Math 3330 - Quiz 6

Name:_____

1. Set up the integral to compute the volume below the function $f(x,y) = 7 - x^2 - y^2$ and above the xy-plane. This problem is from last section now that you know polar double integarls using polar, you can compute this. So for this quiz set up and compute.
2. Compute $\iint_R \frac{1}{\arctan y/x}\, dA$ where R is inside the circle $x^2 + y^2 = 4$ and outside the circle $x^2 + y^2 = 1$ in the third quadrant.
3. Compute $\iint_R \frac{y}{\sqrt{x^2+y^2}}\, dA$ where R is inside the circle $(x-1)^2 + y^2 = 1$ in the first quadrant.
4. Compute $\iint_R e^{-x^2-y^2}\, dA$ where R is the first quadrant.
5. Compute the following line integrals
   (a) $\int_C x - y ds$ where C is the line segment starting at $(1,-1)$ and ending at $(2,2)$.
   (b) $\int_C x - y dx$ where C is the part of the parabola $y = 2x^2$ starting at $(-1,2)$ and ending at $(2,8)$.
   (c) $\int_C x - y ds$ where C is the part of the circle $x^2 + y^2 = 9$ starting at $(0,3)$ traveling counter-clockwise and ending at $(0,-3)$.
   (d) $\int_C \langle x+1, y-2x\rangle \cdot d\mathbf{r}$ where C is given by $\mathbf{r}(t) = \langle 2 - t^2, 3t + 1\rangle$ and $0 \le t \le 4$.
6. Compute the following line integrals. You may need Green's Theorem or maybe Green's Theorem is not possibvle to use.
   (a) $\oint_C \langle e^{x^2} + y^2, e^{y^2} - 2x\rangle \cdot d\mathbf{r}$ where C is the outside of the trinagle traveling counter-clockwise going thrgh the points $(1,2)$, $(1,5)$, $(-1,-1)$ and then returning to $(1,2)$.
   (b) $\oint_C \langle x + y^2, y - 2x\rangle \cdot d\mathbf{r}$ where C is the entire circle $x^2 + y^2 = 2$ starting at $(0,\sqrt{2})$ traveling counter-clockwise.
   (c) $\oint_C \langle \cos(x^2) - y, y - 2x\rangle \cdot d\mathbf{r}$ where C is the part of the parabola $y^2 = x$ starting at $(1,-1)$ and ending at $(1,1)$ and then traveling along the line segment from $(1,1)$ to $(1,-1)$.
   (d) $\int_C \langle 1, x - 2y\rangle \cdot d\mathbf{r}$ where C is the part of the parabola $y^2 = x$ starting at $(1,-1)$ and ending at $(1,1)$.