

8.3) Proving statements involving matrices

Worked example

Prove by induction that for all positive integers n :

$$\begin{pmatrix} 9 & 16 \\ -4 & -7 \end{pmatrix}^n = \begin{pmatrix} 8n + 1 & 16n \\ -4n & 1 - 8n \end{pmatrix}$$

Your turn

Prove by induction that for all positive integers n :

$$\begin{pmatrix} -2 & 9 \\ -1 & 4 \end{pmatrix}^n = \begin{pmatrix} -3n + 1 & 9n \\ -n & 3n + 1 \end{pmatrix}$$

Proof

Worked example

Prove by induction that for all positive integers n :

$$\begin{pmatrix} 2 & 0 \\ 1 & 1 \end{pmatrix}^n = \begin{pmatrix} 2^n & 0 \\ 2^n - 1 & 1 \end{pmatrix}$$

Your turn

Prove by induction that for all positive integers n :

$$\begin{pmatrix} 1 & -1 \\ 0 & 2 \end{pmatrix}^n = \begin{pmatrix} 1 & 1 - 2^n \\ 0 & 2^n \end{pmatrix}$$

Proof