

# Matrices

1.

$$3 \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} =$$

2.

$$4 \begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix} =$$

3.

$$\begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix} \begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix} =$$

4.

$$\begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix} \begin{bmatrix} 0 & -i \\ i & 0 \end{bmatrix} =$$

5. Find the simplest  $2 \times 2$  matrices  $A$  and  $B$  that you can think of for which  $AB \neq BA$ .

6. Find a  $2 \times 2$  matrix which, when multiplied by

$$\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix},$$

gives

$$\begin{bmatrix} 3 & 4 \\ 5 & 6 \end{bmatrix}.$$

7. Can you find a matrix which, when multiplied by itself, gives the zero matrix? (The zero matrix itself works, but can you find another?)

8. Can you find a  $2 \times 2$  matrix  $A$  for which  $AA = A$ ?