

Unit 1: Matrices

Definition - Matrix

A matrix
row
entry

numbers in
led

The
row

of



Examples

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

$$B = \begin{bmatrix} 4 & 2 & -2 & 0 & 6 \\ -5 & 8 & 4 & -2 & 7 \end{bmatrix}$$

$$X = \begin{bmatrix} 3 & 9 \\ -2 & 0 \\ -8 & -9 \end{bmatrix}$$

Scalar multiplication

The process of multiplying each entry in a matrix by a scalar, a real number.

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

$$X = \begin{bmatrix} 3 & 9 \\ -2 & 0 \\ -8 & -9 \end{bmatrix}$$

$$3A =$$

$$-2X =$$

Addition/Subtraction

To add or subtract matrices the dimensions must be the same.

$$A = \begin{bmatrix} 4 & 8 \\ 6 & -9 \\ 0 & -5 \end{bmatrix}$$

$$B = \begin{bmatrix} 3 & -3 \\ 2 & 1 \end{bmatrix}$$

$$X = \begin{bmatrix} 3 & 9 \\ -2 & 0 \\ -8 & -9 \end{bmatrix}$$

$$A + B =$$

$$A + X =$$

$$A = \begin{bmatrix} 4 & 8 \\ 6 & -9 \\ 0 & -5 \end{bmatrix}$$

$$B = \begin{bmatrix} 3 & -3 \\ 2 & 1 \end{bmatrix}$$

$$X = \begin{bmatrix} 3 & 9 \\ -2 & 0 \\ -8 & -9 \end{bmatrix}$$

$$X - A =$$

$$3A + 2X =$$

Solve the Matrix Equation

$$3 \left(\begin{bmatrix} 2x & -4 \\ 6 & 7 \end{bmatrix} + \begin{bmatrix} 5 & -2 \\ -5 & -y \end{bmatrix} \right) = \begin{bmatrix} 12 & 5 \\ 0 & 3 \end{bmatrix}$$

Using Matrices to Organize Data

- **This year**, for individuals, Comprehensive, HMO Standard, and HMO Plus cost \$694.32, \$451.80, and \$489.48, respectively. For families, the Comprehensive, HMO Standard, and HMO Plus plans cost \$1725.36, \$1187.76, and \$1248.12.
- **Next year** for individuals, Comprehensive, HMO Standard, and HMO Plus cost \$683.91, \$463.10, and \$499.27, respectively. For families, the Comprehensive, HMO Standard, and HMO Plus plans cost \$1699.48, \$1217.45, and \$1273.08.

TO-DO:

- Organize this data into two matrices, with labels.
- A company offers the health care plans to its employees. The employees receive monthly paychecks from which health care payments are deducted. Use the matrices to write another matrix that shows the monthly changes in health care payments from this year to next year.

Practice: p. 203

#15,17,21,23,29,30,33,35,37,38