1 Exercise 4.5 (p.175)

$$(\hat{n}\cdot\vec{\sigma}) = \begin{pmatrix} a \\ b \\ c \end{pmatrix} \begin{pmatrix} X \\ Y \\ Z \end{pmatrix} = aX + bY + cZ$$
$$= a\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} + b\begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix} + c\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} = \begin{pmatrix} c & (a-b) \\ (a+ib) & -c \end{pmatrix}$$

$$(\hat{n}\cdot\vec{\sigma})^2 = \begin{pmatrix} c & (a-b) \\ (a+ib) & -c \end{pmatrix}\begin{pmatrix} c & (a-b) \\ (a+ib) & -c \end{pmatrix}$$
$$= \begin{pmatrix} c^2+a^2+b^2 & 0 \\ 0 & c^2+a^2+b^2 \end{pmatrix} = I$$