

$$\begin{aligned}\int_C (7y + 5e^{\sqrt{x}}) dx + (8x + 9 \cos y^2) dy &= \iint_D \left[\frac{\partial}{\partial x} (8x + 9 \cos y^2) \right. \\ &\quad \left. - \frac{\partial}{\partial y} (7y + 5e^{\sqrt{x}}) \right] dA \\ &= \int_0^1 \int_{y^2}^{\sqrt{y}} (8 - 7) dx dy \\ &= \int_0^1 (y^{1/2} - y^2) dy = \frac{1}{3}\end{aligned}$$