

By Green's Theorem

$$\begin{aligned}\oint (x dy - y dx) &= \iint \left( \frac{\partial(x)}{\partial x} - \frac{\partial(-y)}{\partial y} \right) dx dy \\ &= 2 \iint dx dy \\ &= 2 (4a^2) = \underline{8a^2}\end{aligned}$$