

$$\langle \phi | A | \psi \rangle = \begin{pmatrix} 6 & -1i & 5 \end{pmatrix} \begin{pmatrix} 5 & 3+2i & 3i \\ -1i & 3i & 8 \\ 1-1i & 1 & 4 \end{pmatrix} \begin{pmatrix} -1+1i \\ 3 \\ 2+3i \end{pmatrix} = 59 + 155i \quad (1)$$