



Algebra1Coach.com

Organizing Data Using Matrices

Unit 12 Lesson 1

Organizing Data Using Matrices

Students will be able to:

Utilized and construct matrices to organized data.

Key Vocabulary:

- matrices
- column
- row
- elements
- array



Matrices:

A matrix is a rectangular array of mathematical entities such as number, algebraic expression, trigonometric function, etc., enclosed by bracket or parentheses. Matrices are denoted by writing the array or by capital letters. Any of the expressions making up the array is called an element of the matrix.

Organizing Data Using Matrices

Matrices:

$$A = \begin{bmatrix} 2 & 8 & -3 \\ 0 & 5 & 1 \end{bmatrix}$$

Where

$$\begin{bmatrix} 2 & 8 & -3 \end{bmatrix} \text{row1} \quad \text{and} \quad \begin{bmatrix} 0 & 5 & 1 \end{bmatrix} \text{row2}$$

And

$$\begin{bmatrix} 2 \\ 0 \end{bmatrix} \text{column1}; \begin{bmatrix} 8 \\ 5 \end{bmatrix} \text{column2} \quad \text{and} \quad \begin{bmatrix} -3 \\ 1 \end{bmatrix} \text{column3}$$

The example above is a 2X3 matrix.

Organizing Data Using Matrices

Sample Problem 1: Find the element of the following matrices.

1. Find M_{23}

$$M = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 0 & 2 \\ 9 & 4 & 2 \end{bmatrix}$$

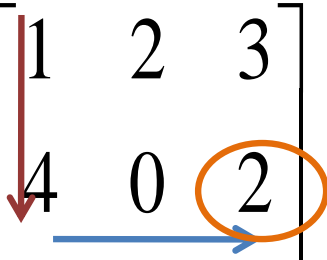
2. Find F_{12}

$$F = \begin{bmatrix} 2 & 6 & -2 \\ 2 & -4 & 5 \end{bmatrix}$$

Organizing Data Using Matrices


Sample Problem 1: Find the element of the following matrices.

1. Find M_{23}

$$M = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 0 & 2 \\ 9 & 4 & 2 \end{bmatrix}$$


$$M_{23} = 2$$

2. Find F_{12}

$$F = \begin{bmatrix} 2 & 6 & -2 \\ 2 & -4 & 5 \end{bmatrix}$$


$$F_{12} = 6$$

Organizing Data Using Matrices

Sample Problem 1: Find the element of the following matrices.

3. Find H_{22}

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

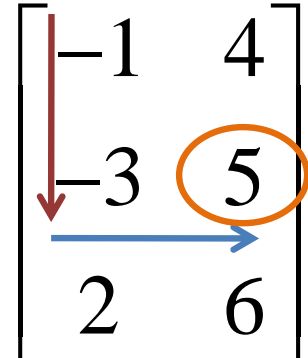
4. Find G_{13}

$$G = \begin{bmatrix} -1 & 2 & 3 \\ -4 & 5 & 7 \end{bmatrix}$$

Organizing Data Using Matrices

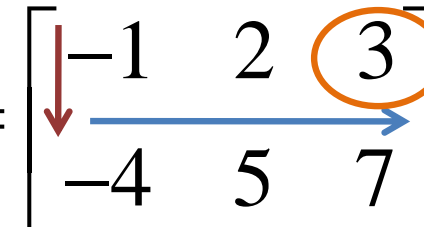
Sample Problem 1: Find the element of the following matrices.

3. Find H_{22}

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


$$H_{22} = 5$$

4. Find G_{13}

$$G = \begin{bmatrix} -1 & 2 & 3 \\ -4 & 5 & 7 \end{bmatrix}$$


$$G_{13} = 3$$

Organizing Data Using Matrices

Sample Problem 2: Solve the following problem involving matrices.

1. The matrix below shows the grade of three male students in math (M), science (S) and English (E).

	<i>M</i>	<i>S</i>	<i>E</i>
John	80	86	89
Ben	81	80	85
Jin	78	85	87

Organizing Data Using Matrices

Sample Problem 2: solve the following problem Involving matrices.

1. The matrix below shows the grade of three male students in math (M), science (S) and English (E).

	<i>M</i>	<i>S</i>	<i>E</i>
John	80	86	89
Ben	81	80	85
Jin	78	85	87

What is John's Grade in Math? 80

What is Jin's Grade in English? 87

What is Ben' Grade in Science? 80

Organizing Data Using Matrices

Sample Problem 2: solve the following problem Involving matrices.

1. The matrix below shows the grade of three male students in math (M), science (S) and English (E).

	<i>M</i>	<i>S</i>	<i>E</i>
John	80	86	89
Ben	81	80	85
Jin	78	85	87

What is Jin's lowest grade and what subject? 78 in Math

What is John's highest grade and what subject? 89 in English

Organizing Data Using Matrices

Sample Problem 2: solve the following problem Involving matrices.

1. The matrix below shows the grade of three male students in math (M), science (S) and English (E).

	<i>M</i>	<i>S</i>	<i>E</i>
John	80	86	89
Ben	81	80	85
Jin	78	85	87

Who got the lowest score in

English? Ben

Who got the highest score in

science? John

Organizing Data Using Matrices

Sample Problem 2: solve the following problem involving matrices.

2. The matrix below shows the preferred drinks and snack of the student's in school Y during break time.

Snacks: sandwich (s), sausages (h) and biscuits (b); drinks: cola (C), juices (J) and shakes (S).

$$\begin{matrix} & C & J & S \\ s & \begin{bmatrix} 17 & 18 & 30 \end{bmatrix} \\ h & \begin{bmatrix} 15 & 20 & 27 \end{bmatrix} \\ b & \begin{bmatrix} 25 & 35 & 23 \end{bmatrix} \end{matrix}$$

Organizing Data Using Matrices

Sample Problem 2: solve the following problem involving matrices.

2. The matrix below shows the preferred drinks and snack of the student's in school Y during break time.

Snacks: sandwiches (s), sausages (h) and biscuits (b); drinks: colas (C), juices (J) and shakes (S).

	<i>C</i>	<i>J</i>	<i>S</i>
<i>s</i>	17	18	30
<i>h</i>	15	20	27
<i>b</i>	25	35	23

How many preferred sandwiches?

$(17 + 18 + 30) = 65$

How many preferred sausages?

$(15 + 20 + 27) = 62$

Organizing Data Using Matrices

Sample Problem 2: solve the following problem involving matrices.

2. The matrix below show the preferred drinks and snack of the student's in school Y during break time.

snacks: sandwiches (s), sausages (h) and biscuits (b); drinks: colas (C), juices (J) and shakes (S).

	<i>C</i>	<i>J</i>	<i>S</i>
<i>s</i>	17	18	30
<i>h</i>	15	20	27
<i>b</i>	25	35	23

How many preferred biscuits and juices? **35**

How many preferred sausages and colas? **15**

Organizing Data Using Matrices

Sample Problem 2: solve the following problem involving matrices.

2. The matrix below show the preferred drinks and snack of the student's in school Y during break time.

Snacks: sandwiches (s), sausages (h) and biscuits (b); drinks: colas (C), juices (J) and shakes (S).

	<i>C</i>	<i>J</i>	<i>S</i>	
<i>s</i>	$\begin{bmatrix} 17 & 18 & 30 \\ 15 & 20 & 27 \\ 25 & 35 & 23 \end{bmatrix}$			How many preferred biscuits or shakes?
<i>h</i>				$(25 + 35 + 23) + (30 + 27 + 23) - 23$
<i>b</i>				$= 83 + 80 - 23 = 140$
				How many preferred sausages or colas?
				$(15 + 20 + 27) + (17 + 15 + 25) - 15$
				$= 62 + 57 - 15 = 104$

Organizing Data Using Matrices

Sample Problem 3: Identify the element of a matrix given the following data.

7. Below is the result of the National Achievement test of the following school in division X.

	2003	2004	2005	2006
School A	80	81.5	82	82.3
School B	81	81.3	81.22	82.1
School C	79.2	78.9	78.92	80.1
School D	73.5	75.6	77.9	72.5

Organizing Data Using Matrices

Sample Problem 3: Identify the element of a matrix given the following data.

7. Below is the result of the National Achievement test of the following school in division X.

	2003	2004	2005	2006
School A	80	81.5	82	82.3
School B	81	81.3	81.22	82.1
School C	79.2	78.9	78.92	80.1
School D	73.5	75.6	77.9	72.5

$$S = \begin{bmatrix} 80 & 81.5 & 82 & 82.3 \\ 81 & 81.3 & 81.22 & 82.1 \\ 79.2 & 78.9 & 78.92 & 80.1 \\ 73.5 & 75.6 & 77.9 & 72.5 \end{bmatrix}$$

Organizing Data Using Matrices

Sample Problem 3: Identify the element of a matrix given the following data.

7. Below is the result of the National Achievement test of the following school in division X.

$$S = \begin{bmatrix} 80 & 81.5 & 82 & 82.3 \\ 81 & 81.3 & 81.22 & 82.1 \\ 79.2 & 78.9 & 78.92 & 80.1 \\ 73.5 & 75.6 & 77.9 & 72.5 \end{bmatrix}$$

a. Identify element S_{22} . What does it represent?

81.3, school b result by year 2004

b. Identify element S_{43} . What does it represent?

77.9, school d result by year 2005

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

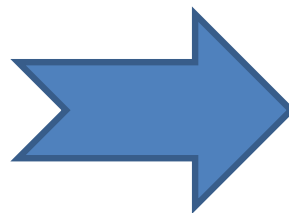
3. Liza got 86 in math and 89 in English while Erika got 92 in math and 87 in English. Construct a 2×2 matrix.

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

3. Liza got 86 in math and 89 in English while Erika got 92 in math and 87 in English. Construct a 2 X 2 matrix.

$$\begin{array}{c} \\ \text{Liza} \\ \text{Erika} \end{array} \begin{array}{cc} M & E \\ \left[\begin{array}{cc} 86 & 89 \\ 92 & 87 \end{array} \right] \end{array}$$

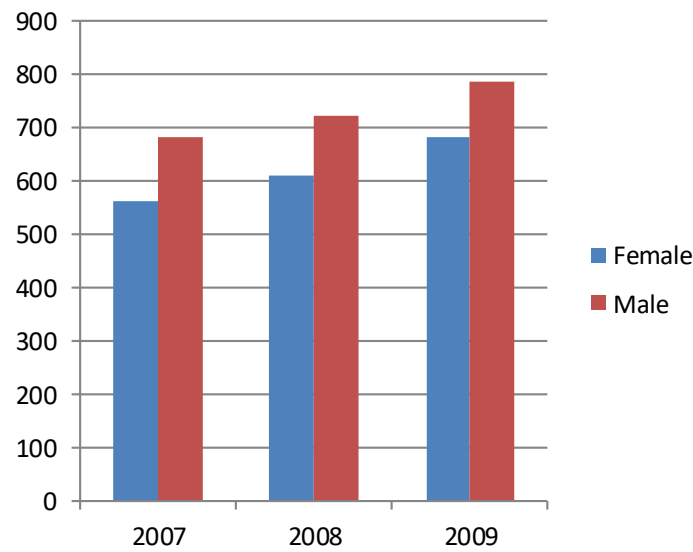


$$G = \begin{bmatrix} 86 & 89 \\ 92 & 87 \end{bmatrix}$$

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

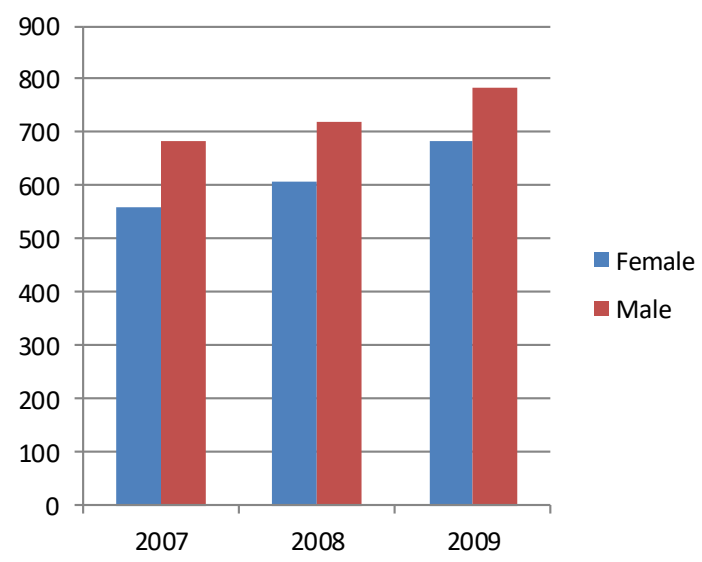
4. Below is a table that contains the number of enrollees of school X from 2007 to 2009. Construct a 3 X 2 matrix of year and the number of students.



Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

4. Below is a table that contains the number of enrollees of school X from 2007 to 2009. Construct a 3 X 2 matrix of year and the number of students.



	<i>F</i>	<i>M</i>
2007	560	690
2008	600	720
2009	690	780

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

4. Below is a table that contains the number of enrollees of school X from 2007 to 2009. Construct a 3 X 2 matrix of year and the number of students.

F

M

2007

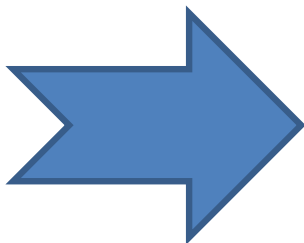
$\left[\begin{array}{cc} 560 & 690 \end{array} \right]$

2008

$\left[\begin{array}{cc} 600 & 720 \end{array} \right]$

2009

$\left[\begin{array}{cc} 690 & 780 \end{array} \right]$



$F =$

$\left[\begin{array}{cc} 560 & 690 \\ 600 & 720 \\ 690 & 780 \end{array} \right]$

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

5. Below is the anticipated temperature in degree Celsius for last three days of the week. Construct a 3 X 3 matrix of the day and temperature.

Day	Morning	Afternoon	Evening
Friday	10	18	13
Saturday	12	19	14
Sunday	15	22	14

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

5. Below is the anticipated temperature in degree Celsius for last three days of the week. Construct a 3 X 3 matrix of the day and temperature.

Day	Morning	Afternoon	Evening
Friday	10	18	13
Saturday	12	19	14
Sunday	15	22	14

F
Friday

S
Saturday

SU
Sunday

$$\begin{bmatrix} 10 & 18 & 13 \\ 12 & 19 & 14 \\ 15 & 22 & 14 \end{bmatrix}$$

Organizing Data Using Matrices

Sample Problem 4: Organized the following data by constructing matrices.

5. Below is the anticipated temperature in degree Celsius for last three days of the week. Construct a 3 X 3 matrix of the day and temperature.

F

S

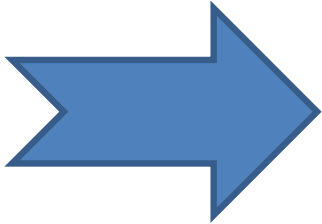
SU

$Friday$


$Saturday$

$Sunday$

$\begin{bmatrix} 10 & 18 & 13 \\ 12 & 19 & 14 \\ 15 & 22 & 14 \end{bmatrix}$



$H = \begin{bmatrix} 10 & 18 & 13 \\ 12 & 19 & 14 \\ 15 & 22 & 14 \end{bmatrix}$

 **Algebra1Coach.com**