6 Parallel component of a vector

Given a vector:
\[ \mathbf{A} = \begin{pmatrix} 4 \\ -160^\circ \end{pmatrix} \]

All answers must be express in the \((x,y)\) coordinate system.

1) Express \( \mathbf{A} \) in component notation.
   Using \( \mathbf{A}_y = (\mathbf{A} \cdot \mathbf{\hat{e}}) \mathbf{\hat{e}} \),

2) Obtain the parallel component \( \mathbf{A}_p \) of \( \mathbf{A} \) along the L direction.

3) Using \( \mathbf{A} = \mathbf{A}_p + \mathbf{A}_\perp \), deduce the perpendicular component \( \mathbf{A}_\perp \) of \( \mathbf{A} \) with respect to the direction L.

\( (x,y) \) orthonormal coordinate system

![Diagram showing vector A and coordinate axes with L direction indicated]