

Name: \_\_\_\_\_

Kroy

## Math 251 Section 2 Quiz #9

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1. Evaluate  $\iiint_E 2x \, dV$ , where

$$E = \{(x, y, z) \mid 0 \leq y \leq 2, 0 \leq x \leq \sqrt{4-y^2}, 0 \leq z \leq y\}.$$

$$\begin{aligned} & \int_0^2 \int_0^{\sqrt{4-y^2}} \int_0^y 2x \, dz \, dx \, dy \\ &= \int_0^2 \int_0^{\sqrt{4-y^2}} 2xz \Big|_0^y \, dx \, dy = \int_0^2 \int_0^{\sqrt{4-y^2}} 2xy \, dx \, dy \\ &= \int_0^2 x^2 y \Big|_0^{\sqrt{4-y^2}} \, dy = \int_0^2 y(4-y^2) \, dy \\ &= 2y^2 - \frac{y^4}{4} \Big|_0^2 = 8 - 4 = \boxed{4} \end{aligned}$$

2. Sketch the solid whose volume is given by  $\int_0^1 \int_0^{1-x} \int_0^{2-2z} dy \, dz \, dx$ .