Math 2210 Summer 2014 Rebecca Noonan Heale

Midterm 3 "would-be-In-class-if-there wasn't-a-holiday" Review Problems
(No solutions provided, but you can ask about anything before the midterm)

1. Find the volume of the region that lies inside the sphere $x^2 + y^2 + z^2 = 64$ and outside the cylinder $x^2 + y^2 = 4$.
2. Find the volume of the region that lies under the surface $z = x^2 + y^2$ and above the triangle enclosed by the lines x=5, y=0, and y=8x.
3. Evaluate $\int_{(-1,1)}^{(5,5)} y - \frac{20}{x^2} dx + x - \frac{20}{y^2} dy$.
4. Find the volume of the region bounded by the surface $z = x^2 + y^2$, the cylinder $x^2 + y^2 = 100$ and the xy-plane.
5. Find the area of the region inside $r = 8\sin\theta$ and $r = 8\cos\theta$.
6. Evaluate $\int_C \frac{x+y+z}{5} ds$, where C is the curve $x = 3t$, $y = 5\cos(4t/5)$, $z = 5\sin(\frac{4t}{5})$, $0 \le t \le 5\pi/4$.
7. Find the area of the surface of the parabolic cylinder $z = y^2$ over the triangle in the xy-plane with vertices (0,0), (0,4), (4,0).
8. Find the volume of the region in the first octant bounded by the coordinate plane and the surface $= 9 - x^2 - y$.
9. Write and iterated triple integral in the order dzdydx for the volume of the region enclosed by the paraboloids $z = 50 - x^2 - y^2$ and $z = x^2 + y^2$.
10. Use the given transformation to evaluate the integral: $u = x + y$, $v = -2x + y$, R is the region bound by the lines $y = -x + 1$, $y = -x + 4$, $y = 2x + 2$, $y = 2x + 5$. $\iint_R \cos\left(\frac{y-x}{y+x}\right)$.
11. Find the mass of a wire of density $\delta(x, y, z) = 4z$ and has the shape of the helix $x = 3\cos t$, $y = 3\sin t$, $z = 4t$.