

Answer on Question 42373, Math, Integral Calculus

$$\vec{F}=(x^2,-x y)$$

Let us write parametric equation for parabola. $x=t; y=2t^2$. Hence, one needs to find integral $\int \vec{F}(x(t),y(t))d\vec{s}$ for $t=0..1$, $d\vec{s}=(dx,dy)=(1,4t)dt$.

$$\int \vec{F} d\vec{s}=\int_0^1(t^2-4t \cdot 2t^3)dt=\int_0^1(t^2-8t^4)dt=(\frac{t^3}{3}-8\frac{t^5}{5})\Big|_0^1=\frac{1}{3}-\frac{8}{5}=\frac{-19}{15} .$$