Given the vector field $F(x, y) = (2x - 3y, -3x + 4y - 8)$

A) Prove that $F$ is path independent in $\mathbb{R}^2$ by finding a potential function for $F$.

B) If $C$ is a path in $\mathbb{R}^2$ parametrized by $c(t) = \left( \frac{t^4}{4}, \sin\left( \frac{t\pi}{2} \right) \right)$ with $0 \leq t \leq 1$ calculate the path integral $\int_C F \cdot dx$. 