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A fishing net S is in the shape of a triangular trough, as shown in the picture. The triangular sides are at $x = 0$ and $x = 5$, the rectangular sides are at 45° to the vertical, and the bottom is at $z = 0$; all lengths are measured in cm. There is no netting across the top, which is at $z = 1$. Water is draining out of the net; the motion of the water is described by the vector field $\vec{F} = \rho \left(a e^{\kappa z^2} \hat{y} - b \hat{z} \right)$ where $a = 3 \frac{\text{cm}}{\text{s}}$, $b = 5 \frac{\text{cm}}{\text{s}}$, $\kappa = 2 \text{ cm}^{-2}$, and ρ is the (constant) density of the water in $\frac{\text{g}}{\text{cm}^3}$. The goal of this problem is to find the best way to evaluate the flux

$$\iint \vec{F} \cdot d\vec{S}$$

of water *down* through S .

- Set up the above surface integral, **but do not evaluate it**
Your answer should be ready to integrate; among other things, all substitutions should be made, and you should determine the correct limits.
- Use the **Divergence Theorem** to find another way to do the problem.
This time, complete the computation.