

Matrix Applications ... Set 1

Applications of Matrices and Determinants

Use Cramer's Rule to solve each 2x2 system.

1) $-6x + 6y = 18$
 $2x - 5y = -18$

2) $-4x - 3y = 26$
 $-3x + y = 0$

3) $6x + 3y = -15$
 $3y = -3$

4) $3x - 2y = -7$
 $-5x + 2y = 13$

5) $-3x - 6y = -27$
 $-5x - 2y = -29$

6) $-3x - 4y = -19$
 $5x + y = 26$

7) $4x - y = -4$
 $x + 5y = 20$

8) $5x + y = -7$
 $x - 6y = 11$

9) $-x - y = -1$
 $3x + 3y = -18$

10) $4x - 2y = 4$
 $-x - 2y = -11$

Use Cramer's Rule to solve each 3x3 system.

11) $-x - 2y + z = -11$
 $-5y + 5z = -25$
 $-4x - 4y - 6z = 0$

12) $x - 6y - 5z = 10$
 $-x + 4y = 0$
 $3x + 5y + 2z = -4$

13) $-4x + 4z = 4$
 $3x + y - 3z = 23$
 $-3x + 4y + 3z = -1$

14) $3x - 5y - 2z = 16$
 $4y + z = -14$
 $2x - 5y - 5z = 10$

15) $2x - 4y - 2z = 2$
 $3y + z = -3$
 $2x - 3y - 6z = -12$

16) $x + 4y - z = -5$
 $-4x - 5z = 1$
 $-2x + 2y - 2z = -10$

17) $5x - 5y = 0$
 $-2x + y + 6z = 16$
 $-x + 2y - z = -1$

18) $3x - 2y + 5z = -17$
 $-x + y + 3z = 18$
 $-6x - 2z = 14$

19) $-6x - 4y - 2z = 2$
 $x + 5y + 5z = -28$
 $-2x + 5y = -9$

20) $-5x - 4y - 2z = -21$
 $5x + y + 5z = 15$
 $6y + 2z = -4$

Matrix Applications ... Set 1

Cryptography

21) Write the uncoded row matrices of dimension 1×3 for the message MEET ME MONDAY.

22) Encode MEET ME MONDAY using the matrix $A = \begin{bmatrix} 1 & -2 & 2 \\ -1 & 1 & 3 \\ 1 & -1 & 4 \end{bmatrix}$

23) Write the uncoded row matrices of dimension 1×3 for the message LANDING SUCCESFUL.

24) Encode LANDING SUCCESFUL using the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 3 & 7 & 9 \\ -1 & -4 & -7 \end{bmatrix}$

25) Use the inverse of the matrix $A = \begin{bmatrix} 1 & 2 & 2 \\ 3 & 7 & 9 \\ -1 & -4 & -7 \end{bmatrix}$ to decode the cryptogram
42 88 101 88 201 251 30 33 0 26 56 64

26) Use the inverse of the matrix $A = \begin{bmatrix} 2 & 3 \\ 3 & 4 \end{bmatrix}$ to decode the cryptogram
85 120 6 8 10 15 84 117 42 56 90 125 60 80 30 45 19 26

27) ***** BONUS *****

Step 1: Type a letter (beginning with Dear Ms. Lambert and ending with your name with at least a full paragraph in between). The letter can reflect what you liked or didn't like about the school year, what you learned throughout the school year, something that you'd like Ms. Lambert to know, etc.

Step 2: On another piece of paper, type the uncoded row matrices of dimension 1×3 for your letter.

Step 3: On a third piece of paper, type the number-to-letter code and an invertible encoding matrix.

Step 4: On a fourth and final piece of paper, type the letter in code.