

People's Democratic Republic of Algeria
Ministry of Higher Education and Scientific Research

University of Batna 2 Common Core of Science and Technology
Faculty of Technology Engineering Section

Module: Algebra 2 (Algèbre 2)

Tutorial Session N°1

Exercise n°1

Solve the following system of linear equations using substitution.

$$y = 4x - 3$$

$$y = 3x - 1$$

Exercise n°2

Find where functions intersect.

$$3x - 4y = 2$$

$$4x + 3y = 14$$

Exercise n°3

Solve the following system of linear equations using elimination.

a.
$$\begin{aligned} 3x+4y &= -5 \\ x-5y &= -8 \end{aligned}$$

b.
$$\begin{aligned} x+2y &= 8 \\ 3x-4y &= 4 \end{aligned}$$

c.
$$\begin{aligned} x-3y &= -7 \\ 2x-6y &= 7 \end{aligned}$$

Exercise n°4

Solve the following system of linear equations using elimination.

$$3x + 2y = 1$$

$$2x + 3y = 1$$

Exercise n°5

Solve the following system of three linear equations by elimination.

a.
$$\begin{aligned} x+2y-z &= 1 \\ 2x-y+z &= 6 \\ 2x-y-z &= 0 \end{aligned}$$

d.
$$\begin{aligned} x+2y+3z &= 6 \\ 2x-3y+2z &= 14 \\ 3x+y-z &= -2 \end{aligned}$$

b.
$$\begin{aligned} 2x-3y+6z &= 3 \\ x+2y-4z &= 5 \\ 3x+4y-8z &= 7 \end{aligned}$$

e.
$$\begin{aligned} x+2y &= 10 \\ 2x-2y &= -4 \\ 3x+5y &= 26 \end{aligned}$$

c.
$$\begin{aligned} 2x+y-z &= -2 \\ 3x+2y+3z &= 21 \\ 7x+4y+z &= 17 \end{aligned}$$

f.
$$\begin{aligned} x+2y &= 10 \\ 2x-2y &= -4 \\ 3x+5y &= 20 \end{aligned}$$

Exercise n°6

Solve the following system. (2 equations in 3 unknowns)

a.
$$\begin{aligned} 2x-2y+5z &= 14 \\ x+4y-3z &= -2 \end{aligned}$$

b.
$$\begin{aligned} 4x-2y+6z &= 5 \\ 2x-y+3z &= 4 \end{aligned}$$

c.
$$\begin{aligned} x+2y-3z &= -4 \\ 2x+y-3z &= 4 \end{aligned}$$

Exercise n°7

a. Let $A = \begin{bmatrix} 1 & 2 & -1 \\ 0 & 3 & 5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 3 \\ 1 & 4 & 0 \end{bmatrix}$. Find $A+B$, $A-B$, $3 \cdot A$; $5 \cdot B$; and $3 \cdot A + 5 \cdot B$

b. Suppose $r=2$; and $A = \begin{bmatrix} 1 & 3 & -5 \\ 2 & 4 & 6 \\ 3 & -6 & 2 \end{bmatrix}$. Find $r \cdot A$; A^T .

c. Let $A = \begin{pmatrix} 3 & 1 & 2 \\ 2 & 4 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 6 & -5 & 4 \\ 3 & 0 & -8 \end{pmatrix}$. Find $(2A - 3B)^T$

Exercise n°8Find the products AB and BA of the following matrices if they exist.

a. $A = \begin{bmatrix} 1 & 3 & 2 \\ 1 & 4 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 1 & 2 & -1 \\ 3 & 0 & 0 & 4 \\ -1 & 1 & 5 & 1 \end{bmatrix}$

b. $A = \begin{bmatrix} 1 & 3 & 2 \\ 1 & 4 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 \\ 0 & 7 \\ -1 & 2 \end{bmatrix}$

c. $A = \begin{bmatrix} 1 \\ 3 \\ -1 \end{bmatrix}$, $B = [1 \quad 6 \quad 10]$

d. $A = \begin{pmatrix} 1 & 2 & -1 \\ 3 & 1 & 4 \end{pmatrix}$, $B = \begin{pmatrix} -2 & 5 \\ 4 & -3 \\ 2 & 1 \end{pmatrix}$

e. $A = \begin{pmatrix} 1 & -2 & 3 \\ 4 & 2 & 1 \\ 0 & 1 & -2 \end{pmatrix}$, $B = \begin{pmatrix} 1 & 4 \\ 3 & -1 \\ -2 & 2 \end{pmatrix}$

f. $A = \begin{pmatrix} 1 & 2 \\ -1 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 2 & 1 \\ 0 & 1 \end{pmatrix}$

Exercise n°9

Solve the following system of equations using the Gauss-Jordan method.

a.
$$\begin{aligned} x + y &= 5 \\ x - y &= -1 \end{aligned}$$

b. $3x - 4y = 1$
 $5x + 2y = 19$

$2x + y - z = 8$
c. $-3x - y + 2z = -11$
 $-2x + y + 2z = -3$

Exercise n°10

Solve the following system of equations using the Row Echelon Form (Gaussian Elimination).

$x - 2y + 3z = 9$
a. $-x + 3y = -4$
 $2x - 5y + 5z = 17$

$2x + 4y + z = -4$
b. $2x - 4y + 6z = 13$
 $4x - 2y + z = 6$

$3x - 2y + 4z = 1$
c. $x + y - 2z = 3$
 $2x - 3y + 6z = 8$

$x + 2y - z = 5$
d. $4x - y + 5z = 11$
 $5x - 8y + 13z = 7$