

Problems from the book:

*Section 6.2:* 28 (use a linear change of variables).

*Section 6.3:* 4 (assume the region has constant density), 12 (change coordinate systems if the calculation gets too messy).

*Section 6.4:* 5ab, 9, 16.

Additional Problems

**A1.** Find a spherical coordinate equation for the sphere  $x^2 + y^2 + (z - 1)^2 = 1$ .

**A2.** Use an appropriate change of variables to evaluate

$$\iint_R \sin(9x^2 + 4y^2) dA$$

where  $R$  is the region in the first quadrant bounded by the ellipse  $9x^2 + 4y^2 = 1$ .

**A3.** Use the change of variables  $x = u/v$ ,  $y = v$  to integrate

$$\iint_R xy dA$$

where  $R$  is the region in the first quadrant bounded by the lines  $y = x$ ,  $y = 3x$  and the hyperbolas  $xy = 1$ ,  $xy = 3$ .

**A4.** Find the center of mass of the quarter of a ball defined by the spherical coordinate inequalities  $0 \leq \rho \leq 1$  and  $-\pi/4 \leq \theta \leq \pi/4$ , assuming that the density is constant.