Ma 1c Prac Assignment 6

Due 2pm Monday, May 16, 2016.

1 Problem 7.1.10 (b)
Evaluate the following integral $\int_{c} f(x, y, z) \, ds$, where $f(x, y, z) = \cos z$ and $c : t \mapsto (\sin t, \cos t, t), \ t \in [0, 2\pi]$.

2 Problem 7.1.24
Compute the path integral of $f(x, y) = y^2$ over the graph of $y = e^x, x \in [0, 1]$.

3 Problem 7.2.4 (c)
Evaluate the following line integral $\int_{c} yz \, dx + xz \, dy + xy \, dz$, where $c$ consists of straight-line segments joining $(1, 0, 0)$ to $(0, 1, 0)$ to $(0, 0, 1)$.

4 Problem 7.2.11
The image of the path $c(t) = (\cos^3(t), \sin^3(t)), t \in [0, 2\pi]$ in the plane is illustrated below. Evaluate the integral of the vector field $F(x, y) = xi + yj$ around this curve.
5 Problem 7.3.9
Find an expression for a unit vector normal to the surface
\[ x = \cos v \sin u, \quad y = \sin v \sin u, \quad z = \cos u \]
at the image of a point \((u, v)\) for \(u\) in \([0, \pi]\) and \(v\) in \([0, 2\pi]\). Identify this surface.

6 Problem 7.3.14
Find the equation of the plane tangent to the surface \(x = u^2, y = v^2, z = u^2 + v^2\)
at the point \((u, v) = (1, 1)\).

7 Problem 7.4.6
Find the area of the surface defined by \(z = xy\) and \(x^2 + y^2 \leq 2\).

8 Problem 7.4.15
Find the area of the surface obtained by rotating the curve \(y = x^2, 0 \leq x \leq 1\)
about the y-axis.