Consider a rectangular sheet oriented perpendicular to the $yz$ plane as shown and positioned in a uniform electric field $\vec{E} = (2\hat{j}) \text{N/C}$.

(a) Find the area $A$ of the sheet.
(b) Find the angle between $\vec{A}$ and $\vec{E}$.
(c) Find the electric flux $\Phi_E$ through the sheet.