1.   Reverse the order of integration in the double integral $\int_0^2 \int_0^{4-x^2} \sin(x^2 + y^2)\, dy\, dx$. (Do *not* evaluate the integral.)

2. Find the volume of the solid under the surface $z = e^{y^2}$ and above the triangle with vertices $(0,0)$, $(0,1)$, and $(1,1)$.