24 11-20-2025

24.1 Section 6.6, Checkpoint 6.55

Calculate surface integral $\iint_S (x-y)\, dS$, where S is a cylinder $x^2+y^2=1$, $0 \le z \le 2$, including the circular top and bottom.

24.2 Section 6.6, Checkpoint 6.56

A piece of metal has a shape that is modeled by paraboloid $x = x^2+y^2, 0 \le z \le 4$, and the density of the metal is given by $\rho(x,y,z) = z+1$ Find the mass of the piece of metal.

24.3 Section 6.6, Checkpoint 6.58

Calculate surface integral $\iint_S \mathbf{F} \cdot d\mathbf{S}$, where $\mathbf{F} = \langle 0, -z, y\rangle$ and S is the portion of the unit sphere in the first octant with outward orientation.