}{y} + \frac{5}{z} = 1$$

$$\text{and } \frac{6}{x} + \frac{9}{y} - \frac{20}{z} = 2, x, y, z \neq 0$$

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Q.60. Using matrices, solve the following system of equations.

$$4x + 3y + 2z = 60$$

$$x + 2y + 3z = 45$$

$$\text{and } 6x + 2y + 3z = 70$$

Q.61. Using matrices, solve the following system of equations.

$$x + 2y + z = 7$$

$$x + 3z = 11$$

$$\text{and } 2x - 3y = 1$$

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Q.62. Using matrices, solve the following system of equations.

$$x + 2y - 3z = -4$$

$$2x + 3y + 2z = 2$$

$$\text{and } 3x - 3y - 4z = 11$$

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Q.63. Solve the following system of equations, by using matrix method.

$$3x - 2y + 3z = 8$$

$$2x + y - z = 1$$

$$\text{and } 4x - 3y + 2z = 4$$

Q.64. Using matrices, solve the following system of equations

$$x + y + z = 1$$

$$z - 2y + 3z = 2$$

$$\text{and } x - 3y + 5z = 3$$

Q.65. Using matrices, solve the following system of equations

$$8x + 4y + 3z = 18$$

$$2x + y + z = 5$$

$$\text{and } x + 2y + z = 5$$

Page | 7 Q.66. Using matrices, solve the following system of equations

$$x + y - z = 3$$

$$2x + 3y + z = 10$$

$$\text{and } 3x - y - 7z = 1$$

Q.67. Using matrices, solve the following system of equations

$$2x + 8y + 5z = 5$$

$$x + y + z = -2$$

$$\text{and } x + 2y - z = 2$$

Q.68. Using matrices, solve the following system of equations

$$x - y + 2z = 1$$

$$2y - 3z = 1$$

$$\text{and } 3x - 2y + 4z = 2$$

Q.69. Using matrices, solve the following system of equations

$$2x + y + z = 7$$

$$x - y - z = -4$$

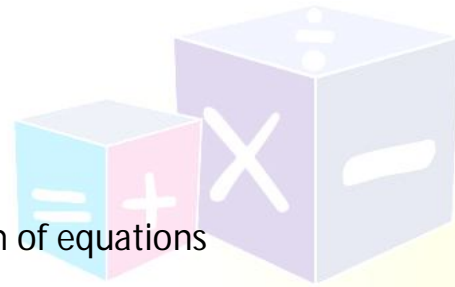
$$\text{and } 3x + 2y + z = 10$$

Q.70. Use produce $\begin{bmatrix} 1 & -1 & 2 \\ 0 & 2 & -3 \\ 3 & -2 & 4 \end{bmatrix} \begin{bmatrix} -2 & 0 & 1 \\ 9 & 2 & -3 \\ 6 & 1 & -2 \end{bmatrix}$ to solve the system of equations.

$$x - y + 2z = 1$$

$$2y - 3z = 1$$

$$\text{and } 3x - 2y + 4z = 2$$



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Q.71. If $A = \begin{bmatrix} 2 & -1 & 1 \\ 3 & 0 & -1 \\ 2 & 6 & 0 \end{bmatrix}$, then find A^{-1} . Using A^{-1} , solve the following system of equations.

$$2x - y + z = -3$$

$$3x - z = 0$$

$$\text{and } 2x + 6y - z = 2$$

Q.72. If $A = \begin{bmatrix} 1 & -2 & 1 \\ 0 & -1 & 1 \\ 2 & 0 & -3 \end{bmatrix}$, then find A^{-1} . Using A^{-1} , solve the following system of equations.

$$x - 2y + z = 0$$

$$-y + z = -2$$

$$\text{and } 2x - 3z = 10$$

Q.73. If $A = \begin{bmatrix} 1 & -2 & 0 \\ 2 & 1 & 3 \\ 0 & -2 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 7 & 2 & -6 \\ -2 & 1 & -3 \\ -4 & 2 & 5 \end{bmatrix}$ then find AB and hence solve system of equations.

$$x - 2y = 10$$

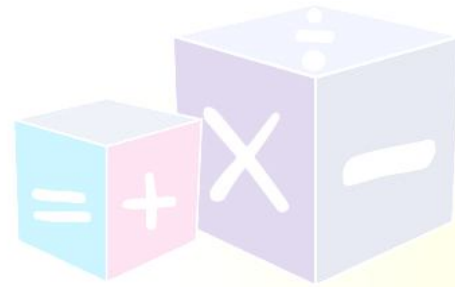
$$2x + y + 3z = 8$$

$$\text{and } -2y + z = 7$$

Q.74. If $A = \begin{bmatrix} 3 & -4 & 2 \\ 2 & 3 & 5 \\ 1 & 0 & 1 \end{bmatrix}$ then find A^{-1} and hence solve the following system of equations

$$3x - 4y + 2z = -1$$

$$2x + 3y + 5z = 7$$



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$$\text{and } x + z = 2$$

Page | 9 Q.75. If $A = \begin{bmatrix} 8 & -4 & 1 \\ 10 & 0 & 6 \\ 8 & 1 & 6 \end{bmatrix}$ then find A^{-1} and hence solve the following system of equations

$$8x - 4y + z = 5$$

$$10x + 6z = 4$$

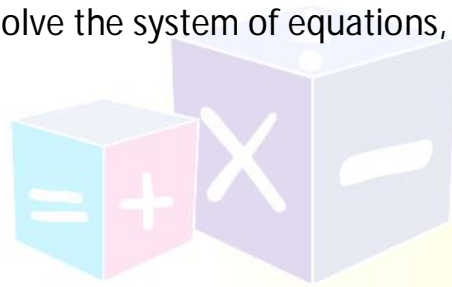
$$\text{and } 8x + y + 6z = 5/2$$

Q.76. Find A^{-1} , where $A = \begin{bmatrix} 1 & 2 & -3 \\ 2 & 3 & 2 \\ 3 & -3 & -4 \end{bmatrix}$. Hence, solve the system of equations,

$$x + 2y - 3z = -4$$

$$2x + 3y + 2z = 2$$

$$\text{and } 3x - 3y - 4z = 11$$



Q.77. If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 3 & 4 \\ 0 & 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -4 \\ -4 & 2 & -4 \\ 2 & -1 & 5 \end{bmatrix}$ then find AB . Use this to solve the system of equations

$$x - y = 3$$

$$2x + 3y + 4z = 17$$

$$\text{And } y + 2z = 7$$

Q.78. $A = \begin{bmatrix} 3 & 2 & 1 \\ 4 & -1 & 2 \\ 7 & 3 & -3 \end{bmatrix}$, then find A^{-1} . Hence, solve the following system of equations

$$3x + 2y + z = 6$$

$$4x - y + 2z = 5$$

$$\text{And } 7x + 3y - 3z = 7$$

$$X + y + z = 6$$

$$X + 2z = 7$$

Q.80. Two schools, P and Q, want to award their selected students for the values of sincerity, truthfulness and hard work at the rate of Rs. X, Rs. Y and Rs. Z for each respective value per student. School P awards its 2, 3 and 4 students on the above respective values with a total prize money of Rs. 4600. School Q wants to award its 3, 2 and 3 students on the respective values with a total award money of Rs. 4100. If the total amount of award money for one prize on each value is Rs. 1500, using matrices find the award money for each value. Suggest one other value which the school can consider for awarding the students.

Q.81. Two institutions decided to award their employees for the three values of resourcefulness, competence and determination in the form of prizes at the rate of Rs. X, Rs. Y and Rs. Z respectively per person. The first institution decided to award respectively 4, 3 and 2 employees with a total prize money of Rs. 37000 and the second institution decided to award respectively 5, 3 and 4 employees with a total prize money Rs. 47000. If all the three prizes per person together amount to Rs. 12000, then using matrix method, find the values of X, Y and Z. What values are described in this question?

Q.82. A school wants to award its students for the value of honesty, regularity and hard work with a total cash award of Rs. 6000. Three times the award money for hard work added to that given for honesty, amount to Rs. 11000. The award money for honesty and hard work together is double the one given for regularity. Represent the above situation algebraically and find the award money for each value, using matrix method. Apart from these values, namely, honesty, regularity and hard work, suggest one more value which the school must include for award.

Q.83. The management committee of a residential colony decided to award some of its members (say X) for honesty, some (say y) for helping others and some others (say z) for supervising the workers to keep the colony neat and clean. The sum of all the awardees is 12. Three times the sum of awardees for cooperation and supervision added to two times the number of awardees for honesty is 33. If the sum of the number of awardees for honesty and supervision is twice the

number for honesty for helping others, using matrix method, find the number of awardees of each category. Apart from these values, namely, honesty, cooperation and supervision, suggest one more value which the management of the colony must include for awards.

Q.84. Two schools P and Q want to award their selected students on the values of discipline, politeness and punctuality. The school P wants to award Rs. X each, Rs. Y each and Rs. Z each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs. 1000. School Q wants to spend Rs. 1500 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as before). If the total amount of award for one prize on each value is Rs. 600, using matrices, find the award money for each value. Apart from the above three values, suggest one more value for awards.

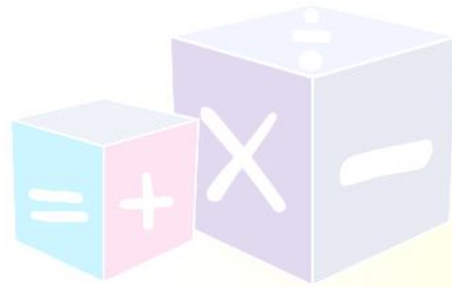
Q.85. Two schools A and B want to award their selected students on the values of sincerity, truthfulness and helpfulness. The school A wants to award Rs. X each, Rs. Y each and Rs. Z each for the three respective values 3, 2 and 1 students, respectively with a total award money of Rs. 1600. School B wants to spend Rs. 2300 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as before). If the total amount of award one prize on each value is Rs. 900, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

Q.86. Two schools P and Q want to award their selected students on the values of tolerance kindness and leadership. The school P want to award Rs. X each, Rs. Y each and Rs. Z each for the three respective values to 3, 2 and 1 students respectively with a total award money of Rs. 2200. School Q wants to spend Rs. 3100 to award its 4, 1 and 3 students on the respective values (by giving the same award money to the three values as school P). If the total amount of award for one prize on each value is Rs. 1200, using matrices, find the award money for each value. Apart from these three values, suggest one more value which should be considered for award.

Q.87. A total amount of Rs. 7000 is deposited in three different savings bank accounts with annual interest rates of 5%, 8% and $8\frac{1}{2}$ % respectively. The total annual interest from these three accounts is Rs. 550. Equal amounts have been deposited in the 5% and 8% savings accounts. Find the amount deposited in each of the three accounts, with the help of matrices.

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