

Topic: Introduction to Matrices

Question: What is a matrix?

How are matrices used to make decisions?

Sabrina wants to buy a sports-utility vehicle (SUV). There are many types of SUVs in many prices and styles. So, Sabrina makes a list of the qualities for different models and organizes the information in a matrix.

4×5

	Base Price	Horse-power	Towing Capacity (lb)	Cargo Space (ft ³)	Fuel Economy (mpg)
Large SUV	\$32,450	285	12,000	46	17
Standard SUV	\$29,115	275	8700	16	17.5
Mid-Size SUV	\$27,975	190	5700	34	20
Compact SUV	\$18,180	127	3000	15	26.5

Source: Car and Driver Buyer's Guide

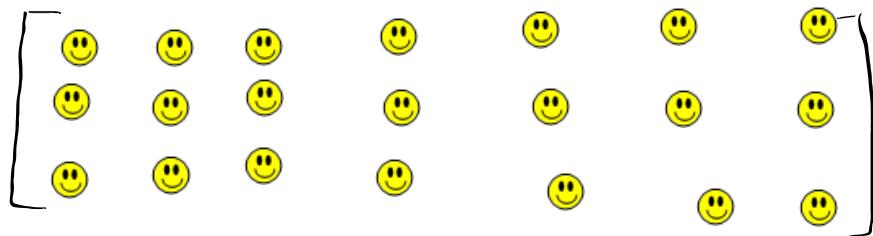
When the information is organized in a matrix, it is easy to compare the features of each vehicle.

Which car would you buy? Why?

Notes: Dimensions of a Matrix

row \times columns

$$3 \times 7$$



$$\begin{array}{c}
 \left[\begin{array}{cc} 27 & 42 \\ 9001 & 69 \end{array} \right] \quad 2 \times 2 \\
 \left| \begin{array}{ll} \neq & \left[\begin{array}{cc} 8 & 3/2 \\ -4 & 1.5 \end{array} \right] \\ \neq & \left[\begin{array}{cc} -6 & 3 \\ 1 & 2 \end{array} \right] \\ \neq & \left[\begin{array}{cc} 9001 & 69 \\ 27 & 42 \end{array} \right] \\ = & \left[\begin{array}{cc} 27 & 42 \\ 9001 & 69 \end{array} \right] \\ \neq & \left[\begin{array}{cc} 2 & t \\ m & 42 \end{array} \right] \end{array} \right.
 \end{array}$$

$27=27 \quad 42=42$
 $9001=9001 \quad 69=69$

Example 1: Solve for x, y

$$\begin{bmatrix} y \\ 3x \end{bmatrix} = \begin{bmatrix} 6 - 2x \\ 31 + 4y \end{bmatrix}$$

2x1

2 rows
1 column

$$\begin{aligned} y &= 6 - 2x \\ 3x &= 31 + 4y \\ y &= 6 - 2x \\ y &= 6 - 2(5) \\ y &= 6 - 10 \\ y &= -4 \end{aligned}$$

$$\begin{aligned} 3x &= 31 + 4y \\ 3x &= 31 + 4(6 - 2x) \\ 3x &= 31 + 24 - 8x \\ 3x &= 55 - 8x \\ + 8x &\quad + 8x \\ 11x &= 55 \\ x &= 5 \end{aligned}$$

Divide by 11

Ex 2. $\begin{bmatrix} x^2 + 1 & 5-y \\ x+y & y-4 \end{bmatrix} = \begin{bmatrix} 5 & x \\ 5 & 3 \end{bmatrix}$ solve for x, y

$$\begin{aligned} x^2 + 1 &= 5 \\ x + y &= 5 \\ 5 - y &= x \\ y - 4 &= 3 \end{aligned}$$

$$\begin{aligned} y - 4 &= 3 \\ + 4 &\quad + 4 \\ y &= 7 \\ 5 - y &= x \\ 5 - 7 &= x \\ - 2 &= x \end{aligned}$$

$$\begin{aligned} x + y &= 5 \\ -2 + 7 &= 5 \\ x^2 + 1 &= 5 \\ (-2)^2 + 1 &= 5 \\ 4 + 1 &= 5 \\ 5 &\neq 5 \end{aligned}$$

homework

in your book

(+2)

Extra Credit:

25

pages 156 - 158

10 - 15 ALL

17, 37, 39

Due Thursday / Friday

111020

111021