Name: _____

There are 20 points possible on this quiz. This is a closed book quiz and closed note quiz. Calculators are not allowed. If you have any questions, please raise your hand.

1. (5 points) Evaluate the integral $\iint\limits_{D} \sin(x^2 + y^2)\, dA$ where D is the region between the circles with center at the origin and radii 1 and 3.

2. (4 points) Convert the integral $\int_0^1 \int_0^{\sqrt{1-y^2}} xy^2\, dx\, dy$ to polar coordinates. (You do not need to evaluate the integral.)

3. (3 points) Evaluate $\int_0^{\pi/4} \int_0^{\cos\theta} 3r \, dr \, d\theta$.

4. (4 points) Let D be the lamina enclosed by curves $y = 0$, $y = \cos x$ for $-\pi/2 \le x \le \pi/2$. Assume D has density $\rho(x, y) = y$.

   (a) Set up but do not evaluate the double integral for M_x the moment about the x-axis.

   (b) Assume the mass of the lamina $m = \pi/4$, the moment about the x-axis $M_x = 4/9$, and the moment about the y-axis $M_y = 0$. Find the center of mass.

5. (4 points) Set up but do not evaluate the double integral to find the surface area of the part of the paraboloid $z = 5 - x^2 - y^2$ above the plane $z = 1$.