Exercise 1. Find the flux of $\nabla \times F$ through the half ellipsoid

$$E = \{4x^2 + 9y^2 + 36z^2 = 36,\ z \geqslant 0\}$$

where our vector field F is

$$F(x,y,z) = (y, x^2, z^{2024} - xyze^{xyz}).$$

[Hint: Apply Stokes and be frightened not.]

Exercise 2. Compute the flux of the field

$$F(x,y,z)=(e^{x^2},-3y,5-z^9)$$

through the lower five faces of the cube in 3-space between corners (0,0,0) and (1,1,1). [Hint: Apply Gauss's theorem creatively.]