# Tutorial 5 - Geometric Mappings

## COMP1046 - Maths for Computer Scientists

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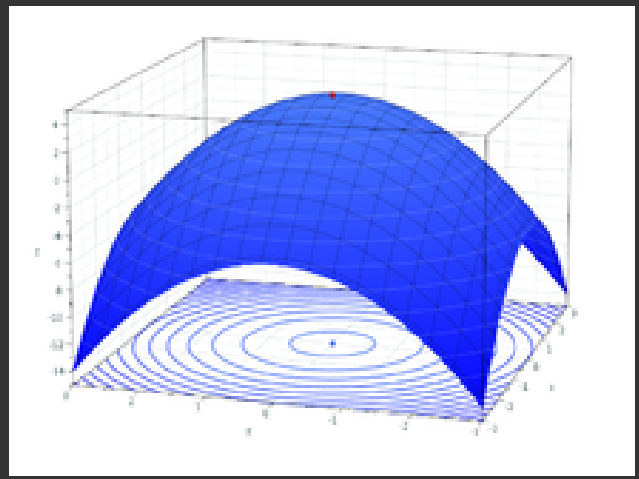
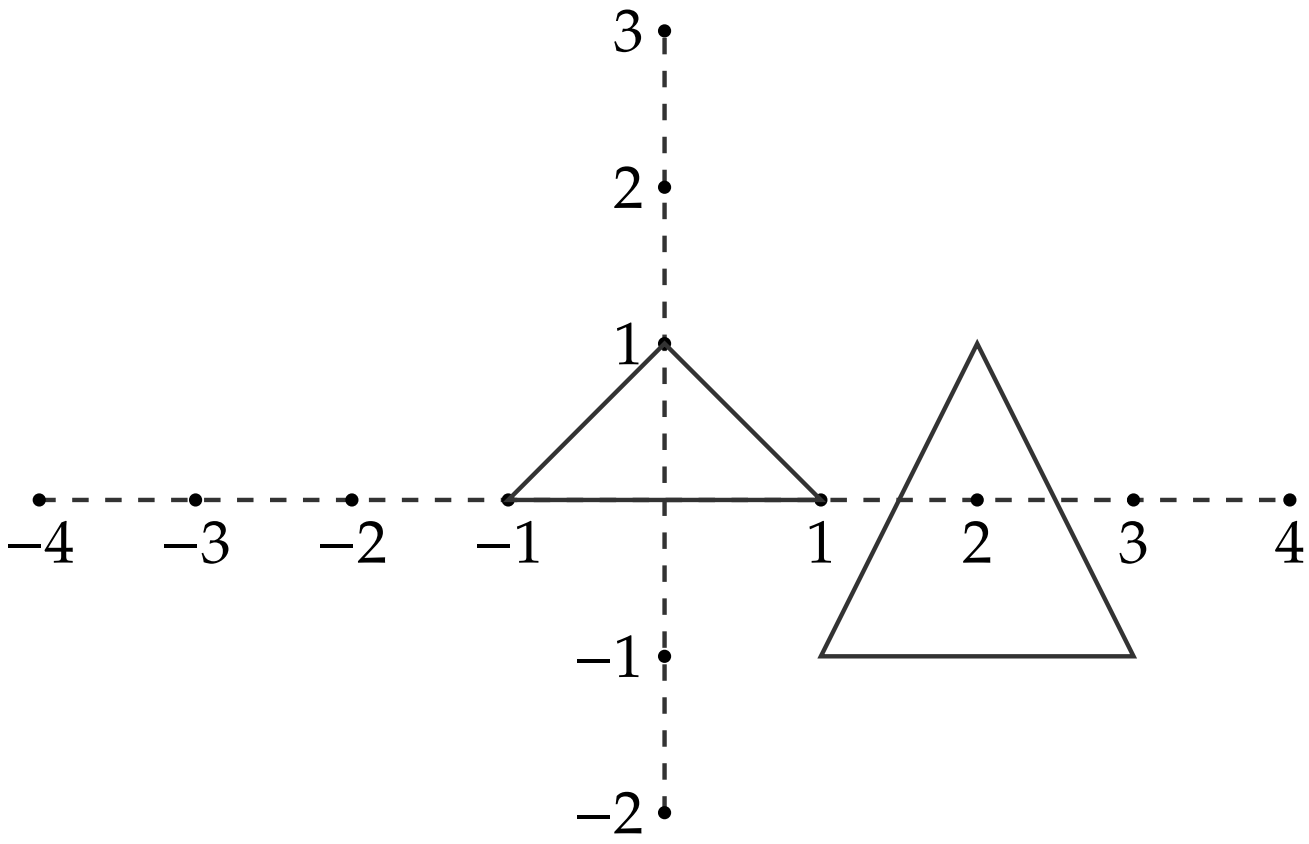


# Geometric Mappings

Consider the following geometric shapes:




Call the smaller triangle on the left, triangle $T1$.

Call the larger triangle on the right, triangle $T2$.

# Geometric Mappings

1. What is the $3 \times 3$ matrix that represents the geometric mapping from $T1$ to $T2$?
2. Apply the translation $\begin{pmatrix} 0 \\ 1 \end{pmatrix}$ to $T2$, followed by the geometric mapping given by

$$\mathbf{S} = \begin{pmatrix} 1 & \frac{1}{2} & 0 \\ 0 & 1 & -1 \\ 0 & 0 & 1 \end{pmatrix}.$$

Draw the resulting shape on the grid and call it $T3$.

# Geometric Mappings

3. What type of geometric mapping is **S**? That is: is it a scaling, vertical or horizontal reflection, rotation, vertical or horizontal shear or translation, or a combination of these?
4. Express the geometric mapping from $T1$ to $T3$ by a single $3 \times 3$ matrix.