1. Evaluate $\iiint_{\mathcal{B}} f(x, y, z)\, dV$ for the specified function f and box $\mathcal{B}$.

   (a) $f(x, y, z) = xe^{y-2z}; 0 \leq x \leq 2, 0 \leq y \leq 1, 0 \leq z \leq 1$

   (b) $f(x, y, z) = (x - y)(y - z); [0, 1] \times [0, 3] \times [0, 3]$

   (c) $f(x, y, z) = \frac{z}{x}; 1 \leq x \leq 3, 0 \leq y \leq 2, 0 \leq z \leq 4$

   (d) $f(x, y, z) = (x + z)^3; [0, a] \times [0, b] \times [0, c]$

   Solution

   (a) $\displaystyle\iiint_{\mathcal{B}} f(x, y, z)\, dV = \int_0^2 \int_0^1 \int_0^1 xe^{y-2z}\, dz\, dy\, dx$

   $\displaystyle = \int_0^2 \int_0^1 \left[-\frac{1}{2}xe^{y-2z} \right]_0^1 dy\, dx$

   $\displaystyle = \int_0^2 \int_0^1 -\frac{1}{2}xe^{y-2} - \frac{1}{2}xe^y\, dy\, dx$

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