The third quiz will be about §§16.6-16.7: parametrizing surfaces, computing the area of a parametrized surface, and/or setting up integrals of functions over a parametrized surface. Here are two sample quizzes.

1. Let $S$ be the portion of the surface $y = x^2$ where $0 \leq z \leq x \leq 2$.

   (The multiple inequality sometimes confuses some students. It just means that $0 \leq z$, $z \leq x$, and $x \leq 2$ all hold. Thus both $x$ and $z$ are in the interval $[0, 2]$, and $z \leq x$.)

   (a) Give a parametrization of $S$, including its domain*.

   (b) Compute the surface area of $S$.

2. Let $S$ be the portion of the surface $x^2 + 4y^2 = 36$ between the planes $z = 0$ and $z = 10$.

   (a) Give a parametrization of $S$, using a single parametrization for the entire surface. Be sure to state the domain* of the parametrization.

   (b) Set up but do not evaluate an integral for the moment of inertia of $S$ with respect to the $x$-axis if the mass density is one. Your integral should be entirely in terms of the parameters you used; for instance, if you used $u$ and $v$ as parameters, the integrand and all limits should be in terms of $u$ and $v$ (not $x$, $y$ and $z$).

   If you're OK with the questions above and want a bit more challenge, in problem 2, change the condition $z \leq 10$ and say how your answers will change.

* Giving the domain of a parametrization means stating constraints on the parameters so that you get the entire surface and no more (and don’t go over the same points multiple times, as you would if you didn’t restrict $\theta$ in polar coordinates).