Show work on this sheet in 50 minutes (5 × 20 = 100 points).

Name _____. *SocSecNo.* _____.

1. Evaluate $\int_0^{\pi/2} dx \int_0^1 dy \; x \cdot \sin(xy) =$

2. Evaluate $\int_0^1 dy \int_y^1 dx \;\; \sin(x^2) =$

3. On $4 \leq x^2 + y^2 \leq 9$, evaluate $\int\int_R dA \;\; \cos(x^2 + y^2) =$

4. On $4 \leq x^2 + y^2 + z^2 \leq 9$ in the first quadrant, evaluate $\int\int\int_R dV \ (x^2 + y^2 + z^2)^{100} =$

5. Evaluate $\int\int\int_R dV \ z^3$ over the region bounded by $x^2/a^2 + y^2/b^2 + z^2/c^2 = 1$, using $x/a = u \cdot \cos(v)\sin(w)$, $y/b = u \cdot \sin(v)\sin(w)$, and $z/c = u \cdot \cos(w)$, with

$$\partial(x, y, z)/\partial(u, v, w) = a \cdot b \cdot c \cdot \partial(x/a, y/b, z/c)/\partial(u, v, w)$$

.