King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

Math 302
Quiz3

Semester (121) November 19, 2012 Time: 7:00 - 8:00 pm

Name: .....

I.D: .....

Exercise 1. Evaluate the line integral with respect to arc length $\int_{\mathcal{C}}(x^2 - y^2).ds$, where $\mathcal{C}$ is given by $x = 5\cos t, y = 5\sin t$, with $0 \leq t \leq 2\pi$.

Exercise 2. Let $F(x, y) = (\cos x \cos y, 1 - \sin x \sin y)$.

(1) Show that F is conservative.

(2) Evaluate the line integral $\int_{\mathcal{C}} F.dr$, where $\mathcal{C}$ is a path (piecewise smooth curve) with starting point $A = (0, 0)$ and ending point $B = (\frac{\pi}{2}, 0)$.

Exercise 3. Let $F = (-2y^2, 4xy)$ and $\mathcal{C}$ be the boundary of the region in the first quadrant determined by the graphs of $y = 0$, $y = \sqrt{x}$ and $y = -x+2$. Using Green's Formula, evaluate the line integral $\int_{\mathcal{C}} F.dr$.

Exercise 4. Find the surface area of those portions of the sphere $x^2 + y^2 + z^2 = 2$ that are within the cone $z^2 = x^2 + y^2$.