

Fourth Examination
Tuesday, November 20, 2018

Instructions: This exam should be done on your own paper. Your name should be on each sheet and on the back of the last sheet; the answers should appear written carefully and in order. If in doubt, show intermediate steps: Full credit may not be given, even for correct answers, unless work is arranged clearly and explained. This exam is closed book. You may leave after handing in your exam paper, but be sure to check your answers carefully. You may keep this exam sheet. Each problem is worth 25 points.

1. Compute the work done on a particle by the force field $\mathbf{F}(x, y) = \langle xy, x^2 \rangle$ as the particle moves along the parabola $y = x^2$ from $(x, y) = (0, 0)$ to $(x, y) = (1, 1)$.
2. Compute the work done on a particle by the force field $\mathbf{F}(x, y) = \langle 2xy, x^2 \rangle$ as the particle moves along any curve from $(x, y) = (0, 0)$ to $(x, y) = (1, 1)$.
3. Compute the work done by the force field $\mathbf{F}(x, y) = \langle -y, x \rangle$ on a particle as it takes one complete revolution, proceeding counterclockwise, about the unit circle $x^2 + y^2 = 1$.
4. Compute $\iint_{\sigma} x^2 dS$, where σ is the portion of the cylinder $x^2 + y^2 = 1$ between $z = 0$ and $z = 1$.