

Computer Animation Activity: Linking Matrices and Geometric Transformations

Goals:

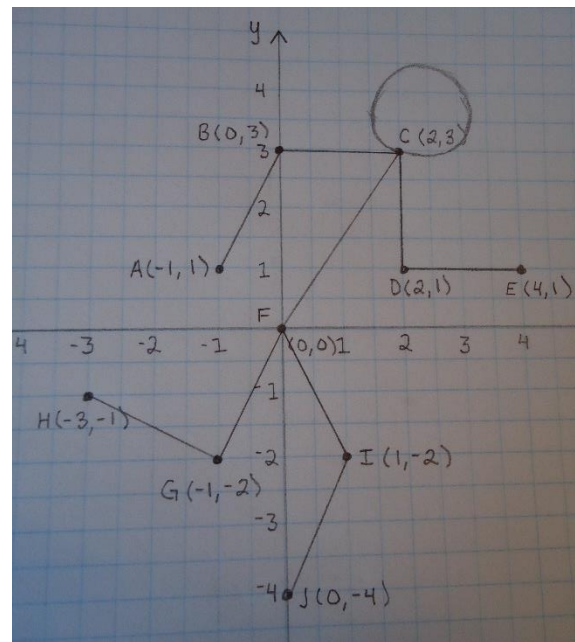
- Study a real-life application of mathematics
- Apply skills in
 - matrix multiplication
 - geometric transformation identification
- Explore connections between matrix multiplication and geometric transformations

Objectives:

- Create matrices from the points that make up a figure drawn on the coordinate axis
- Perform matrix multiplication and plot the points in the product matrix
- Describe the geometric transformation that would change the figure in the same way as the matrix multiplication

Materials:

- Computer Animation Worksheet
- Pencils
- Graph Paper
- Straightedge



Create the 2×2 matrix S such that each column is an ordered pair. List the ordered pairs in alphabetical order according to the points' labels.

For questions 1 - 3:

- a. perform the matrix multiplication on this worksheet
- b. on your graph paper, plot, label, and connect the points in the product matrix
- c. identify the transformation that produced each image, then label any lines of reflection, centers of rotation, etcetera

1. $\begin{bmatrix} -1 & 0 \\ 0 & 1 \end{bmatrix} S$

2. $\begin{bmatrix} 2 & 0 \\ 0 & 4 \end{bmatrix} S$

3. $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix} S$

Create the $3 \times z$ matrix R by adding row 3, a row of 1's, to S .



4. $\begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} R$