Math 250B Assignment 3

Covers: Sections 11.8, 13.7-13.9 and 14.1
Due: Mon Nov 17 at 11:30am

INSTRUCTIONS:
This assignment will be marked for completion.
Solutions will be posted on the course website 24 hours after the deadline.
You may not copy the work of another person or AI.
Submit jpg or pdf files to the D2L Dropbox.

1. Rewrite the integral below in cylindrical coordinates. Do not evaluate.

$$I = \int_{-7}^{7} \int_{-\sqrt{49-x^2}}^{\sqrt{49-x^2}} \int_{\sqrt{x^2+y^2}}^{\sqrt{98-x^2-y^2}} \sqrt{x^2+y^2}\; dz\; dy\; dx$$

2. Rewrite in spherical coordinates and evaluate:
$I = \iiint_T \sqrt{x^2+y^2}\; dV$ where T is the region $x^2+y^2+z^2 \leq 1$.

3. Find the surface area of the parametric surface given by:
$\mathbf{r} = [(1+\cos a)\cos b,\ (1+\cos a)\sin b,\ \sin a]$ where $0 \leq a, b \leq 2\pi$.

4. Let R be bounded by $y-2x=1,\ y-2x=2,\ x+y=3$ and $x+y=4$.
Use a change of variables to evaluate $\iint_R (y-2x)e^{3x+3y}\; dA$.

5. Calculate the divergence and curl of $\mathbf{F} = [x^2y+z,\ \ xy^2-xz,\ \ yz^2+y]$.