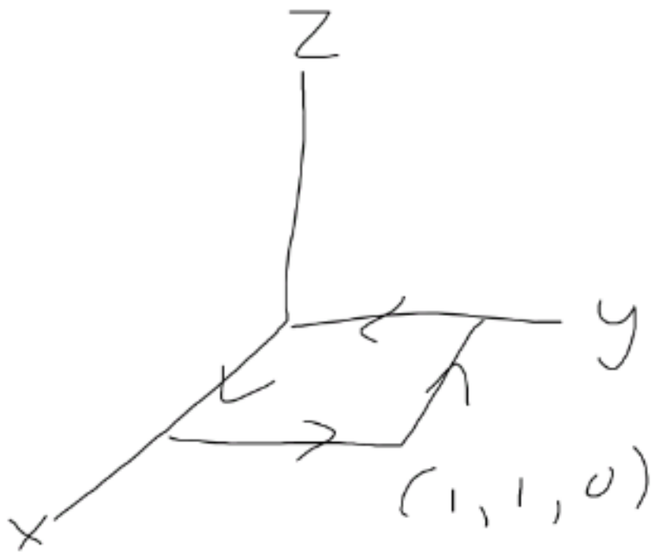
1. [**8 marks**] The vector field $\vec{A}$ is given in Cartesian coordinates by

$$\vec{A} = 3y^2\hat{x}$$

Confirm that the Curl Theorem (Stokes' Theorem) works for this vector field through/around the square shown in the diagram. Note that the length of the sides of the square is 1.



We want to show

$$\oint \vec{A} \cdot d\vec{l} = \int (\vec{\nabla} \times \vec{A}) \cdot d\vec{a}$$

Start with the LHS