1. [EC 12.4.8] Find the mass and center of mass of the lamina occupysing the region D with density ρ where D is bounded by $y = \sqrt{x}$, $y = 0$, and $x = 1$, and $\rho(x, y) = x$.

2. [EC 12.5.4] Evaluate $\int_0^1 \int_x^{2x} \int_0^y 2xyz \, dz \, dy \, dx$.

3. [EC 12.5.12] Evaluate $\iiint_E xz \, dV$ where E is the solid tetrahedron with vertices $(0, 0, 0)$, $(0, 1, 0)$, $(1, 1, 0)$, and $(0, 1, 1)$.

4. [EC 12.6.4(a)] Change from rectangular to cylindrical coordinates: $(3, 3, -2)$.

5. [EC 12.6.18] Evaluate $\iiint_E (x^3 + xy^2) \, dV$, where E is the solid in the first octant (x, y, z are all positive) that lies beneath the paraboloid $z = 1 - x^2 - y^2$.

6. [EC 12.6.28] Evaluate by changing to cylindrical coordinates:

$$\int_{-3}^{3} \int_{0}^{\sqrt{9-x^2}} \int_{0}^{9-x^2-y^2} \sqrt{x^2 + y^2} \, dz \, dy \, dx$$

7. [EC 12.7.2a] Change $(5, \pi, \pi/2)$ from spherical coordinates to rectangular coordinates.

8. [EC 12.7.4a] Change $(0, \sqrt{3}, 1)$ from rectangular coordinates to spherical coordinates.

9. [EC 12.7.10] Write the equation in spherical coordinates,

   (a) $x^2 + y^2 + z^2 = 2$

   (b) $z = x^2 - y^2$

10. [EC 12.7.22] Evaluate $\iiint_H (x^2 + y^2) \, dV$, where H is the hemispherical region that lies above the xy-plane and below the sphere $x^2 + y^2 + z^2 = 1$.

11. [EC 12.7.26] Find the volume of the solid that lies within the sphere $x^2 + y^2 + z^2 = 4$, above the xy-plane, and below the cone $z = \sqrt{x^2 + y^2}$.