Congratulations! You passed!

TO PASS 80% or higher

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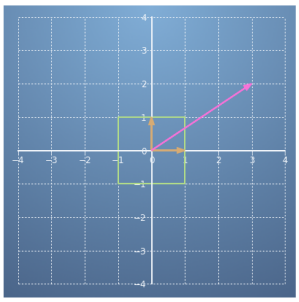
GRADE 100%

# Using matrices to make transformations

TOTAL POINTS 6

1. Matrices make transformations on vectors, potentially changing their magnitude and direction. 1 / 1 point

If we have two unit vectors (in orange) and another vector, $\mathbf{r} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ (in pink), before any transformations - these look like this:



What new vector, $\mathbf{r}'$, does $A$ transform $\mathbf{r}$ to? Specifically, what does the following equal?

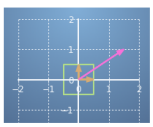
$$A\mathbf{r} = \begin{bmatrix} 1/2 & -1 \\ 0 & 3/4 \end{bmatrix} \begin{bmatrix} 3 \\ 2 \end{bmatrix} =$$

- $\begin{bmatrix} 3/2 \\ -1/2 \end{bmatrix}$
- $\begin{bmatrix} 3/2 \\ -3/4 \end{bmatrix}$

Correct

Well done.

3. $\begin{bmatrix} -1/2 & 1/2 \end{bmatrix}$ 1 / 1 point



4. A digital image can be stored by putting lots of coloured pixels at their particular coordinates on a grid. 1 / 1 point

If we apply a matrix transformation to the coordinates of each of the pixels in an image, we transform the image as a whole.

Given a starting image (such as this one of "The Ambassadors" [1533] by Hans Holbein the Younger),

$\begin{bmatrix} -\sqrt{3}/2 & 1/2 \end{bmatrix}$

Correct

This is a rotation matrix (by 30° anticlockwise).

5. At the bottom of the "The Ambassadors", in the middle of the floor, there is a skull that Holbein has already applied a matrix transformation to! 1 / 1 point

matrix and press *Go!* to score on this question.

You can also use this example to experiment with other matrix transformations. Try some of the ones in this quiz. Have a play!


Correct

Feel free to use the tool to try out different matrices too.