1. Consider the torus, Σ, which is the circle in the xz-plane centered at $x = 5$ and $z = 0$ with radius 3 rotated about the z-axis to form a donut-like shape. Σ has the parametrization $f(t, u) = ((5 + 3\cos t)\cos u, (5 + 3\cos t)\sin u, 3\sin t)$.
   (a) Find the surface area of Σ.
   (b) Set up an integral to find $\int_\Sigma z^2 \, d\sigma$.

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2. Let Σ be the surface defined by the equations $x^2+y^2 = 9$, $0 \le z \le 4$. Evaluate $\int_\Sigma (x+y+z)\, d\sigma$.

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3. Compute $\int_\Sigma z \, d\sigma$ where Σ is the disk $x^2 + y^2 \le 4$ on the plane $z = 3$.

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4. Compute the following surface integrals:
   (a) $\int_\Sigma x^2yz \, d\sigma$, where Σ is the part of the plane $z = 1 + 2x + 3y$ that lies above the rectangle $0 \le x \le 3$, $0 \le y \le 2$.
   (b) $\int_\Sigma yz \, d\sigma$, where Σ is the part of the plane $x + y + z = 1$ that lies in the first octant.
   (c) $\int_\Sigma yz \, d\sigma$, where Σ is the part of th plane $z = y+3$ that lies inside the cylinder $x^2+y^2 = 1$.
   (d) $\int_\Sigma z \, d\sigma$, where Σ is the hemisphere $x^2 + y^2 + z^2 = 4$, $z \ge 0$.

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5. Find the mass of the $x^2 + y^2 + z^2 = 4$, $z \ge 0$ if it has constant density $\rho = a$.