

High score: 20; (nonzero) Low score: 17; Average score: 19.72

Problem 1 (20 Points). Evaluate

$$\int_0^2 \int_0^3 \int_0^z (2x - y) \, dx \, dy \, dz$$

Solution.

$$\begin{aligned} & \int_0^2 \int_0^3 (x^2 - xy) \Big|_{x=0}^{x=z} \, dy \, dz \\ & \int_0^2 \int_0^3 (z^2 - yz) \, dy \, dz \\ & \int_0^2 \left(yz^2 - \frac{1}{2}y^2z \right) \Big|_{y=0}^{y=3} \, dz \\ & \int_0^2 \left(3z^2 - \frac{9}{2}z \right) \, dz \\ & \left(z^3 - \frac{9}{4}z^2 \right) \Big|_0^2 \\ & = 8 - 9 - 0 + 0 = \boxed{-1} \end{aligned}$$